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The
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THE PARIS UNIVERSAL EXHIBITION.

Notwithstanding the diplomatic difficulties that for a time threatened to cast a shadow over the celebration by republican France of its first centenary, the *grande nation* has once more proved equal to the occasion. Ninety-six years ago, when the allied rulers of other European countries threatened France, she "hurled at their feet, as gage of battle, the head of a king." To-day, when the memory of that past has raised against her a light cloud, "small as a man's hand," on the political horizon, she replies with a temple of peace that equals in glory, if it does not eclipse all its predecessors. This may seem exaggeration to those who remember the fine series of exhibitions that have been held in our own metropolis, to say nothing of those that have appeared in the provinces and in other continental cities, but in Paris there has been a conjunction of favourable conditions beyond any perhaps that have obtained elsewhere. The spacious area devoted to the exhibition, with its noble approach from the Trocadero, has lent itself to the innate genius of the French for producing spectacular effect, which has had full play in the colossal Eiffel tower, majestic as a giant, and apparently about as useful, and in the picturesque accessories of the colonial courts. Everything has not, however, been sacrificed to show; there is food for the mind as well as gratification for the eye, though the weak point in this, as in all similar exhibitions, is that, as a rule, the objects most entitled to admiration are those which appeal least effectively to the general public and are appreciated only by the initiated few in the respective departments.

Although it would be out of place to enter here into any detailed description of the arrangement of the exhibition buildings and their contents, a few lines of general explanation may be useful in giving some idea of the extent of the ground covered and the pedestrian work that lies before any enthusiast who hopes to make himself acquainted with all the exhibits in even a single group. In 1878 the exhibits were brought together in buildings arranged with some degree of compactness, though separated by the river and a considerable length of promenade from the principal entrance; but in 1889 there has been added another group of buildings, much nearer the city, and connected by a double band of courts and houses extending along the river front upwards of half a mile. In fact it is estimated that in order to visit all the courts it is necessary to cover a distance of from ten to twelve miles.

Undoubtedly the best and most imposing general view of the exhibition is obtained from the Trocadero palace, from which elevation the spectator's eye can follow the straight lines of a broad promenade, taking in glimpses of subsidiary buildings on either side, until it lights upon the glittering dome of the principal "palace" lying in the distance beyond and dwarfed by the Eiffel tower. This portion of the exhibition occupies the old military parade ground known as the "Champ de Mars," and may be described as an oblong parallelogram, one of the short sides of which is formed by the river Seine and the other by the École Militaire, whilst the long sides are constituted by the Avenue de la Bourdonnais and the Avenue de Suffren. Passing from the Trocadero entrance along a walk running through the palace grounds the Seine is reached and crossed by the Pont d'Jéna, without leaving the enclosure. A little further on stands the Eiffel tower, and the broad promenade, carried between the wide span of its foundation arch, is then continued past two fine groups of fountains and two buildings belonging to the city of Paris to the entrance of the principal "palace." But before reaching that edifice two other handsome domed buildings will have been left behind, one devoted to education on the right and the other to the fine arts on the left. In a line with the fine arts building and reaching from it to the principal "palace" are the courts devoted to Great Britain and her colonies, Belgium, Holland and Denmark; whilst in a corresponding position in the opposite wing are the courts of Italy, Switzerland, United States, Spain, Portugal, Roumania, Servia, Greece, Norway and Japan. Outside these latter in a long continuous line are courts occupied by Uruguay, St. Dominique, Paraguay, Guatemala, Hayti, India, Morocco, Egypt and Persia.

The entrance to the principal building is surmounted by a handsome dome, the proportions of which are sadly dominated by the enormity of the Eiffel tower, so that it is difficult to realize that this dome exceeds in height the towers of Notre Dame and that inside it is lofty enough, within twenty feet, to allow the London "Monument" to stand upright in it. The building is constructed mainly of iron, glass and terra cotta, and the effect of the colouring and decorations is very fine, the prevailing tints being brown and gold, with the principal girder lines picked out in a pale blue-green side by side with a band of vermillion. The principal nave is nearly one hundred feet broad and running from it transversely are seven galleries or courts on each side. These are devoted almost exclusively to French exhibits, only Russia occupying a portion of a court on one side and Austro-Hungary about as much on the other. At the end of the nave is another smaller dome, which serves as a vestibule to the enormous machinery hall that constitutes the rear of the exhibition in this direction.

Returning now and standing with the back to the river, there may be seen on the right of the Eiffel tower an irregular group of buildings erected for the exhibits from Brazil, Argentine Republic, Venezuela, Bolivia, Chili, Mexico, as well as the Suez and Panama Courts. Turning to the left a broad avenue follows the Quai d'Orsai, running nearly parallel with the river, and opening with a very interesting series of buildings illustrative of human dwelling-places from the earliest times. After passing these there are, right and left of this avenue, about a dozen buildings devoted principally to agricultural and food exhibits of different kinds, including an English dairy and bakery. The avenue is continued past the Pont d'Alma and the Pont des Invalides, and when it has reached to within a few hundred yards of the Pont de la Concorde it opens upon another but smaller oblong parallelogram, one of the short sides of which is also formed by the river. In consequence, however, of the bend of the river between this spot and the Pont d'Jéna the long sides are inclined at an angle of about forty-five degrees towards the long sides of the larger plot, but nevertheless they do not connect by a considerable distance. In this portion of the exhibition, which is known as the Esplanade des Invalides, are situated, besides a number of departmental displays, the separate buildings of such French colonies as Algeria, Tonquin and Cochin China, as well as an edifice devoted to joint colonial exhibits.

As raw material, at least, may be found in almost any of the buildings on this vast area, and especially in the scattered exhibits from the French colonies, it will be evident from what has been said, if it be intelligible without a map, that shortcomings and omission in a notice of this kind will not be without some excuse. But in addition it must be stated that even in June some of these houses were not yet open, as, for instance, those belonging to Brazil and Cochin China, and that throughout the exhibition there were numbers of unfinished cases and unlabelled specimens, concerning which no information could be obtained from the unusually bald catalogue.

The classification of the exhibits is very similar to that followed in 1878, the primary division being into the following nine groups: (1) Works of Art; (2) Education and Instruction, Apparatus and Processes of the Liberal Arts; (3) Furniture and Accessories; (4) Textile Fabrics, Clothing and Accessories; (5) Mining Industries, Raw and Manufactured Products; (6) Apparatus and Processes used in the Mechanical Industries; (7) Alimentary Products; (8) Agriculture and Pisciculture; and (9) Horticulture. These nine groups are subdivided into seventy-three classes. Of course it is only in comparatively few of these classes that much material is found of special interest to pharmacists; nevertheless, the searcher frequently lights upon such substances in very unexpected association. The most characteristic class is the forty-fifth, occurring in the fifth group, devoted to "Mining Industries, Raw and Manufactured Products," a title not particularly suggestive of "Chemical and Pharmaceutical Products." A somewhat elastic application is also made of this latter title, for it is made to cover acids, alkalies, salts of all kinds; sea-salt and products of inland water industry; various chemical products; wax and fatty substances; soaps and candles; resins, tar, and the products derived from them; essences and varnishes; glue and gelatine; printing inks, coating substances, and blacking; primary pharmaceutical materials; simple and compound medicaments; products of the india-rubber and gutta percha industries; dyes and colours; products from the treatment of minerals for use as lighting materials, and refined petroleum. Another class with a title suggestive of good material is the fifty-first, which is called "Plant used in Chemistry, Pharmacy and Tanning." But the promise is not borne out by experience, for a visit to the machine hall, where the class is located, reveals very little that relates to chemistry or pharmacy. Better results are to be obtained in the forty-second and forty-third classes, which include products of the cultivation of forests and forest industries and spontaneous products, and in the groups devoted to alimentary and agricultural products. Not inappropriately, considering the nature of the present display, although it is very good of its kind, perfumery is again included, as in 1878, in the group devoted to "Furniture and Accessories."

In respect to the first-mentioned branches of science and industry, which are of special interest to the readers of this Journal, it may be said at once that there is little shown that can be described as sensational or novel. The exhibits are good,—more, many of them are of great beauty and interest,—but it can hardly be claimed that any very important advance in chemistry or pharmacy is here represented for the first time. Perhaps the most obvious impression that is borne in upon the mind of the observer is that the practitioner of old-fashioned galenical pharmacy is in France, as in other countries, fast being superseded by the chemical manufacturer on the one hand and the medical confectioner on the other. In fact, it may be remarked, in passing, that an English pharmacist visiting Paris soon finds himself in presence of indications that his French brethren have troubles not unlike his own, for he need not travel far to find exhibited in the window or on the door-post of a pharmacy the French equivalents of "store prices" and "rational charges."

The total number of exhibits included in Class 45 as "Chemical and Pharmaceutical Products," not reckoning those from Brazil, which are to be enumerated in a special catalogue, is 965, of which 437 are contributed by France, 72 by French colonies, 44 by Great Britain, and 412 by other countries. As has been stated, however, the title of the class is made to cover a wide diversity of products. Speaking in general terms, the actual chemistry and pharmacy of the Paris Exhibition is the chemistry and pharmacy of France, and is all to be found in one of the courts on the left side of the nave of the principal building. It is true that there are chemical and pharmaceutical exhibits in the courts of other countries, but these are comparatively few and not often of much importance. When it said that in the British court pharmacy is practically limited to the exhibits of Bishop and Co., Burroughs, Wellcome and Co., Christy and Co., and Oppenheimer Brothers and Co., and chemistry to the cases of Brunner, Mond and Co., Chance Brothers, and Stevenson, Carlile and Co., and one or two others, it will be understood how little is likely to be found elsewhere.

Turning then first to the French court it will be as well to commence by referring to some of the cases that specially illustrate different phases of pharmacy, and these will form the subject of the next paper.

(*To be continued.*)

NOTE ON THE DILUTION OF COW'S MILK IN INFANT FEEDING.

BY GEO. SMITH, F.C.S.

The following may be of interest as having a bearing on Dr. Rotch's article on this subject published in the *Pharm. Journ.* for March 2, page 706. The writer in September, 1886, had occasion to consider this question in his daughter's case, owing to the mother's deficiency in milk. The food used as a substitute on that occasion has proved so successful in more than one case that it merits recording.

The formula is mainly based on a process devised by Professor Frankland in rearing one of his own children (*vide* 'Experimental Researches,' pp. 843, 844).

In his paper (published December, 1854) Prof. Frankland gives the percentage amounts of the different constituents of human, ass's, and cow's milk as follows :—

	Woman.	Ass.	Cow.
Casein	2·7	1·7	4·2
Butter	3·5	1·3	3·8
Milk-sugar	5·0	4·5	3·8
Salts	·2	·5	·7.

These figures for human and cow's milk differ in several respects from the averages deduced from a wider range of analyses which are quoted by Mr. Thos. Maben in a paper published in the *Pharm. Journ.* for March 23 (pp. 768–769), the most notable differences being those of sugar and fat; but on referring to the *minimum* and *maximum* figures found by Professor Leeds,* from analyses of 80 samples of human milk from different sources, it will be seen that those given by Prof. Frankland provide him with a basis for a formula which produces a fair imitation of human milk from that of the cow.

In this formula Professor Frankland takes no account of the differences in *coagulable* and *non-coagulable* albumenoids existing in each of the respective milks. His process practically consists in a precipitation (by means of rennet) of one-third of the casein from fresh cow's milk, and the addition of one-third more milk-sugar, but this was found by the writer somewhat tedious except to a specially trained person. The process of dilution with water was adopted because it was simpler and would enable the food to be prepared in a few minutes whenever it was required.

Taking Professor Frankland's figures for the average of fresh cow's milk, as quoted, it will be seen that when it is diluted with water in the proportion of 3 parts of the former to 2 parts of the latter the average amount of constituents is modified as follows :

Fresh cow's milk 3 parts, water 2 parts—

Casein	2·52 per cent.
Fat	2·28 „
Sugar	2·28 „
Ash	·42 „

From these figures the writer compiled the following formula.

The albumenoids, fat, and milk-sugar are by calculation made to approximate as nearly as possible to the average of these constituents in human milk.

Finely gound oatmeal ¼	gradually increasing to ½ oz.
Fresh butter	1 drachm.
Milk-sugar	2 drachms.
Fresh cow's milk	6 fluid ounces.
Pure water	4 fluid ounces.
Salt	5 grains, or a sufficiency.

Mix gradually the water with the oatmeal, milk-sugar, and salt, so that no lumps are formed in the mixture, then add the milk and butter, and heat to the boiling point in a clean, enamelled saucepan. The product should be made up to the measure of half a pint, if necessary, and given lukewarm with a spoon when required.

The oatmeal was introduced as a useful attenuant, and it has been found to act as a laxative, and also as a direct fat and heat-producer in the process of digestion. The process of feeding with a spoon is at first troublesome, but it is to be preferred to the use of a feeding bottle, as, if care be taken to have all the vessels employed scrupulously clean, the infant will enjoy an immunity from thrush (*Oidium albicans*), diarrhœa, and other diseases that follow in their train.

THE COMPOSITION OF TRAGACANTH.

BY JOHN OGLE, M.P.S.

An article headed "The Soluble Gum of Tragacanth," by Professor J. M. Maisch, reprinted in the Journal of March 23 from the *American Pharmaceutical Journal*, suggested that some uncertainty exists as to the composition of this drug. The statements made in the various works on materia medica referred to in that article are so conflicting that it was felt that another investigation would not be out of place. Accordingly an examination was carried out with the object of determining the amount of moisture and soluble gum present; to what extent the soluble portion resembles gum acacia; and the percentage of ash yielded.

A sample of fine Syrian tragacanth, answering to the "characters" of the Pharmacopœia, was obtained through the courtesy of Mr. C. Umney. Of this, 5 grams, maintained at a temperature of 100° C. for twenty-four hours, left a residue weighing 4·054 grams, the loss of ·946 gram being equivalent to 18·92 per cent. of moisture.

The dried gum was powdered: to 3 grams of the powder 250 c.c. of distilled water were added, and the mixture was heated to 80° C. for six hours, in order to effect disintegration. To the resulting semi-fluid mass, which was too viscid to allow of filtration, distilled water was added so as to increase the volume to a litre. After standing for two hours the fluid was thrown upon a wet filter, when a bright, colourless solution, neutral to test paper, was slowly obtained. 100 c.c. of this liquid, representing the soluble constituents of ·3 gram of the dried sample, yielded on evaporation a transparent residue which weighed ·133 gram, equal to 44·33 per cent. of soluble gum calculated for the dried, or 35·94 per cent. for the natural tragacanth. This residue having been ignited left an ash, which, on examination, was found to consist chiefly of calcium and potassium phosphates.

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* *Pharm. Journ.*, [3], xv., p. 580.

The filtrate answered to the tests given under gum acacia in the Pharmacopœia, the precipitate resulting from the addition of rectified spirit rising to the surface as a transparent gelatinous mass; subacetate of lead produced a white opaque jelly. On the other hand, it differed from arabin in giving a clear solution with borax, and in the absence of precipitates when treated with sodium stannate and sodium silicate; also, by the production of a white precipitate in the presence of neutral lead acetate. After boiling with hydrochloric acid it readily reduced Fehling's solution. Both the soluble and insoluble portions yielded mucic acid when heated with strong nitric acid. The water-insoluble gum readily dissolved in potassium hydrate, whereas lime water appeared to have little or no solvent action.

Two grams of the tragacanth left on ignition ·055 gram of ash, equal to 2·75 per cent., which was partly soluble in water, the dissolved material consisting mainly of the phosphates of sodium and potassium, the insoluble portion containing calcium carbonate, with traces of magnesium salts.

These then are the tabulated percentage results obtained:—

Moisture	18·92
Soluble gum	35·94
Ash	2·75
Insoluble gum (by difference) . . .	42·39
	100·00

No evidence of the presence of starch could be obtained, the iodine test producing no coloration, nor could the official statement that "after maceration in cold water the fluid portion is not precipitated by the addition of rectified spirit" be verified. In fact, as stated above, alcohol at once gave an evident precipitate.

IODINE ABSORPTION AS A TEST FOR THE PURITY OF ESSENTIAL OILS.*

BY H. W. SNOW.

In a hitherto unpublished paper presented to the faculty of the school of pharmacy of the University of Michigan, as a thesis (1884), the writer reported some experiments on the reaction which takes place between iodine, alcoholic solutions of mercuric chloride and turpentine, by which the iodine is decolorized and partly, at least, taken up by the mercury to form iodide of mercury. At that time it was only the nature of the mercury salt which was under investigation. Some few weeks ago while engaged in the examination of a number of samples of oil of peppermint, the earlier work occurred to my mind, and the thought suggested itself that the free manner in which turpentine absorbed the halogens under these conditions might be made the means of determining its presence in other essential oils. The use of iodine absorption as a means of detecting adulteration is not new, inasmuch as Hubl has employed it† for the detection of adulteration in fixed oils, and his process, which the writer used, has been favourably reported on by a number of chemists. The writer had performed a number of experiments in this direction when the work of A. B. Stevens* came to hand, in which that investigator points out that oil of peppermint absorbs iodine quite freely. Mr. Stevens's experiments were performed under somewhat different conditions from my own, and yielded substantially the following results. (1) On adding known volumes of oil of peppermint to known volumes of decinormal solution of iodine made with potassium iodide and with a mixture of alcohol and water for a menstruum that the iodine is decolorized. (2) That on determining the excess of iodide of thiosulphate solution, it was found that the reaction proceeded up to nearly ten minutes, beyond which time no further increase in the iodine taken up occurred. (3) That the presence of alcohol prevented in some measure the absorption of iodine, and that the amount of iodine decolorized increased as the alcohol decreased. (4) That on adding known volumes of oil of peppermint to known volumes of decinormal solution of iodine in *aqueous* potassium iodide and shaking continuously for ten minutes, and then estimating the excess of iodine with thiosulphate solution, that 1 c.c. of oil decolorized 30 c.c. of N—10 solution of iodine. (5) That when these figures are calculated into parts by weight 100 parts of oil absorb about 42 parts of iodine. In my own experiments I followed Hubl's process without modification, as I had already noticed in my earlier experiments that mercuric chloride facilitated the absorption of the halogens. The process is as follows:—

Introduce into a tared flask having a capacity of about 60 c.c., 0·100 to 0·250 grams of the oil to be tested and obtain the exact weight taken. Dissolve in 10 c.c. of chloroform and add from 10 to 40 c.c. solution of iodine and mercuric chloride prepared as directed below, noting the exact amount introduced. The amount of iodine solution added must be such that after standing an hour or so the solution will have a distinct iodine colour as the iodine must always be in quite decided excess. If the first portions are decolorized more may be added. After the solution has stood from forty to forty-eight hours add 5 to 10 c.c. of strong solution of potassium iodide and about 125 to 150 c.c. of water, titrate at once with decinormal solution of sodium thiosulphate, adding towards the last freshly-prepared starch solution as an indicator.

	Time of digestion.					
	3 hours.	6 hours.	15 hours.	24 hours.	40 hours.	48 hours.
Oil peppermint . .	21·1	22·8	24·5	—		
" " . .	—	—	—	—	179	179
" " . .	—	—	—	—	110	110
" " . .	—	—	—	—	120	126 !
" bergamot . . .	—	—	300	—	—	345
" orange peel, bitter	—	—	321	—	—	362
" turpentine . .	291	333	245	353	—	397

Calculate results to the basis of the amount of iodine absorbed by 100 parts of oil. The solution of iodine is made by dissolving 25 grams of iodine in 500 c.c. of alcohol and 30 grams of mercuric chloride in an equal amount of the same solvent. Mix the two solutions and after twelve hours filter. Inasmuch as the strength of this solution is subject to considerable alteration in strength on standing, it should always be determined at the same time the titrations are made of that added to the chloroform solution of the oil. It is essential that after diluting the solution with water it should be titrated at once, as the compounds formed are extremely unstable as a rule, and on standing, iodine soon begins to be liberated, so that the solution again acquires purplish to blue tint. Some comparative experiments running from three to forty-eight hours show that about forty hours must elapse before the absorption of iodine is complete, and sometimes then it does not seem to be so.

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* From *The New Idea*, March.

† Allen's 'Com. Organic Analysis,' 1886. Vol. ii., p. 48, from *Journ. Chem. Soc.*, iii., p. 641.

* 'Proc. Amer. Phar. Assoc.,' 1888, 97, *Amer. Drug.*, Oct., 1888, 192, and other English reprints.

The following figures show the results and relate to the number of parts of iodine which 100 parts of the oil will absorb in the time specified :—

	Time of digestion.		
	6 hours.	15 hours.	40 hours.
Oil peppermint*	23·	24½	—
„ „ (adulterated)	84·7!	74·1!	—
„ „ „	88·3!	73·6!	—
„ „	—	—	179
„ „	—	—	109
„ „	—	—	67
„ „	—	—	71
„ „	—	—	106
„ „	—	—	105
„ „ Japanese . .	—	—	64
Menthol	none.	—	—
Oil bergamot	—	—	345
„ limes.	—	—	289
„ lemon	—	—	343
„ orange (bitter)	—	—	362
Methyl salicylate (synthetic	—	—	—
oil wintergreen)	—	8¾	—
Oil sweet birch (sold as oil	—	—	—
wintergreen)	—	3¼	—
Oil wintergreen (true) . . .	—	1	—
„ anise.	—	—	121
„ coriander	—	—	385
„ caraway.	—	—	233
„ thyme	—	210!	183!
Thymol	—	201!	181!
Oil lavender	—	—	286
„ cloves	—	—	467
„ sassafras	—	—	166
„ pennyroyal.	—	—	152
„ camphor	—	—	129
Camphor.	—	2¼	—
Oil turpentine (fresh distilled)	—	—	397
„ erigeron	—	—	280
„ copaiba.	—	—	250

The writer's experiments thus far indicate that the iodine absorption of essential oils may yield figures having a considerable value in the determination of the purity of oils, but it is of course not likely that these figures are constants, except perhaps in a few instances, any more than the specific rotatory power, specific gravity, etc., are constant. There are also some anomalies which need clearing up, and it is necessary that maximum, minimum and average equivalents should be determined by making estimates with a number of samples of the same oil and of unquestionable purity. The only direct application which the writer has yet made of it is in the detection of turpentine in oil of peppermint with a partial application to the detection of oil of copaiba, accounts of which are given elsewhere (see *Pharmaceutical Journal*, June 29, p. 1056).

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* An unusually fine article purchased four or five years ago.

BISMUTHYL IODIDE.

*Comparative Value of Methods Proposed Heretofore, with an Improved Method for its Preparation.**

BY CHARLES E. GREEN.

Bismuthyl iodide was introduced into hospital practice in New York by Dr. A. Sidney Reynolds about ten or twelve years ago under the name of "Bismuth-subiodide or oxyiodide." It was used for the local treatment of chronic ulcers, syphilitic sores, eruptions, etc. It was said to be more efficient than iodoform, with none of the saffron-like and almost intolerable odour so characteristic of the latter. Dr. Reynolds also claims that it will "control inflammation, allay irritation, suppress suppuration, promote granulation, and induce cicatrisation;" and that it is "almost a specific in gonorrhœa and general mucous inflammations," etc. Internally it is strongly recommended in gastric ulcers, gastritis, and typhoid fever.

The objects had in view in the prosecution of the work as presented by this paper were, first, to ascertain the amount of true BiOI in the commercial article sold by the name "Subiodide of Bismuth;" secondly, to test the various methods proposed for the manufacture of the compound, and also to ascertain the percentage found in the products obtained by these methods; and thirdly, to devise, if possible, a new method for its preparation that would yield a better result than any as yet known to myself.

The information which I was able to obtain, both as to the effect and as to a satisfactory mode of preparing bismuthyl iodide, was not only very meagre, but very unsatisfactory indeed. Although considerable has been written on the mode of preparation, yet, after a great number of experiments, no one seems to have obtained a thoroughly satisfactory result. None of the products obtained were of sufficient purity, and none of the methods employed were without some serious objection, yet these investigations were made by some of the best pharmacists in our land. How far I may have been successful in my efforts in this direction I leave for others to judge. At the time of Dr. Reynolds's experiments the high cost of the compound prevented its general adoption; therefore the main point for consideration was a process by which a chemically pure compound could be obtained at a price sufficiently reasonable to bring it into general use.

The first commercial sample which I examined was of a very dark brown, almost chocolate colour, with nothing of the characteristic brick red colour which it should have, indicating the presence of a considerable quantity of iodine in other form of combination than BiOI, most probably as BiI_3. When boiled with an excess of water it assumed a much lighter colour, finally a bright brick red, owing to more perfect oxidation, one atom of oxygen from the hot water replacing two of iodine forming a molecule of BiOI. When heated to 100° C. no apparent change took place, only a slight odour of iodine becoming perceptible. As the heat was slowly raised to cause partial decomposition, and as the iodine was slowly liberated, the compound gradually assumed the brick red colour. By analysis I found that it contained 48·36 per cent. of iodine, or about 12 per cent. more than a pure article should contain, and we may justly draw the conclusion that this is a very indefinite and, therefore, unsatisfactory compound.

The next sample examined was, like the first, of American manufacture. It was dark red in colour, dense and heavy, and exhibited a few lumps of a lighter colour. It contained 91·83 per cent. BiOI, with a small amount as $BiONO_3{\cdot}H_2O$. One other sample was examined, but it did not differ from the one just spoken of, except that it had been more carefully powdered and contained 92·61 per cent. BiOI, and small proportion of $BiONO_3{\cdot}H_2O$.

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* From the *American Journal of Pharmacy*, April.

Of the various processes set forth in journals and books of reference, I have tried several with varied success. The first tried was the so-called method of "precipitation," proposed by Jos. W. England, in the *American Journal of Pharmacy*, Jan., 1887, pp. 9-15 The product by this process was of a fairly good colour, but slightly darker than some other specimens, cakey, and very difficult to pulverise finely. The chief disadvantages of this method are, that the water being hot and the acid solution not being sufficiently diluted, a very appreciable quantity of iodine was liberated as vapour, giving the supernatant liquor a distinctly violet colour, and readily recognizable both by the odour and by the starch test. By analysis I found the compound made by this process to contain 97·65 per cent. of BiOI.

The next method was devised by R. Rother (*Amer. Jour. Phar.*, Aug., 1887, pp. 390-391). Theoretically this is certainly a good method. It yields a product of a dark red colour, heavy, dense, and rather hard to pulverize finely. It contains 95·3 per cent. BiOI, with 3 or 4 per cent. $BiONO_3 \cdot H_2O$; but, to say the least, the process is rather tedious and the resulting compound not so satisfactory as desired.

The next method tried was that of precipitation with hydriodic acid and freshly prepared bismuth hydroxide, as proposed by Frank X. Moerk (*Amer. Jour. Phar.*, June, 1887, pp. 273-274). The author states, "the oxyiodide so obtained is of very fair colour, and contains no water of crystallization." In this product, as in all others which I examined, I found no water of crystallization. That which I obtained was very tough, almost unpulverizable, heavy and cakey. So far as chemical composition is concerned it was as good as the average samples found upon the market, containing 92·9 per cent. BiOI, with some $BiONO_3 \cdot H_2O$, as in the others. But the process not only occupies too much time, but requires a great deal more skill and care than is necessary to produce a very much better article.

The next process tried was devised by the same author as the preceding one, and consists in boiling certain quantities of $BiONO_3 \cdot H_2O$ and KI together without the presence of an acid; and, as the preceding one was remarkable for being complicated, so this one is justly celebrated for being extremely simple. In devising these manipulations the author has surely touched both extremes. "The (supposed) *advantages* of this method are, first, the avoidance of *free acid*; second, its definite composition; third, a higher percentage of BiOI." The first advantage (?) I readily admit; there certainly is no *free acid* present. Yet this could be considered a good method provided the two latter advantages claimed were true for the resulting compound. The samples made by myself, after boiling for more than an hour, were found to contain only 27·6 per cent. iodine, making the resulting compound represent 76·66 per cent. BiOI, with a large amount of $BiONO_3 \cdot H_2O$, showing conclusively that large quantities of KI remained undecomposed and were lost in the washings, and that there is nothing "definite" in its composition. The washings, when tested with a solution of $AgNO_3$, gave a copious white, curdy precipitate of AgI.

Several samples were made by various other methods, as by "trituration," etc., but none of these were satisfactory, having various percentages of BiOI, from 88 to 95 per cent., with "*uncertain*" quantities of $BiONO_3 \cdot H_2O$, differing in no special way from those already spoken of.

Of all the methods so far considered I had found no one that was entirely satisfactory. The method of "precipitation" seemed to be in all respects better than any of the others, yet it was far from being perfect. In experimenting upon this process I found that it should be modified as follows: Dissolve 409 grs. $BiONO_3 \cdot H_2O$ in 1 fluid ounce HNO_3 with the aid of heat, as is stated in Mr. England's formula; then carefully dilute this solution with water as long as $BiONO_3$ is not reprecipitated, or, at least, until it has assumed a slight permanent opalescence. Add to this 221 grs. of KI, dissolved in about 16 fluid ozs. of *cold* water, in a large flask or some suitable vessel, agitate thoroughly, and *then* apply heat, *but not to the boiling point* (about 80°-85° C.). The mixture at first assumes a black colour, growing gradually brownish, becoming still lighter as it is agitated, and under the influence of *moderate* heat and violent agitation it is finally changed from a light brown to a brilliant red. The agitation is continued for a few moments longer that the reaction may be completed. The precipitate is washed by decantation, drained upon a plain filter and dried at 100° C. The yield should be about 470 grs. The whole operation is completed in a very short while. No iodine is liberated, and hence the product contains a larger and proper percentage of it, and represents a pure article of BiOI.

Bismuthyl iodide so obtained is of a very bright red colour, almost vermilion, and has the additional advantage of being in very fine powder, light and bulky, admirably adapted for use as a dusting powder or dressing, an advantage possessed by none of the other specimens. By analysis I found it to contain 35·8 per cent. of iodine, making 99·44 per cent. BiOI, with only ·35 per cent. $BiONO_3,H_2O$.

The reaction taking place in the above is most likely as follows:—

(1) $BiONO_3 \cdot H_2O + 2HNO_3 = Bi\,3NO_3 + 2H_2O$.
(2) $3(Bi\,3NO_3) + 3KI = BiI_3 + 2(Bi\,3NO_3) + 3KNO_3$.
(3) $BiI_3 + 2(Bi\,3NO_3) + 3H_2O = 3BiOI + 6HNO_3$.

The mode of analysis which was pursued in these experiments is as follows:—

For Estimation of Iodine.—Place 0·5 gm. BiOI in a flask with a few pieces of test zinc, cover with water, and mix thoroughly, then add sufficient H_2SO_4 to evolve hydrogen slowly, at the same time decomposing the BiOI. Thus H combines with I to form hydriodic acid, while $ZnSO_4$ is formed and Bi is precipitated in black flocculent masses. This reaction is completed in two or three hours. Neutralize the resulting mixture carefully with KHO, add a few drops of solution K_2CrO_4 as an indicator; titrate with one-tenth normal solution of $AgNO_3$ until a red precipitate begins to form. The percentage of iodine is then calculated as by U. S. P. process.

For Estimation of Bismuth.—Dissolve 0·5 gm. BiOI in a small quantity of nitric acid, dilute with water, boil until all iodine has been vaporized and all odour of HNO_3 has disappeared; add to this KHO, until a precipitate is formed which does not redissolve on shaking. Collect on a plain filter, wash well, ignite and weigh as Bi_2O_3.

LEPTOTRICHIC ACID.

Under this name Herr J. Amaun records the first example of a crystallizable product obtained from the Muscineæ. He procured it from *Leptotrichum glaucescens*, Hpe., the glaucous appearance of which moss is caused by a white scurfy coating which protects it from the action of water like a coating of wax. He finds this substance to be very soluble in ether, chloroform, or hot alcohol of 90 p. c. The concentrated solution in ether has an acid reaction, and the acid crystallizes out on evaporation in the form of prismatic needles. It is distinguished by its powerful resistance to concentrated sulphuric and hydrochloric acid, which scarcely affect it, nor is it attacked by caustic alkalies in the cold. The author finds this substance present in the green parts of the moss to the extent of 13 p. c. of its weight. No chemical formula is given.

The Pharmaceutical Journal.

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SATURDAY, JULY 6, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed* "*Pharm. Journ.*"

THE COUNCIL MEETING.

THE last meeting of the Council was attended by nineteen of its members, the absentees being Mr. SOUTHALL and Mr. WATT. The most important part of the proceedings was the discussion that took place after the report of the Building Committee had been presented. In reference to the recommendation of that Committee to accept the tender sent in by Messrs. KIRK and RANDALL, the President pointed out that though the amount of the estimate for the new building was in excess of that based upon the sketch plans submitted some time ago the increase was not more than about six hundred pounds. This was shown to be partly in consequence of the decision to cover more of the back space than was at first intended, and partly also of the requirement on the part of the Duke of Bedford's agent that the sanitary accommodation provided for the new building should be of a more ample description. This increased expenditure was therefore unavoidable, but in other respects the careful control exercised by the Building Committee over this undertaking was shown by the reduction that had been made in the builder's estimates to the extent of nearly two thousand pounds by omitting certain details of an ornamental character, though without in any degree detracting from the substantial quality of the new building. It may, of course, be found that these estimates are liable to be supplemented, as is so frequently the case in building operations, by requirements that have not been ascertained, such, for instance, as those connected with the condition of the party walls, but the uncertainty in this respect is no more than usual, and the report of the Committee appears to give evidence of every possible care having been taken to limit the expenditure to the utmost that is consistent with efficiency, and to ascertain as far as can be done the extent of the outlay incurred.

The suggestion brought forward that the reports of Committees should be sent round to members of the Council together with the agenda paper, upon the assumption that such a plan would facilitate the discussion of the subjects referred to, did not meet with much approval from the Council. It was shown by the President that as most of the Committees meet on the day before the Council meeting, to suit the convenience of members coming from the country, it is only the report of the Library, Museum, Laboratory and House Committee that could be circulated as proposed. The report of that Committee is generally very long and full of detail, since a good deal of formal routine work is done by the Committee. Moreover, when any proposition brought forward is of a special or abnormal character it is competent for any member to move that its consideration be postponed for a month, and as that plan is usually adopted in such instances, ample opportunity is thus afforded for members of Council to get a grasp of the work of the Society entrusted to that Committee. As regards other committees, any member of the Council wishing to know what has been done, can consult the minute-book before the sittings of the Council, and can thus readily put himself in possession of what he desires to know. A committee that undertakes to deal with, and present a report upon, any part of the Society's business, is, moreover, entitled to the confidence of the other members of Council, without there being any ground for apprehension that their freedom of action would be interfered with. The Solicitor's report of progress in certain law cases was, as usual, dealt with by the Council in Committee, and the reports of the Finance and Benevolent Fund Committees, recommending the temporary investment of the legacy left by Mr. JOHN WILLIAMS and the payment of certain grants to widows of registered chemists were adopted. As a further feature of the latter report it was stated that the feeble health of two of the ISHERWOOD orphans had much interfered with the endeavours to furnish them opportunities of earning their living, though the third child is now doing very well. The important subject of local secretaries was again dealt with in the report of the Library, etc., Committee, and the proposed list of appointments submitted was adopted, but the further question as to the services to be required of local secretaries in future is still under consideration. It seems probable that a recommendation will be made to relieve local secretaries of the inconvenient and somewhat irksome duty of collecting subscriptions and confine it entirely to the London office. On the recommendation of the same committee it was resolved that the Society's written examinations shall be held in the same centres as last year and that the appointments as superintendent shall be offered in the first instance to the local secretaries, except in London and Edinburgh.

Among the other subjects brought before the Council mention may be made of the Medical Acts Amendment Bill, introduced into Parliament by Sir WALTER FOSTER, which turns out to be a much less formidable affair than it appeared to be according to a recent prophetic report. It is simply intended to empower medical corporations to hold special examinations and grant diplomas and titles in relation to State medicine, sanitary science, and public health, and to provide for the registration of such titles. Reference was also made to a circular that has been issued by the organizing Committee appointed to make arrangements for an International Pharmaceutical Congress in Milan. This project has hitherto miscarried, and notwithstanding somewhat positive assurances that the Congress would be held this year, it is now deferred until 1889. As the arrangements have now advanced to the stage of requesting those who intend to become members of the Congress to apply for registration as such and remit ten francs, it may be anticipated that there is a somewhat better prospect of its realization. Pharmacists who intend to take part in this Congress must make application for membership before the 30th of November, and forward at the same time an introduction from a pharmaceutical association or from an administrative authority that has control of the public health. This plan appears to have been adopted as the alternative to sending definite personal invitations, and though it may possess in some respects advantages over the latter it may be doubted whether it is likely to be equally successful in securing a good attendance.

The Local Secretaries for the forthcoming meeting of the British Association, Newcastle, have issued circulars stating that they are requested by the Local Executive Committee to invite the attendance of members at the meeting which will be held there from the 11th to the 19th of September next, under the presidency of Professor Flower, C.B., F.R.S., etc., the Director of the Natural History Department of the British Museum. This will be the third meeting of the British Association held in Newcastle, the previous ones having been in 1838 and 1863, both of them having been highly successful, and the largest in point of numbers up to their respective dates. To pharmacists the last meeting was of special interest, as having been the occasion on which the formation of the British Pharmaceutical Conference took place, and the approaching meeting in September will also have an attraction for them, as the Conference has, with the exception of two years, followed the larger body to its annual place of meeting. Of the features of interest of Newcastle we will not now say more than that they, as well as the facilities for such meetings, are described as having increased since 1863. Special committees have been engaged for some time past in organizing excursions to places of interest in the district and in preparing to meet the wants of visitors in regard to lodging and hotel accommodation. Those who desire information on these matters should apply to the Local Secretaries, Professors Bedson and Merivale, at the Literary and Philosophical Society, Newcastle-upon-Tyne.

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It will be seen from our obituary notices this week that the Society has lost in Mr. James Crispe an old member and former auditor.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, July 3, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Evans, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Robbins and Schacht.

The minutes of the previous meeting were read and confirmed.

RETIREMENT OF MR. SAVAGE.

The PRESIDENT said a letter had been received from Mr. Savage, expressing his thanks for the resolution passed last month, and the expressions which had accompanied it.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Allen, Willie.
Barker, Joseph.
Carman, Frederick Henry.
Dennis, Fred Woodrow.
Duffin, Charles William.
Gardner, John.
Heap, Isaac Henry.
Neville, Thomas Crofts.
Saville, Edwin.
Tharratt, George Row.
Vincent, John.
Wansbrough, Edwin George Lincoln.
White, Thomas Arthur.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barker, Joseph	Nottingham.
Dennis, Fred Woodrow	Louth.
Gardner, John	Bolton-le-Sands.
Neville, Thomas Crofts	London.
Rimmington, George	Bradford.
Wansbrough, Edwin G. Lincoln	Barrow-in-Furness.
White, Thomas Arthur	Basingstoke.

ASSOCIATES IN BUSINESS.

The following having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Cook, Thomas Marsden	Hindley.
Gray, John Johnston	Cults.
Johnson, William Wilson	Llandrindod Wells.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Bonnett, Frederick	Doncaster.
Cheney, Henry Robert	Banbury.
Cowie, William Beaverly	Mains of Newrain.
Negus, John Henry	Northampton.
Parker, Robert	Rishton.
Pilkington, William	Buxton.
Rees, David Charles	Ipswich.

Tapp, Charles	Sittingbourne.
Taylor, Joseph John	Sittingbourne.
Thorp, Edwin	Harrogate.
Thursfield, John Henry	Kettering.
Twigg, Paul O'Brien	Bath.
Walwin, Walter	Warminster.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Bartle, William Thomas	Heckmondwike.
Chappelow, Thomas Henry	Southampton.
Davies, Daniel Evan	Carmarthen.
Dey, Alexander John	Edinburgh.
Dryden, Thomas	Landore.
Middleton, James	London.
Shirtliff, Wm. Edward Daniel	London.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee recommended the usual payments and the purchase of £100 stock on the Benevolent Fund account.

The President, in moving the adoption of the report, said the principal receipts during the month had been from examination fees. On the Benevolent Fund account there had not been many subscriptions received, but the legacy from the late Mr. John Williams of £100 had been paid, and it was recommended that that be invested. When the amount invested on this reached a substantial sum, it would be proposed that the Committee should look out for an investment in ground rents, so as to produce 4 per cent. instead of the small interest obtained from Consols.

The motion was unanimously agreed to.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 59) of a member and subscriber, and one of the unsuccessful candidates at the last election of annuitants. (Lincolnshire.)

£10 to the widow (aged 40) of a registered chemist and druggist, who subscribed to the Fund for 7 years. Applicant's husband died in April last, insolvent, having been in bad health for some time previously. There are six children, the eldest twelve years old. (Yorkshire.)

£5 to the widow (aged 42) of an associate in business and subscriber, who endeavours to support herself by needlework. She had a grant of £5 in June, 1888. (Warwickshire.)

£5 to the widow (aged 62) of an associate and member from 1842 to 1856, who had a grant of £5 in 1861, and who died last month. Applicant is in feeble health and mainly dependent on her children, one of whom is now out of employment. (London.)

One application the Committee had declined to entertain, and two had been deferred for further information.

The Isherwood Orphans.

Mr. Houghton had attended the Committee and reported on the condition and prospects of the two boys living with him.

The Vice-President, in moving the adoption of the report and recommendations, said they were of the usual character and called for no special remark. With reference to the Isherwood children, Mr. Houghton had attended the Committee and reported that the boys were going on well, barring their feeble condition of health, which was the old story they had heard all through. Both boys appeared to be in very delicate health, and not equal to battle with the world in the ordinary way. The elder one, who was an ironmonger's assistant, had had to return home a week ago owing to an attack of ill health. The younger one had also been obliged to leave his employment in consequence of the state of his health. The girl, who had been taken charge of by a friend in Hull, appeared to be the most robust of the family, and was doing very well. In the case of one of the applications, which had been deferred, his attention had been called to a published statement by the applicant when before the Bankruptcy Court that the Pharmaceutical Society was going to keep him when he had passed his examination. If the applicant had made such a statement he would take that opportunity of undeceiving him. The Committee could not entertain his case whilst the bankruptcy proceedings were pending, but had informed him that when they were over any fresh application he might make would be considered. So far, however, as providing for him for life, the Committee had no such idea.

Mr. Greenish remarked that the statement with regard to the Isherwood children was very important, and should he thought be taken into consideration by the Committee. The Society had given these children an opportunity of earning their living, and now it was found that their condition of health was such that they could scarcely avail themselves of it.

Mr. Hampson did not think a similar course would be adopted again.

Mr. Robbins thought from the experience of this case the Committee would not be likely to repeat it.

Mr. Atkins said the Committee had had a long conversation with Mr. Houghton, who had been extremely kind to these boys. The elder boy, although in delicate health, was practically off their hands, and Mr. Houghton did not intimate that any further application would be made on his behalf. With regard to the younger boy he seemed to have broken down more completely, and Mr. Houghton was anxious to change his occupation, and came to the Committee for advice. Practically there was only this boy to look after, and it was hoped that he would soon be off their hands entirely.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
May	Day . .	546	28	12	20
	Evening .	250	16	6	11

Circulation of books.	Town.	Country.	Total.	Carriage paid.
May. . . .	219	155	374	£1 19 7½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Boyle (R.), Chymista scepticus, 1662.
From Mr. W. H. Symons.

University of London, Calendar, 1889.
From the University.

Mathematical questions, with their solutions, edited by W. J. C. Miller, vol. 50, 1889.
From the Editor.

Middlesex Hospital, Reports for 1887.
From the Hospital.

New Zealand, Pharmaceutical Register for 1889.
From the Pharmacy Board.

India, Revenue and Agricultural Department, Selections from the Records, by the Reporter on Economic Products, Nos. 1–4, 8-16, 1888–89.
From H. M. Secretary of State for India.

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Digest of Criticisms on the United States Pharmacopœia, 1880, part 1.

From the Chairman of the Committee of Revision and Publication.

Flückiger (F. A.), Strychnos Ignatii, 1889.

— Ein zweckmässiger Extraktionsapparat, 1889.

— Zur Kenntniss des Copals, 1889.

Gerock (J. E.), Trennung des Strychnins vom Brucin, 1889. From Professor Flückiger.

Raue (B.), Untersuchungen über ein aus Afrika stammendes Fischgift, 1889.

Rymsza (A.), Ein Beitrag zur Toxikologie der Pikrinsäure, 1889. From Professor Dragendorff.

Cros (T.), Étude micrographique du poivre noir et de ses falsifications, 1889.

Galinier (H.), Étude sur la lanoline, 1888.

Grimal (E.), Étude sur les différents procédés employés dans la détermination de l'astigmatisme, 1889.

Jadin (F.), Les organes sécréteurs des végétaux et la matière médicale, 1888.

Marty (A. P.), La pharmacie à Montpellier, 1889.

Planchon (L.), Étude sur les produits de la famille des sapotées, 1888.

Robert (J.), Le chloroforme au point de vue pharmaceutique, 1889.

Sambuc (C.), Contribution à l'étude de la flore et de la matière médicale de la Sénégambie, 1887.

From Professor J. L. Soubeiran.

Belzung (E. F.), Recherches sur l'ergot du seigle, 1889.

— La chlorophylle et ses fonctions, 1889.

Bourquelot (E.), Des fermentations dont les produits sont utilisés en pharmacie, 1889.

Bouvier (E. L.), Le système nerveux des crustacés décapodes et ses rapports avec l'appareil circulatoire, 1889.

— Les cétacés souffleurs, 1889.

Brunotte (C. M. G.), Des fruits utiles de pipéritées, 1889.

Devaux (H.), Généralités sur les sirops et les mellites, 1889.

Herail (J.), Développement des organes reproducteurs et formation de l'œuf chez les phanérogames, 1889.

From the École Supérieure de Pharmacie de Paris.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Meldola, Chemistry of Photography.

Bouchardat, Formulaire magistral, 1889.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
May	Morning	528	41	9	19
	Evening	167	16	1	6

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Microscopic slides of aconite root stained, unstained, and showing the alkaloid *in situ*, also slides of crystallized aconitine and its nitrate, and a series of photographs in illustration of the same.

From Messrs. E. Richards and F. A. Rogers.

Specimen of Selenium oxide, in fine crystals.

From Mr. A. J. Simons.

Specimens of the fruit of *Balanites Roxburghii*, of the gum-resin of *Balsamodendron Berryi* and of Musamba or Indian aloes containing iron slag as an adulterant.

From Mr. D. Hooper, Ootacamund.

Specimen of Farnham hops.

From Mr. W. W. Crisp.

A log from a trunk of *Pinus australis*, showing the method of chipping the trunk and boxing the turpentine.

A specimen of the stem of *Abies balsamea*, showing the vesicles containing the balsam.

Specimen of the fruit and leaves of *Sophora speciosa*.

From the President of the Philadelphia College of Pharmacy.

Specimen of balsam of *Liquidambar styraciflua* from Nicaragua. From Mr. T. O. Sandell.

Specimen of gold reef in which gold is found in the Transvaal.

From Mr. Herbert St. John Tugman.

To the Society's Museum in Edinburgh—

Specimen of barbaloin and socaloin.

From Messrs. T. and H. Smith and Co.

Specimens of the leaves of *Hamamelis virginica*.

From Mr. D. T. Macdonald.

The staff of the Society's School had attended and reported on their respective classes.

The Committee recommended that any necessary repairs and cleaning be done during the vacation under the order of the President.

At a second meeting of the Committee the list of local secretaries for the ensuing year had been agreed to and was recommended for appointment.

The President, in moving the adoption of the report, said a paragraph would be added to it which had been omitted on the subject of the local secretaries. It would be remembered that there had recently been a discussion on this subject, and it was referred to the Committee for consideration. Not being desirous of coming to a hasty decision the Committee had adjourned it with the hope of getting as much information as possible from members living in the country. The opinions expressed at the Council meeting were being duly considered by the Committee, but the report would not be ready for some little time, as it was very desirable to consider the subject in all its bearings. One point on which a strong feeling had been expressed was that it was invidious and inconvenient in some respects that the local secretaries should be called upon to collect subscriptions, and probably a recommendation that this duty should be left to the London office would ultimately be made. The appointment of the local secretaries for the year would form the subject of a separate resolution, but he might say that the result of the present election, as on former occasions, had been to show that very little interest was taken in the matter by the voters themselves in many districts.

The report and recommendations were unanimously adopted.

List of Local Secretaries, 1889–1890.[*]

The following gentlemen were by a subsequent resolution appointed Local Secretaries for the ensuing year:—

Towns eligible.	Names of persons appointed.
Aberdeen	Strachan, Alexander.
Aberystwith	Wynne, Edwin Price.
Abingdon	Smith, William.
Accrington	Stanley, Thomas.
Altrincham	Clarke, James Thomas.
Andover	Bienvenu, John.
Appleby	Longrigg, John.
Arbroath	Burn, David Haitly.

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[*] Local Secretaries are appointed in all towns in Great Britain (except London and Edinburgh) which return a Member or Members to Parliament, and in such other towns as contain not less than three Members of the Society or Associates in Business.

Towns eligible.	Names of persons appointed.
Ashbourne	Osborne, James.
Ashby de la Zouch	Bullen George Wm.
Ashford	Ingall, Joseph.
Ashton-under-Lyne	Bostock, John W.
Aylesbury	Turner, John.
Ayr	
Banbury	Ball, George Vincent.
Banff	Alexander, William.
Bangor	Jones, Owen.
Barnsley	Badger, Alfred.
Barnstaple	Goss, Samuel.
Barrow-in-Furness	Chapman, Leonard P.
Basingstoke	
Bath	Appleby, Edward J.
Bedford	Taylor, James B.
Belper	Calvert, James.
Berwick	Lyle, William.
Biggleswade	Evans, John.
Bilston	Gray, Charles.
Birkenhead	Brookes, Alfred Fincher.
Birmingham	Southall, Alfred.
Bishop Auckland	Thorburn, Hy. Wm.
Blackburn	Garland, Alfred P.
Blackpool	Laurie, John.
Bodmin	Cardell, Richard T.
Bolton	Mason, William B.
Boston	Haller, Frederick Wm.
Bournemouth	Duncan, Alexander.
Bradford (Yorkshire)	Rimmington, George.
Brechin	Hodgeton, David.
Brecon	Meredith, John.
Bridgend	Jenkins, David.
Bridgnorth	Deighton, Thomas Milner.
Bridgwater	Basker, John Anthony.
Bridlington	Purvis, John Bowlt.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Bromley	
Broughty Ferry	Park, William.
Burnley	Cowgill, Bryan H.
Burslem	Blackshaw, Thomas.
Burton-on-Trent	Wright, George.
Bury	
Bury St. Edmunds	Summers, Frank.
Buxton	Wright, Robert.
Camborne	Fiddick, Thomas.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Munday, John.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard Morgan.
Carnarvon	Jones, John.
Chatham	Crofts, Holmes C.
Chelmsford	Metcalf, Wilson.
Cheltenham	Barron, William.
Chertsey	Boyce, George.
Chester	Baxter, George.
Chesterfield	Windle, John T.
Chichester	Long, William Elliott.
Chippenham	Coles, John Coles.
Chorley	Hill, William.
Christchurch	Green, John.
Cockermouth	Cooper, F. Ashley.
Colchester	Cordley, William Bains.
Coventry	Hinds, James.
Crewe	Harrop, Wm. H.
Croydon	Clarke, Josiah.
Darlington	Robinson, James.
Dartford	
Deal	Green, John.
Denbigh	
Derby	Cope, John A.
Devizes	Edwards, Thos. Roberts.
Devonport	Codd, Francis.
Dewsbury	
Doncaster	Howorth, James.
Dorking	Clift, Joseph.
Douglas	Brearey, Arthur William.
Dover	Bottle, Alexander.
Dudley	Gare, Charles Hasard.
Dumfries	Allan, William.
Dundee	Hardie, James.
Dunfermline	Seath, Alexander.
Durham	Sarsfield, William.
Ealing	Curtis, F. G.
Eastbourne	Crook, Herbert.
East Grinstead	Tully, John.
Eccles	Howie, William Lamond.
Egremont (Cumberland)	Ireland, Edward J.
Elgin	Robertson, William.
Epping	Rowland, Thomas.
Evesham	Dingley, Richard Loxley.
Exeter	Broom, William W.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, Walter Francis.
Fareham	Batchelor, Charles.
Faversham	Lenfestey, William G.
Flint	Jones, Owen Williams.
Folkestone	Goodliffe, George.
Forfar	Ranken, John.
Gainsborough	Spouncer, Henry Thomas.
Galashiels	Walker, James.
Gateshead	
Glasgow	Kinninmont, Alexander.
Gloucester	Foulkes, William Henry.
Grantham	Whysall, William.
Gravesend	Clarke, R. Feaver.
Greenock	McNaught, Archibald.
Grimsby, Great	Cook, Robert, Junr.
Guernsey	Nickolls, John B.
Guildford	Martin, Edward W.
Haddington	Watt, James.
Halifax	Dyer, William.
Hanley	Cornwell, T. C.
Harrogate	Davis, R. Hayton.
Hartlepool	Jackson, William G.
Harwich	Bevan, Charles F.
Hastings and St. Leonards	Tharle, Charles A.
Hawick	Maben, Thomas.
Helensburgh	Harvie, George.
Henley-on-Thames	Batchelor, Charles J. H.
Hereford	Williams, Walter.
Hertford	Durrant, George R.
Hexham	Gibson, John Pattison.
Heywood	Beckett, William.
Hitchin	Ransom, William.
Honiton	Dyer, Edward H.
Horncastle	Kemp, Herbert W.
Houghton-le-Spring	Rowell, R. H.
Huddersfield	King, William.
Hull	Bell, Charles Bains.
Huntingdon	Provost, John Pullen.
Huntly	Chalmers, George.
Hyde	Wild, Joseph.
Hythe	Lemmon, Robert Alce.
Ilkley	Worfolk, G. W.
Inverness	Allan, Alexander.
Ipswich	Anness, Samuel Richard.
Jersey	Ereaut, John.
Keighley	
Kendal	Severs, Joseph.
Kettering	Thursfield, John F.
Kidderminster	
Kilmarnock	Borland, John.
King's Lynn	
Kingston-on-Thames	Walmsley, Samuel.
Kingswinford	
Kirkcaldy	Storrar, David.
Knutsford	Silvester, Henry T.

Towns eligible.	Names of persons appointed.
Lancaster	Vince, James.
Launceston	
Leamington	Pullin, W. H.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Clark, Walter Beales.
Leigh (Lancs.)	Bennett, John W.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Sandiland, R. B.
Lewes	Saxby, Henry.
Lichfield	Perkins, John Jaquest.
Lincoln	Maltby, Joseph.
Liverpool	Parkinson, Richard.
Llandudno	Winter, Joseph.
Loughborough	Scrase, Richard.
Louth	Smith, Mark.
Lowestoft	Clarke, Geo. Ernest.
Ludlow	Woodhouse, George.
Luton	Duberley, George S.
Macclesfield	Bates, William Isaac.
Maidenhead	Walton, Ralph.
Maidstone	Stonham, W. B.
Maldon	Wallworth, David.
Malton	Buckle, James.
Malvern	Coldwell, David B.
Manchester, etc.	Benger, F. Baden.
Mansfield	Patterson, Douglas J.
March	Davies, Peter Hughes.
Margate	Candler, Joseph Thomas.
Market Harborough	Bragg, William B.
Melton Mowbray	Wing, Geo. N.
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Buck, Thomas.
Montrose	Reid, John.
Morecambe	Birkett, John, Junr.
Morpeth	Schofield, F. E.
Newark	Cherrington, Geo. W.
Newbury	Davis, Henry J.
Newcastle-on-Tyne	Martin, Nicholas H.
Newcastle-under-Lyme	Poole, Weston.
Newmarket	Barrow, Frank Arthur.
Newport (Mon)	Paine, Charles.
Newport (Salop)	Barlow, John.
Newtown	Owen, Edward.
Northampton	Bingley, John.
Northwich	Humphreys, Griffith.
Norwich	Sutton, Francis.
Nottingham	Parker, William Henry.
Nuneaton	Iliffe, George.
Oldham	Bates, Henry.
Oswestry	Evans, John.
Otley	Lockwood, Thomas.
Over Darwen	Shorrock, Ralph.
Oxford	Prior, George Thomas.
Paisley	MacCowan, R. T.
Pembroke Dock	Laen, William.
Penrith	Kirkbride, W.
Penzance	Buckett, Alfred Henry.
Perth	Donald, David.
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Sloggett, Thos. C.
Pontefract	Bratley, William.
Pontypridd	Cule, Taliesin.
Poole	Pomeroy, Francis T.
Portsmouth, etc.	Childs, James L.
Preston	Willan, William.
Prestwich	Mercer, Allan.
Radcliffe	Pollitt, Joseph Moore.
Ramsey (Hunts)	Palmer, Frederick Wm.
Ramsgate	Baily, Edward.
Reading	Cardwell, Ernest.
Reigate	
Richmond (Yorks)	Walton, E. Bridges.

Towns eligible.	Names of persons appointed.
Ripon	Parkin, Joseph Brooks.
Rochdale	Taylor, Edward.
Rochester	Watts, George Wm.
Romford	Lasham, John William.
Ross	Matthews, Thomas.
Rotherham	Horsfield, John M.
Rothesay	Duncan, William.
Rugby	Brown, Frederic P.
Ruthin	Rouw, Theodore J.
Ryde (Isle of Wight)	Pollard, Henry Hindes.
Rye	Waters, William Allen.
St. Albans	Ekins, Arthur E.
St. Andrews	Govan, Alexander.
St. Austell	Binks, Burcham.
St. Ives (Cornwall)	Young, Tonkin.
Saffron Walden	Gilling, John.
Salisbury	Atkins, William Ralph.
Scarborough	Whitfield, John.
Sevenoaks	Pain, Edwin.
Sheffield	Ward, William.
Shields, South	Noble, John.
Shipley	Dunn, Henry.
Shrewsbury	Cross, William Gowen.
Skipton	Wilks, Robert.
Southampton	Dawson, Oliver R.
South Molton	Swingburn, Richd. Hy.
Southport	Ashton, William.
Spalding	Branston, John Williams.
Stafford	Averill, John.
Stalybridge	Simpson, Allwood.
Stamford	
Stirling	Shairp, William.
Stockport	Kay, Samuel.
Stockton-on-Tees	Brayshay, Thomas.
Stoke-on-Trent	Adams, Frank.
Stourbridge	Selleck, W. H.
Stowmarket	Gostling, George James.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Coley, Samuel James.
Sudbury	
Sunderland	Harrison, John.
Swaffham	Bell, Frederick R.
Swansea	Gross, Nicholas M.
Tamworth	Allkins, Thomas Boulton.
Taunton	Short, George William.
Tavistock	Gill, William.
Teignmouth	Maunder, William.
Tenby	Davies, Moses Prosser.
Tewkesbury	
Thirsk	
Tiverton	Havill, Paul.
Torquay	Shapley, Charles.
Totnes	Morse, Charles H. S.
Truro	Percy, Thomas Bickle.
Tunbridge Wells	Howard, Richard.
Twickenham	Shelley, Henry.
Tynemouth	
Ventnor	Weston, Charles.
Wakefield	Duffin, Thomas.
Walsall	Elliott, George.
Warrington	Greenough, Hugh F.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Wellington (Salop)	Bates, James.
Wellington (Somerset)	Windeatt, George Jas.
Wells (Somerset)	Manning, R. J.
Westbury	Paine, Charles.
West Bromwich	Eynon, C. J.
Weston-super-Mare	Hall, Edwin.
Weymouth	Groves, Thomas Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wick	Miller, Kenneth.
Widnes	

Towns eligible.	Names of persons appointed.
Wigan	Phillips, Jonathan.
Wimbledon	Dowdeswell, Jonathan.
Winchester	Hunt, Richard.
Windsor	Russell, Charles J. L.
Wisbech	
Wokingham	Spencer, Thomas.
Wolverhampton	Gibson, Fredk.
Woodbridge	Betts, John.
Worcester	Virgo, Charles.
Worthing	Cortis, Arthur Brownhill.
Wrexham	Edisbury, J. F.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, William S.
Yeovil	Maggs, Frederick R.
York	Sowray, Joseph.

SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

It was resolved that the written examinations be held in the same centres as last year, and that the appointment of Superintendent be offered in the first instance to the local secretaries with the exception of London and Edinburgh.

The **PRESIDENT** stated that the Superintendent in Guernsey for some years past had been Mr. Collinette, who was a pharmacist there, but not a member of the Society; but there was now an examined member of the Society in the island, who, as a matter of course, became local secretary, and would in the ordinary course become Superintendent of the Examinations. He mentioned this in order to express the obligation of the Society to Mr. Collinette for having looked after the interests of the Society so long, and to explain how it was that he would no longer be Superintendent, as a member of the Society must, according to the regulations, be appointed to that position.

Mr. **EVANS** drew attention to the fact that there was no centre between Carmarthen and Carnarvon, although Aberystwith was the seat of a university, and said that many Welsh students had to make a journey of 70 or 80 or 100 miles to be examined. He did not press the matter now, but hoped it would be borne in mind when arranging the centres next year.

Mr. **GREENISH** said Aberystwith was formerly a local centre, but had been omitted a few years ago on account of the small number of candidates presenting themselves there.

The **PRESIDENT** said the subject should be borne in mind next year by the Committee when arranging the local centres.

REPORT OF EXAMINATIONS.

June, 1889.

ENGLAND AND WALES.

	Candidates. Examined.	Candidates. Passed.	Candidates. Failed.
Major (19th)	8	7	1
„ (20th)	9	6	3
	—17	—13	— 4
Minor (19th)	20	5	15
„ (20th)	21	3	18
„ (21st)	25	14	11
	—66	—22	—44
	83	35	48

Preliminary Examination.

Two certificates by approved examining bodies were received in lieu of the Society's examination.

APPOINTMENT OF PROFESSORS FOR THE ENSUING YEAR.

Professor **ATTFIELD** was appointed Professor of Practical Chemistry.

Professor **DUNSTAN** was appointed Professor of Chemistry.

Professor **GREEN** was appointed Professor of Botany.

Mr. **HOLMES** was appointed to conduct the demonstrations of materia medica.

Mr. **INCE** was appointed to conduct the lectures and demonstrations on pharmacy and practical pharmacy.

THE COUNCIL PRIZES.

Messrs. **BLUNT** and **BOWEN** were appointed to conduct the examinations for the Council prizes.

PRELIMINARY EXAMINATIONS.

The Secretary presented the following report as to the Preliminary Examinations:—

List of Centres and Table of Attendances of Candidates at each Centre.

	1886. Jan. Apr., July, Oct.	1887. Jan., Apr., July, Oct.	1888. Jan., Apr., July, Oct.	1889. Jan.,	1889. Apr.	Total number of attendances at each centre at 14 examinations.
ENGLAND AND WALES.						
Birmingham	64	66	65	10	18	223
Brighton	11	20	20	3	3	57
Bristol	55	36	37	9	8	145
Cambridge	15	9	18	11	5	58
Canterbury	9	16	10	1	6	42
Cardiff	41	25	16	6	9	97
Carlisle	24	39	54	8	10	135
Carmarthen	46	59	49	10	16	180
Carnarvon	29	22	26	5	7	89
Cheltenham	5	10	17	9	5	46
Darlington	22	24	26	8	4	84
Exeter	41	31	28	15	7	122
Hull	19	20	26	3	10	78
Lancaster	17	29	19	4	5	74
Leeds	55	61	69	20	19	224
Lincoln	35	34	28	5	5	107
Liverpool	50	68	52	18	17	205
London	169	148	176	26	59	578
Manchester	85	110	86	20	43	344
Newcastle	35	51	49	15	14	164
Northampton	16	13	13	2	3	47
Norwich	33	22	21	3	8	87
Nottingham	48	49	47	8	16	168
Oxford	7	15	12	3	2	39
Peterborough	18	22	13	4	5	62
Sheffield	26	29	42	7	13	117
Shrewsbury	21	20	24	2	6	73
Southampton	29	29	29	7	10	104
Truro	14	20	13	1	9	57
Worcester	7	11	9	1	3	31
York	25	32	27	2	13	99
SCOTLAND.						
Aberdeen	44	48	46	25	19	182
Dundee	35	25	37	6	12	115
Edinburgh	87	83	105	21	24	320
Glasgow	52	50	66	12	21	201
Inverness	7	17	10	2	1	37
Douglas, I. of Man	5	3	0	0	1	9
Guernsey	2	5	4	1	0	12
Jersey	2	2	4	2	1	11

THE NORTH BRITISH BRANCH.

A letter from Mr. J. R. Hill, Assistant Secretary, was read, giving the names of the members who had been elected to constitute the Executive of the North British Branch. (The names have been already published at p. 1040 of the Journal for June 29.)

BUILDING COMMITTEE.

This Committee reported that it had received seven tenders for the rebuilding of Nos. 15 and 16, Bloomsbury Square, but had decided not to accept either, but had requested the architect to go through the specification with a view to modifying some of the items.

At an adjourned meeting held on July 2, the architect had submitted a fresh tender from Messrs. Kirk and Randall, and gave details of the manner in which the cost of the building had been reduced. The Committee recommended that the tender of Messrs. Kirk and Randall for £7425 be accepted, and that the Committee be authorized to instruct the Society's Solicitors to prepare a contract, and get it executed. This estimate did not provide for rebuilding the party walls, should it be found necessary.

The **PRESIDENT**, in moving the adoption of the report, said the rough estimate given some time ago was considerably exceeded, but on going into the subject it was found that the architect had proposed certain forms of internal fittings which were very nice but somewhat costly and not really necessary, and consequently it had been possible to reduce the lowest tender sent in by nearly £2000, and still leave the Council room in the new building with very excellent and substantial fittings, whilst the other portion of the building would be of the ordinary character. The greater portion of the cost was in respect of the portion of the new building to be used for the purposes of the Society. Since the sketch plans were submitted on which the original estimate was based, it had been decided to cover rather more of the back space than was at first intended, and there had been no vaults in front of either of these two houses, which had since to be provided. Practically the original estimate, which was from £6500 to £6750 for the two houses, was only exceeded by about £600, which was attributable very largely to the causes he had indicated, and especially to what the architect called the "increased cube" of the portion to be used by the Society. The estimate still included a great many things which might very well be called fittings, such as a lift for the strong room, and certain other internal arrangements. The builders who had tendered were a large and highly respectable firm, and the Society would be quite safe in dealing with them on a scale of prices.

Mr. **HAMPSON** asked if any time had been named for the completion of the building.

The **PRESIDENT** said six months.

Mr. **SCHACHT** asked what was meant by the allusion to the rebuilding of the party wall.

The **PRESIDENT** said it was believed the two party walls were quite good, but until they were exposed it was impossible to say. Something might have to be spent more than was provided for, as if they were absolutely dangerous they would have to be rebuilt. No one could be quite sure about that, until the old building was pulled down, but there was every reason to believe that the walls were pretty good. The Duke of Bedford's agent had been changed since the negotiations commenced, and the plans had had to be somewhat modified to meet his views.

Mr. **SCHACHT** asked what portion of the whole would be expended on the house which was proposed to be let.

The **PRESIDENT** said about £3100 or £3200; that would not go so far back as the one to be used by the Society, which would go right up to the Examination Hall. The Duke's agent, when he saw the plans, complained that sufficient sanitary accommodation had not been provided, and an increase had to be made in that direction, which was rather expensive.

Mr. **EVANS** remarked that the original estimate was from £6000 to £7000, and when the tenders came in for more than £2000 above the highest figure it looked as if the architect was rather out of his calculations.

The **PRESIDENT** said he might have thought that the Society would be willing to have a superior building. The sketch plan on which the original estimate was based was not the same as that which had been decided upon. The architect was desirous of having the fittings of a more substantial character than were originally contemplated, and he also said—and this was confirmed by the builders—that prices were a little higher now than they were two years ago. He could put up a very good building on the site for £6500, but the object was to have it as well suited as possible for the requirements of the Society.

Mr. **EVANS** thought most probably other extras would probably crop up again as the building progressed, and would like to have some idea what the total amount would be, whether eight, nine, ten, or eleven thousand pounds.

The **PRESIDENT** said he did not think there was any reason to anticipate extra expense, except possibly with regard to the party wall.

Mr. **MARTIN** said he presumed the economy which had been effected in the internal fittings did not mean any inferior quality in the joists, doors, and so on.

The **PRESIDENT** said no; it was simply the question of an extra style of thing, as against a good useful style.

Mr. **RICHARDSON** asked the rental which would be expected from the private house, which he understood would cost over £3000.

The **PRESIDENT** replied from £150 to £200 a year.

Mr. **ATKINS** said of course there would be some expenditure necessary when the building was completed.

The **PRESIDENT** said of course there would be some furniture required and some gasfittings, but a certain portion of lighting was provided for, and it was probable they might have the electric light at a moderate cost.

Mr. **EVANS** said it would be just as well the Council should know the total cost, if the information could be given. Would it be likely to come to more than £8000 altogether?

The **PRESIDENT** said it would not be wise to make any precise statement. Mr. Evans himself might come and insist on more money being spent; but so far as he could see it need not cost more.

Mr. **EVANS** said last time the original intention was to spend between £6000 and £7000, and the Council finished by spending between £10,000 and £11,000. He should like to know whether it was going to do the same thing again, or whether it had something more definite this time.

The **PRESIDENT** thought there was something more definite on this occasion.

Mr. **HAMPSON** said this was a very important matter, but he had every confidence in the Committee, and was sure it would be as economical as possible.

The **PRESIDENT** said it was a pretty large Committee, and two of the members had as much knowledge of such subjects almost as if they were builders themselves. He was quite sure the Committee might be trusted not to spend money unnecessarily.

Mr. **ATKINS** said he had every confidence in the Committee, and should not think of casting any reflection on their work hereafter, but he might be allowed at this early stage to express the hope that the Committee would keep an eye particularly on the matter of extras. They all knew that on the former occasion the Council had been led into much more expense than was originally contemplated, and though he had not had much experience in building, from what little he had and what he heard he was quite satisfied that there were always extras which were found inevitable when once you began, though you had not anticipated them. If things were removed from the old building to the new one the old one would have to be rehabilitated, so that there would inevitably be some considerable outlay beyond that provided for in the estimate. There was no disguising the fact that the Society was putting its capital into a form in which a large portion of it would be unremunerative and was adding to its establishment expenses while reducing its income.

The **President** said the Committee had had to modify the plans of the house on the other side to some extent, in order to meet the views of the adjoining tenant with regard to lights. The proposition submitted some ten months ago was to arrange for a building without a Council room, and it would be remembered that he was then outvoted, and told to recast the scheme and introduce a new Council room. He did not object to being considered a spendthrift, but when he wanted to be economical it was rather hard that he should be forced to go into more outlay and be taxed with it afterwards. He thought the Council wise at the time, but still this additional room added considerably to the cost of construction, and was not originally included.

Mr. **Allen** as a member of the Committee wished to say that the plans which had been finally adopted were not the same as those on which the estimate of £6500 to £6750 was based. It was quite correct that the Committee did endeavour some time ago to cut down the expenditure by a great deal. It was thought that a certain portion of the sanitary arrangements could be dispensed with; but when the plan was submitted to the Duke's agent, it was found that in a building like that, taking into consideration the purposes for which it was intended, it would be very much wiser to provide this additional accommodation, and that alone represented something like £250. Again there was no vaulting underneath the pavement at present, but permission had been obtained to excavate, and capacious vaults would be constructed there, which also would cost a considerable sum. After having received tenders for the larger amount, which the Committee was quite unable to accept, the architect had been desired to endeavour to cut down the expenses in some way or other, and at the meeting on the previous day he had given a full and detailed account of every item which he intended to touch. It was particularly put before him that the wish of the Committee was not to interfere with quality. The Council knew very well it could build a cheaper building, even on the same plans, but the wish of the Council would be to put up a substantial building which should be of good quality and likely to last. Therefore, no item the architect had modified would in any way interfere with quality. He could give the details, if necessary, and he had made a list of a large number of items, but he might say generally that the reduction was to a considerable extent effected in doing away with tiles, terra cotta, and oak fittings.

Mr. **Evans** said he was quite sure the Building Committee had gone into the matter so carefully that it would welcome any criticism upon its labours, and he hoped any remarks he made would be accepted in that light. He fully believed the members of the Committee had done their very best, but he wanted to relieve them of one responsibility, if he could, by the questions he put, and what he wanted to know was what were the probable extras, and the probable cost of fittings, and the removal of fixtures from one place to another. Would the whole amount to £8000, £9000, £10,000 or £11,000, and was the whole scheme to exceed £20,000 from the commencement? He simply wanted the Building Committee to protect itself, so that no one might come forward in another year, and say you told us it would only cost £8000, and now it has cost £10,000 or £11,000. Of course no one could bind himself to a particular figure, but he thought the Council might have some idea given of what the thing was going to cost ultimately. He was not criticising the Committee in any hostile spirit, but he might say that his own opinion was that it would have been much better if the other large section of the building which was now completed had been left until the present time, and the whole thing had been built together. It would probably have saved some thousands.

Mr. **Cross** said he was sure the Council would be glad to hear the explanation which Mr. Allen had given, that the way in which the expense was cut down had been by lopping off luxury rather than necessity, and above all he was glad to hear the report that the Duke's agent had looked after the Committee as regards the sanitary arrangements. Those in the present building were a disgrace, and he did not think in a small provincial town such a state of things would be allowed.

Mr. **Harrison** asked whether in the very large reduction which had taken place in the tender proposed to be accepted there had been any reduction in the accommodation required for business purposes; whether the new building met the Society's present and future requirements.

The **President** said certainly.

Mr. **Richardson** said the luxury of having a new Council room had been referred to, but he understood that in a short time the present Council room would be required for the Library, and therefore the members ought not to be blamed for that.

The **President** said he had suggested that the Council should meet in the Examination Hall.

Mr. **Robbins** said one of the largest reductions was in tiles and terra cotta, which would look very smart, but the Duke's agent did not seem to care much about them, and some people thought the building would look all the better without them.

Mr. **Evans** said all he wanted to know was the probable amount of extras.

Mr. **Richardson** said no one could tell. When the house was built Mr. Evans might be the first to suggest that some extra expense should be incurred in fittings or ornaments.

The **President** said the Committee would have to come to the Council to sanction any further outlay, and it was unreasonable to ask him to say what the amount would be. He should decline to do so, especially after the free use which had been made of an observation made by an individual member of Council on a former occasion when he mentioned a particular figure. All he could say was that the Committee was a thoroughly representative one and contained two or three members who knew as much about the value of building materials as the architect, so that there was every security that no unnecessary expenditure would be incurred.

Mr. **Gostling** agreed in what the President had said. Though the estimate was now a little over £7,000 everyone's experience in building was that there were sure to be extras which could not be foreseen. Every care would be taken, and nothing would be done without the sanction of the Council, and that was all that could be said.

Mr. **Abraham** asked if the new front would be uniform with that of their present buildings?

The **President** said No; the elevation would be red brick and Portland stone. The Committee objected very much to stucco and paint, which was very expensive to keep up, and some day, if the Society could afford it, it might be proposed to take off the stucco and make the old building correspond with the new one.

The motion was then put and carried unanimously.

A resolution was also passed authorising the President to sign and seal the contract with Messrs. Kirk and Randall when prepared.

THE INTERNATIONAL PHARMACEUTICAL CONGRESS.

The **PRESIDENT** said a report had been received from the Committee of Organization of the Seventh International Pharmaceutical Congress, to the effect that the members of the Lombardian Pharmaceutical Society had formed themselves into a Committee, with Professor Cannizzaro as President, and Messrs. Arturo Castoldi and Venturini Vittorio, Secretaries; and they had issued a circular stating that after considering the advisability of holding an International Congress this year at Milan, they had decided, having regard to certain congresses which were to be held in Paris, and which might interfere with gentlemen coming to Milan, that the Congress should not take place until next year, when it would be held during the first fortnight in September. It was announced that each member in sending in his adhesion might at the same time remit 10 francs, which looked like business.

The **VICE-PRESIDENT** remarked that when the Congress was held in London, no charge was made to foreign visitors.

The **PRESIDENT** said it was usual with continental congresses. If there were no big exhibitions next year the congress would probably be a successful and an extremely pleasant meeting, and anyone who went would probably derive a good deal of mental gratification from his visit. Apart from the Italian pharmacists, Milan was now very convenient for Germans, since the St. Gothard tunnel had been opened, and not only for them, but for Russians, and those from the Mediterranean and further east would probably come in considerable numbers. Milan was in the centre of perhaps the most beautiful district in the world, close to some of the grandest lakes, and in full view of nearly the whole chain of the Alps.

Mr. **RICHARDSON** hoped arrangements would be made that the congress should not clash with the British Pharmaceutical Conference. There should, if possible, be a fortnight between.

Mr. **ATKINS** said the Congress had been postponed a little in order to avoid the extreme heat of the Italian summer season. Last year he spent ten days in the neighbourhood of Milan, called on Signor Zambelletti, and had a long talk with him about it. He hoped it would be a success, but if so it would not be through any great enthusiasm in Milan itself, where there were the same difficulties from want of union as existed in England. Signor Zambelletti was a foremost pharmacist in Milan, and took great interest in the Congress, but he told him there were many difficulties.

FREEHOLD GROUND RENTS COMMITTEE.

The **PRESIDENT** moved that a Committee consisting of the President, Vice-President, Treasurer and Mr. Hills be appointed to look out for suitable investments in freehold ground rents when occasion required.

The motion was seconded and carried.

MEDICAL ACTS AMENDMENT BILL.

The **PRESIDENT** said he had received a letter referring to an article in one of the trade journals on a Bill which had been introduced into Parliament by Sir Walter Foster. He had stated to his correspondent that the Bill was not correctly described in the article; it was simply a Bill which proposed to empower the medical corporations to grant certain titles in public health, sanitary science, and State medicine, which titles could now be conferred only by certain universities, and the other provision was to enable the Medical Council to place opposite the names of practitioners an indication of such diplomas having been granted them.* When the Medical Act passed there was no provision for the registration of titles in public health, sanitary science, and State medicine, and this was simply a Bill of two clauses providing as he had described. As his correspondent and others seemed a little alarmed about the matter, he thought it might be convenient to make this statement.

REPORTS OF COMMITTEES.

Mr. **LEIGH** said if he were in order he should like to suggest that the reports of the Committees be sent round to members of the Council with the agenda as soon as possible. This was done in many public bodies, and he thought it would facilitate discussion. He referred to the reports of such committees as the Library and Building Committees when they were held early in the month. This would assist members of the Council in getting a grasp of the work of the Society.

The **PRESIDENT** said the Report of the Library Committee was the only one which could be circulated, as the other Committees always met on the day before the Council. The report of the Library Committee was very long and full of detail. There was a good deal of work done, but it was formal routine work. Whenever there was any proposition brought forward which was special or abnormal, it was competent for any one to move that it be postponed for a month for consideration, and that was the plan usually adopted. He did not think any advantage would be gained from sending out these reports beforehand.

Mr. **RICHARDSON** said Mr. Leigh was probably alluding to Town Councils, where what he suggested was done, but that was only within the last few years.

The **PRESIDENT** said a member of the Council who was not a member of the Committee could hardly appreciate a written report without an explanation as to the reasons for coming to the decision.

Mr. **SCHACHT** remarked that the Committee had no reporter present, and he did not know who was to do the work. It would be merely a copy of the minutes, supposing any were made, which was not always the case.

Mr. **EVANS** said that difficulty could easily be got over; there were the same facilities to take notes in the Committees as in the Councils.

Mr. **RICHARDSON** said the Committees were appointed as a sort of executive of the Council. If they had not confidence in the Committees all the work would have to be done in the Council, which would lead to no end of chatter, and he was sure the business of the Society would not be conducted with the same facility. If the Committees did not possess the confidence of the Council they were of no use.

Mr. **ATKINS** said he did not understand that Mr. Leigh expressed any want of confidence in the Committees, but rather that he wanted when he came there to have a grasp of the work which had been done. He did not think the proposal was practicable. If Mr. Leigh wished to consult the minute book it would be perfectly within his power to do so before the sitting of the Council, and he might thus put himself thoroughly in touch with what had been done.

Mr. **EVANS** remarked that whenever a question of this sort arose someone always suggested that they must have confidence in the Committee. He was not backward in according his confidence, but at the same time the members of the Council were not to be muzzled, and he objected to such remarks being made.

GENERAL PURPOSES COMMITTEE.

This report included the usual letter from the Solicitor, stating the progress of the cases placed in his hands. In several cases which had been standing some time evidence had been obtained and proceedings were being commenced.

The Committee had considered other cases of alleged infringement of the Act which had been brought to its attention, and recommended that proceedings be taken.

The Council, as usual, went into committee to consider the report.

On resuming, the report and recommendations were unanimously adopted.

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* The Bill is printed on p. 20 of the present number.

MEETING OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, June 27, at 12.30 p.m. Present—Messrs. Boa, Gilmour, Mackenzie, Stephenson and Thompson, Edinburgh; Fisher, Dunfermline; Kerr, Dundee; Kinninmont, Glasgow; Maben, Hawick; Nesbit, Portobello; Paterson and Strachan, Aberdeen; Storrar, Kirkcaldy; and Watt, Haddington.

Apologies for absence were received from Messrs. Hardie, Dundee; Lawrence, Oban; and McAdam, Glasgow.

On the motion of Mr. Gilmour the chair was taken by Mr. Watt, Haddington.

The minutes of last meeting were read and approved.

The Chairman having intimated that the first business was the election of Chairman,

Mr. Stephenson said he had much pleasure in moving that Mr. Gilmour be elected Chairman. Mr. Gilmour had fulfilled the duties very efficiently, and as he had not yet been a full year in office he thought they had some claim upon him, and trusted he would accept for another year.

The motion was seconded by Mr. Mackenzie and unanimously agreed to.

Mr. Gilmour, having taken the chair, said he had to thank them for this renewed expression of their confidence. He would have much pleasure in devoting the best of his ability and as much of his time as possible to the affairs of the Society.

Mr. Watt, Haddington, said he had now held the office of Vice-Chairman of the North British Branch Executive from the beginning and had endeavoured to do what he could to further the interests of the Society. He thought, however, that the honours should go round, and he therefore proposed that Mr. Storrar, Kirkcaldy, be elected Vice-Chairman. Mr. Storrar had performed all his duties in connection with the affairs of the Society in an admirable manner.

The motion was seconded by Mr. Maben, Hawick, and unanimously agreed to.

Mr. Storrar said this was an unexpected and an undeserved honour, but as it seemed to be the desire of the Executive that this office should be filled by a country member he would accede to the desire, and do his utmost to perform all the duties efficiently. He regretted that Mr. Watt did not see his way to continue in the office, because he had done so much for the Society already, and was likely to do more. Though he did not agree with all Mr. Watt's views, either pharmaceutical or political, he had always admired the way in which he discharged all his duties.

The Chairman, Vice-Chairman and resident members were appointed a General Purposes Committee to take charge of any business arising between meetings.

The Assistant-Secretary submitted an estimate of the probable cost of the cleaning and painting required in the Society's House. This was remitted to the General Purposes Committee, with powers, as was also the making of arrangements for evening meetings during the winter months.

Mr. Paterson, Aberdeen, drew attention to the hour of meeting, which he said was too early for some country members. After some discussion, it was agreed that in future meetings of the Executive should be held at 1 p.m.

The Chairman said there was a matter of some importance which he understood had been troubling some of the members. He referred to the question as to the legality of their selling certain medicated wines. This was, he thought, a convenient opportunity for exchanging opinions on the subject. He might state that there had not been much difficulty in Edinburgh, but he was informed that in the north the Revenue authorities had been raising some difficulties.

Mr. Kinninmont, Glasgow, said that in Glasgow, Messrs. Frazer and Green and the Apothecaries' Company held a licence for the sale of such liquors as those mentioned by the Chairman. The former had four shops, but they only held the licence for one. They, however, could supply their customers in any part of Glasgow from the licensed premises. The latter gave an undertaking to the magistrates that they would not sell the liquors in question on Sundays. A gentleman in the Paisley Road had applied for a licence, but was refused. It had been suggested that the sale of certain specified wines by chemists only should be permitted, and that thus the difficulty would be obviated. He did not know whether that was practicable or not, but he for one strongly objected to the introduction of the American system of chemists selling liquor.

The Chairman: On what principle did the magistrates refuse the Paisley Road licence?

Mr. Kinninmont replied that they intimated they could only give a grocer's certificate.

Mr. Paterson, Aberdeen, said it was necessary to apply for a spirit licence as well, as the shop could not be opened on Sunday.

Mr. Kinninmont: And if they grant it to one they must grant it to all.

Mr. Boa asked whether the licences held by Frazer and Green and the Apothecaries Company were wholesale trade licences.

Mr. Paterson, Aberdeen, said he was aware that the licence of the Apothecaries Company was a retail one.

Mr. Storrar, Kirkcaldy, said he understood Messrs. Frazer and Green paid £12 12*s*. a year.

Mr. Kerr, Dundee, said he thought if anyone had a right to refuse it ought to be the Inland Revenue authorities. He himself held a wine licence, having had to take it out for Pearson's and Coleman's Wines. He had no trouble in getting the licence in Dundee, it being only necessary to have the application signed by two magistrates. The licence cost him £2 4*s*. 4½*d*.

Mr. Storrar, Kirkcaldy, said that was an ordinary grocer's licence, and asked how Mr. Kerr did with the officials if he sold after hours.

Mr. Kerr said nobody ever troubled him. He only sold medicated wines, but he was told he could sell all kinds.

Mr. Storrar, Kirkcaldy, said he could readily have obtained a licence, but did not take it, as he found he would be under the control of the magistrates in the conducting of his business. He could not then legally open on Sundays or even before 8 o'clock in the morning.

Mr. Paterson, Aberdeen, said if they took a £10 licence they could open on Sunday and sell at any time they liked. Under an excise licence they could legally sell any of the wines mentioned, and they would not be under police supervision in the same way as under the ordinary wine licence. Under the latter, with a judicious superintendent of police and Procurator-Fiscal they probably would not be interfered with. The magistrates, however, made no bargain with them, and if they took such a licence and opened on Sunday they were liable to prosecution and also if they sold after hours. Moreover, he suspected that if the superintendent of police had his attention drawn to the matter he would be bound to forward the case to the Fiscal for prosecution. Then, too, some one in the trade might use his power without any consideration for his neighbour, and action would at once be taken all over the country. That would be against the interests of the public, because there must be some means of obtaining necessary medicines on Sunday, and it would not do to have all the shops closed on that day. In the north they were having some trouble about this matter, and as far as he could judge, the best plan would be to get certain of these wines added to the Pharmacopœia, and then they would be saved any further trouble regarding them. He thought they should approach the Chancellor of the Exchequer, either through the Society or by the united action of the chemists all over the country. There might be a licence for medicated wines similar to what there was for British wines, and then sellers would not be subject to police supervision. It should also be remembered that if they were to sell certain quantities of these wines under a grocer's certificate they would have no recourse against anyone disputing their account. They would either have to get cash, or put it out of the account altogether. He put the question to an official in Aberdeen, and he said that the Tippling Act might be brought into force, and an ingenious lawyer might chalk all these lines out of a Bill. Another restriction was that they would have to supply their customers out of standard measures. If they got the Chancellor of the Exchequer to pass such an Act as he had indicated, it should be left to the Inland Revenue authorities to issue regulations, as they did in other departments, defining what were medicated wines.

Mr. Watt, Haddington, said he had the greatest possible objection to have anything to do with a wine licence. He feared they would be classed with a number of people who were very desirous to push trade in that direction. He trusted he would never see chemists pushing the sale of these wines.

Mr. Paterson said he would like to explain that the licence he proposed would not be held from the magistrates, but from the Excise, in the same way as that for methylated spirit.

Mr. Watt said he did not know to what extent these wines were sold by provincial chemists, but he felt sure the sale would not pay with an expensive licence. As he had already said, he would not like to see chemists cultivating this trade more than was indipensable. He had observed some time ago in the Journal a suggestion which seemed to him the easiest way out of the difficulty for those chemists who objected to hold licences. The proposal was that each bottle of these wines should have on it a special charge or stamp for the licence. He further thought that if the matter were inquired into strictly it would be found that chemists could not hold grocer's licences and also sell methylated spirit.

Mr. Storrar, Kirkcaldy, said he had a letter from the Board, giving him permission to hold both a wine licence and a methylated spirit licence, provided either the one or the other was received, stored, and sold in sealed bottles. The medicated wines were so put up.

Mr. Paterson, Aberdeen, remarked that pepsine wine was not.

Mr. Watt, continuing, said he would not like to see chemists going forward for a licence. They should rather repudiate the idea as much as possible and keep to their own business. The sale of these wines had become a large trade, and was being pushed very extensively, but whether or not it would continue he did not know. He could not help stating his strong aversion to chemists holding a wine licence, which would cover the sale of all sorts of wine.

Mr. Thompson said these wines were ordered by doctors and chemists must supply them.

Mr. Mackenzie said the real question was whether it was worth their while meddling with licences. Surely the makers of these articles could easily make them to be taken with wine, and allow the consumer to supply his own wine. The less they had to do with licences the better.

Mr. Maben, Hawick, said if any one applied to him for any of these wines he would say he did not keep it, but if he were furnished with a doctor's prescription he would get a bottle for him.

Mr. Kinninmont, Glasgow, said that was illegal. They ought to send them to the grocer next door. Chemists had no more right to sell these wines than they had to sell port or claret.

Mr. Strachan, Aberdeen, said that on the previous evening he had a conversation with one of the Revenue Officers on this question. He asked the officer whether he could supply eight ounces of pepsine wine just as he could supply eight ounces of rectified spirits. The answer was "No." He then asked if he would be at liberty to supply it to a doctor's prescription. The officer declined to frame an answer to the question; he said his personal opinion was that he (Mr. Strachan) ought not to be prosecuted, but he would not guarantee that he would not.

Mr. Maben, Hawick, said he would run the risk of dispensing a doctor's prescription. It was ridiculous to think they could not do so. The onus would lie on the doctor and not on them. He agreed with Mr. Watt that it was a very risky business to try to get a new licence for themselves. As to having a special licence for medicated wines, he would ask what were medicated wines, and where would they draw the line? They would be unable to fix a standard when they could say this was a medicated wine and that was not.

Mr. Thompson said the difficulty must be got over some way or another. They must either take out grocers' licences or give up selling these wines.

Mr. Paterson mentioned in regard to one of the Glasgow cases that they had circulated a statement that the licensed branch was not opened on Sunday.

Mr. Kinninmont said the Buchanan Street shop was closed on Sunday, but the Apothecaries' Company's premises were open all day, but on the distinct understanding that these wines were not sold. Were this permission granted generally he believed it would practically turn drug shops into shebeens.

Mr. Storrar pointed out that doctors would prescribe Coleman's wine, and there ought to be a scheme whereby they could fulfil the doctor's prescription without objection. He objected to taking a grocer's licence, but what he asked was, Was there no other way of getting over the difficulty?

Mr. Mackenzie said chemists should approach the makers of those articles, and get them to put them up in a form that would allow of their being sold without a licence.

Mr. Storrar said the makers would reply that they could get the grocers to sell them.

Mr. Watt again said that he thought the best plan was to put a stamp on the bottles equivalent to the licence.

Mr. Boa said that would still be open to objection, and might bring the sale under the Tippling Act. The proposed stamp might very easily be abused. They might be selling a wine that was nominally medicinal, but not so in reality. Many of the so-called medicinal wines were really not medicinal at all, but were sold for another purpose. People might buy such wines merely for a tipple, and the chemist would practically be on a level with the publican. While recognising the convenience in certain cases of taking out a grocer's licence for the purpose of selling these wines, he did not think it was a principle that should be recommended to the trade generally. His own feeling was that the sale of many of those wines, and he would not mention names, should be discouraged, because practically they were not medicinal wines, and it was a misnomer to call them so. With regard to really medicinal wines he did not think there was much danger of prosecution. If they made their pepsine wine in a proper manner for use only as a medicinal agent, though they might have no legal right to sell it, he did not think they would be prosecuted. The sale of spirits, such as brandy, even for a medical prescription, was quite illegal. If it were mixed it might be allowed.

Mr. Maben: But what if it is signed by a doctor?

Mr. Boa said the onus would be on the chemist and not on the doctor. If anyone came to him for one of these compound wines he told him he did not keep it, but recommended him to get a bottle of good port next door.

Mr. Nesbit, Portobello, said he quite concurred in the opinion that the less chemists had to do with these wines the better. If they took out a grocer's licence it would bring them down to the level of a publican.

Mr. Mackenzie said he thought they should utilize their organization as a society, and seek to obtain proper representation by having two members of the Pharmaceutical Society on the General Medical Council. In this way they might get the Medical Council to do something in the matter under discussion by adding these medicinal preparations to the Pharmacopœia.

The Chairman said the discussion had done good by showing those members who felt the shoe pinching that they must be prepared to take the consequences. If they took out a grocer's licence they saw what it involved. It seemed to be just out of the frying-pan into the fire. He did not think the discussion could be carried further that day.

Mr. Strachan said a meeting of the local Society had been held in Aberdeen on the previous night, and what Mr. Mackenzie had mentioned was practically what they resolved to do, namely, to send a request to the General Medical Council to insert formulæ in the Pharmacopœia for these medicated wines. He did not, of course, mean any of the proprietary medicated wines.

Mr. Paterson urged that the question should be put upon some clear legal basis, and he thought some representation to that effect might be made to the Council. It was unfortunate that they, as a body, should be selling pepsine wine, which he thought they were perfectly entitled to do, and be under the constant risk of being called to account for it.

Mr. Boa said they were not disturbed in Edinburgh.

Mr. Paterson said they were warned in Aberdeen, and prosecution had been threatened.

It was then resolved to adjourn further consideration of the subject till next meeting.

The meeting then closed.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The annual general meeting was held on Thursday, June 27, Professor Attfield, F.R.S., President, in the chair. The following report was read by the Secretary:—

Annual Report of Executive Committee.

The Executive Committee of the School of Pharmacy Students' Association have held three meetings for the transaction of the business of the session.

At a meeting held November 28, 1888, the Secretary reported that nomination papers had been printed at the commencement of the session, and forwarded to all members who had previously paid their annual subscriptions. At the same meeting the following members were appointed as a Committee of Reporters on the sciences allied to pharmacy: Pharmacology, Miss M. E. Buchanan; Practical Pharmacy, Mr. F. C. J. Bird; Botany, Mr. W. Wyatt; Materia Medica, Mr. W. A. Salter; Physics, Mr. E. J. Eastes; Organic Chemistry, Mr. A. C. Stark; Inorganic Chemistry, Mr. L. W. Hawkins; Analytical Chemistry, Mr. F. Browne.

At the same meeting, a motion was made by Mr. Sturton, that instead of all the meetings being devoted to reading papers, some should be of a social character. It was, however, pointed out by the Secretary that this would be contrary to the Rules of the Association, Rule IX. providing that "The ordinary meetings of the Association shall be devoted to the reading and discussion of papers and reports," and after some discussion, the subject dropped.

At a meeting held May 23, 1889, a grant of 7*s.* from the Research Fund was made to Mr. A. J. Simons to defray the expenses of his paper on Selenium, and a grant of 9*s.* to Mr. H. D. Fuge for the expenses of his paper on Cascara Sagrada.

At a meeting held June 27, the Secretary reported that the papers and reports of the previous session had been copied in type, bound, and presented to the Library of the Pharmaceutical Society, and that a letter of thanks from the Society had been received. An application from Mr. Latchmore for a grant of 14*s.* from the Research Fund, to defray expenses incurred in the illustration of his paper on Spectrum Analysis was considered and granted. The following statement of the Committee of Reporters was read by the Secretary on behalf of the Committee.

The Committee of Reporters on Science have, since their appointment in November, 1888, held two meetings for the transaction of business. At a meeting held December 6, 1888, the order of Reports for the ensuing session was arranged; the following reports have been made by the members of the Committee during the session:—"Report on Materia Medica," by Mr. W. A. Salter; "Report on Analytical Chemistry," by Mr. W. F. Browne; "Two Reports on Botany," by Mr. W. Wyatt; "Report on Organic Chemistry," by Mr. A. C. Stark; "Report on Pharmacology," by Miss M. E. Buchanan; "Report on Inorganic Chemistry," by Mr. L. W. Hawkins; "Report on Physics," by Mr. E. J. Eastes; "Report on Practical Pharmacy," by Mr. F. C. J. Bird.

This statement was approved by the Committee.

The following statistics show the progress of the Association durring the Session:—The number of members on the books is 66, being four less than last session; on the other hand the attendance at the meetings, which showed a marked increase last session, has still further improved. The number of meetings held has been thirteen, including to-night's annual meeting, and the gross attendance 290, making an average attendance of between 22 and 23 at each meeting. The number of communications read has been 27, viz., 9 reports already mentioned and 18 papers or notes, of which the following is a list:—"Introductory Address," by Professor W. R. Dunstan, M.A.; "Spirit of Sal Volatile, and its Estimation," by Mr. C. W. Andrew; "Sir Humphrey Davey," by Mr. C. B. Bell; "Tests for Pilocarpine," by Mr. L. Ough; "Euonymins," by Mr. W. T. Jones; "Mercurous Iodide," by Mr. W. Allen; "Alums," by Mr. J. B. Thornley; "Cascara Sagrada," by Mr. H. D. Fuge; "The Preparation of Aloin," by Mr. T. Woodruff; "Lactic Acid," by Mr. C. J. Wain; "Combustion in Moist and Dry Oxygen," by Mr. R. H. Bremridge; "Selenium and its Compounds," by Mr. A. J. Simons; "Beer and Brewing," by Mr. W. W. Crisp; "The Tees-side Iron Industry," by Mr. W. J. Talintyre; "Notes on Dispensing," by Mr. Albert Smith; "The Composition of a Counterfeit Half-crown," by Mr. C. W. Andrew; "Telephones," by Mr. G. S. Fuller; "Spectrum Analysis," by Mr. A. Latchmore.

Seven of these papers and four reports have been published by the Editor of the *Pharmaceutical Journal*, as well as abstracts of all the others.

The Treasurer's accounts, to be presently audited, show that the receipts have amounted to £8 17*s.* 0*d.*, and the working expenses to £8 17*s.* 4½*d.*; in addition, grants have been made from the Research Fund, to the extent of £1 10s., leaving a balance of £20 10s. 1½*d.* to the credit of that fund.

Messrs. Burridge and Marsden were then appointed to audit the Treasurer's accounts, which they reported to be correct.

The report was then, on the motion of the Chairman, seconded by Mr. W. T. Jones, adopted by the meeting.

The business concluded with votes of thanks to the President and other officers of the Association.

At the conclusion of the meeting, Mr. Fuge, on behalf of the students of the school, said they had very recently learnt that Mr. E. White was about to resign his post of Junior Demonstrator, and they desired to show their appreciation of his services. They had not yet had sufficient time to prepare an address and get the names of all who wished to participate in it, but as this would be their last opportunity of meeting Mr. White publicly, they would ask the Chairman to present him with a silver-mounted cane as a mark of their cordial esteem.

The cane was then presented by the President, who spoke of the pleasure it gave him to find that Mr. White's work in the laboratory was so well appreciated, and he felt sure Professor Green would think the same of his work with the Practical Botany classes.

The gift was suitably acknowledged by Mr. White, who was received with great enthusiasm.

The proceedings then terminated.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth botanical excursion of the season took place on Wednesday, June 26, to Blackford Hill. Twenty-four members met at the Blackford Hill Station at 9 p.m., and had a most delightful and profitable ramble round the western base of Blackford and down the banks of the Braid Burn, reaching town again about 11 p.m. A large number of interesting specimens were collected, including *Conium maculatum*, *Digitalis purpurea* and *Sambucus nigra*. Structural as well as systematic botany came in for a large share of attention, many students preparing for examination finding these rambles valuable opportunities for acquiring that practical knowledge of plant forms demanded of the pharmaceutical candidate. The next excursion takes place on Wednesday, July 10, to Craigcrook, by train from Caledonian Station at 5.50 a.m. and returning from Craigleith Station at 8.1 a.m.

Parliamentary and Law Proceedings.

A BILL TO AMEND THE MEDICAL ACT, 1886.

The following is the text of the Bill referred to at the meeting of the Council (see before, p. 16):—

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1. *Short Title and Construction.*—This Act may be cited as the Medical Act, 1889, and shall be construed as one with the Medical Acts.

2. *Medical Corporations within the Meaning of the Medical Act,* 1886, *entitled to Grant Registrable Diplomas in Sanitary Science.*—Every body being a medical corporation within the meaning of the Medical Act, 1886, or any two or more of such bodies acting in combination, shall be competent to hold special examinations and to grant diplomas in sanitary science, public health, or State medicine; and every holder of any such diploma shall, subject to the provisions of section twenty-one of the said Act, be entitled to have such diploma entered in the Medical Register, in addition to any other diploma or diplomas in respect of which he is registered under the Medical Acts; and every such diploma shall be deemed to be a diploma in sanitary science, public health, or State medicine, under the said section within the meaning of section eighteen, subsection two, of the Local Government Act, 1888, for all other purposes.

Obituary.

Notice has been received of the death of the following:—

On the 22nd of May, Mr. John Flint, Chemist and Druggist, Ranelagh Place, Liverpool. Aged 70 years.

On the 27th of June, Mr. James Crispe, Pharmaceutical Chemist, Cheapside, London. Aged 68 years. Mr. Crispe became a member of the Pharmaceutical Society in 1859 and in 1864–5 he filled the office of Auditor.

On the 29th of June, Mr. Robert Brady Wade, Chemist and Druggist, Southdown Road, Shoreham. Aged 35 years.

We regret to have also to announce the death from brain fever of Mr. Henry Allen, B.Sc. Mr. Allen was a Bell Scholar in 1877, and in that session obtained a silver medal in each of the three departments of the School of Pharmacy, viz., chemistry, practical chemistry, botany and materia medica. In the following session he obtained the Society's Bronze Medal and held the position of Assistant Demonstrator in the Chemical Laboratories. During these years he was an active officer of the School of Pharmacy Students' Association, to which he contributed several valuable papers that have been printed in this Journal. In 1880 Mr. Allen became an assistant in the Patent Office, having been appointed on the results of an examination in mathematics, physics, and chemistry. Latterly he was promoted to an Assistant Examinership of Patents. In 1882 he proceeded to the degree of B.Sc. at the London University, which he took with considerable distinction.

ANSWERS TO CORRESPONDENTS.

Forcep.—We know of no perfectly safe anæsthetic that answers to all the conditions mentioned by you. A 10 per cent. solution of cocaine is now frequently injected into the gum before removal of a tooth, but it is desirable that three or four minutes should elapse after the injection, before application of the forceps, to allow for absorption of the cocaine.

Cymro and W. H. are referred to the rule as to anonymous communications.

E. Polack.—(1) The colouring matter could be obtained through almost any wholesale chemist. (2) For information respecting "universal gum" see the *Pharmaceutical Journal* for November 6 last, p. 861.

An Associate.—Your letter will certainly not admit of publication without the authentication of your name. We have therefore handed it to the Board of Examiners.

J. Morcombe.—(1) *Lycium barbarum.* (2) *Chiococca racemosa.* (3) *Arenaria serpyllifolia.* (4) *Sagina procumbens.* (5) *Alchemilla arvensis.* (6) No.

F. Gall.—*Sherardia arvensis* and *Asperula cynanchica.*

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Wilkerson, Porteous, Hill, Burroughs, Wellcome and Co., Rentoul, Brunton, Barron, Harvey and Co., Thompson.

LESSONS FROM FIELDS AND LANES.

JULY.

"The flaunting flowers our gardens yield
High shelt'ring woods and wa's maun shield;
But thou beneath the random bield
O' clod or stane,
Adorns the histie stibble field,
Unseen, alane."

When Burns wrote these lines to the daisy he expressed in a few pretty words one of the most important characters of the order to which it belongs. The *Compositæ*, or at least the bulk of them, court the north wind, and are at home in soil which to many plants would mean utter starvation. They are more widely distributed than any other order of plants; they have acquired the "knack" of occupying crannies and corners inaccessible alike to plant and animal; their species and varieties are innumerable, and run so nearly into one another that the mere mention of the word *Compositæ* raises in the brain of the plant-hunter ghosts of a *pappus* which is neither pilose nor plumose, of ray florets which might or might not be hairy at the tip, of an involucre which might either be imbricate or one seriate, of fruits whose beaks might be long or short, or not there at all, of anthers whose tails might be there in their full glory or might have succumbed to social conditions, of styles which decline to be called either yellow or livid. During the whole year some of the members of the order are to be found in flower, but towards the end of June they begin to show what can be done by a unanimous effort, until in July the landscape owns them in many places as its most conspicuous feature.

The part of the dandelion or the daisy which is popularly known as the flower is not a flower at all, but an inflorescence; it is known as a *capitulum*, or head, and consists of a great number of sessile flowers crowded together on the flattened end of the common flower stalk. The stamens of these little flowers—or florets, as they are called—are joined together by their anthers, and form with the style a single column (*syngenesious*). The florets vary in shape, and this variation forms an important factor in the sub-division of the order. In the dandelion, which is typical of one division, they are all *ligulate*, or strap-shaped, that is, the corolla forms a flat band or strap-like body; if, however, this be traced to its base it will be seen that it ends in a little tube. The whole corolla was once tubular throughout, but has become modified in the direction of greater attractiveness. It will be noticed that the strap has five teeth at its apex; these are all that is left of five petals which once formed the corolla. The corolla of the dandelion then must originally have consisted of five separate petals, but as development proceeded these petals became united to form a *gamopetalous* tubular corolla. Some of these tubular corollas probably showed a tendency to flatten out so as to make themselves more conspicuous than their neighbours; the heads with the most showy flowers would be favoured with the greatest number of visits from insects, which are notoriously fond of things gaudy, and the consequence would be that the showiest heads would be the most thoroughly cross-fertilized, would therefore—as we have already seen—produce the most healthy offspring, and it would follow as a matter of course that these would stand the best chance of surviving—in the event of a struggle for life becoming necessary through scarcity of food, want of space, or other of the causes which are always at work weeding out the least fit. In the thistle and the hard-head or knap-weed, which represent a less developed division of the order, the florets are all tubular, while in the daisy we have an intermediate form, the central florets being tubular and the outer or ray florets being ligulate and of a different colour to those of the disc. The daisy is a well-marked example of what might very fitly be termed a natural law,—that development in the direction of extra showiness is almost always accompanied by a sacrifice of more essential organs, the showy ray florets of the daisy and its near relations, the "marguerites" or "moon-pennies," and the chamomiles, being possessed of a pistil only, and sometimes not of that. In the guelder-rose, a tree belonging to the same order as the elder, and now to be found in flower in copses, the same law shows itself in an equally marked degree; the outer florets of the inflorescence are much larger than the inner ones, but are quite innocent of either pistil or stamen.

Many of the composites, such as the dandelion and the goat's beard, are already in good condition for the examination of the fruit. The ovary is *inferior*, and is therefore to be looked for at the base of each of the florets, both corolla and calyx being on the top of it. The fruit, or fertilised and developed ovary and appendages, consists in the composites, of the ovary and a *persistent* calyx. The ovary is one-seeded, and the calyx in many members of the order, such as those just mentioned, is *pappose*—that is, the sepals have become reduced to hairs, which are sometimes rigid and sometimes soft and feather like, the form they take being an important means of distinguishing the genera. When the corolla has died off, the pappus develops considerably, spreads out, and with the help of the wind carries the seed and its embryo plant to pastures new. Who in his young days, when his imitative faculties were at their highest, has not tried to tell the "time o' day" by exercising his lungs on the pappus of the dandelion, or of the "cat's ear," a plant which has now taken the place of the dandelion in dry pastures, and is easily distinguished from it by its branched tough peduncle? The leaf-like bodies which surround the capitulum of composite plants and look like a calyx, are *bracts*, and form a good example of an *involucre* or ring of bracts.

In the light of what has just been said about the general structure of the *Compositæ*, it is comparatively easy to understand their wonderful adaptability to such varied conditions of climate and soil. Their wonderful "physique" they owe mainly to the almost universal practice of cross-fertilisation among them. The factors which bring this about are the conspicuous nature of the inflorescence, due to the collection of so many flowers in one mass and also in some cases to its brilliance and variety of colour; the absolute certainty of promiscuous pollen distribution among flowers so thickly set; and the easy accessibility of the honey to all kinds of insects, so encouraging a repetition of their visits. The honey is secreted at the base of the style and collects in the tube of the corolla; it is thus so easily sipped that the plant obtains insect allies of all varieties. The healthy influence of cross-fertilisation is intensified by the power possessed by the seeds of traversing large areas, so enabling them not only to reach fresh soil, but also to obtain foothold in places which are inaccessible to other plants, and where consequently the struggle for existence is less keen and the chance of survival infinitely greater. The high state of development of this order is wonderfully apparent in the contrivances some of its members have adopted for saving labour. While the calyx of each separate flower serves as a means of transport for its seed, there exists an involucre which, from the crowded position of the flowers, is enabled to act as a general protective calyx to the whole inflorescence, thus obviating the necessity for a protective calyx in the individual florets. The style serves not only as a channel by which pollen from another flower can reach the ovules at its base, but also as an instrument for distributing the pollen from the anthers of its own flower. But in order to understand this a little explanation is necessary. The flowers of composites are what is known as *dichogamous*, which means that the stamens and pistil reach maturity at different times; they are, moreover, *proterandrous*—that is the stamens ripen before the pistil—and the anthers generally discharge their pollen on the style before the flower opens. On the opening of the flower the style elongates, carrying with it—sometimes by means of hairs which form a brush on its outer surface—the pollen grains, which are then deposited on the first intruder; after this has been accomplished the style comes to maturity, splits in a forked manner at the apex, and exposes its sensitive stigmas, which are then in a position to make use of any pollen which comes their way from another flower. It will be at once seen that this contrivance, besides being of a labour-saving nature, renders self-fertilisation an impossibility, at least so far as the individual florets are concerned. Another direction in which the order has developed is exemplified by the thistles, which have found it necessary to protect themselves from the attacks of browsing animals and have, therefore, adopted a spiny covering.

The foxglove (*Digitalis purpurea*) is now at its best for examination, and from its important position in medicine should be of especial interest to pharmaceutical students. It is one of our noblest indigenous plants and is certainly July's most conspicuous floral ornament. The characters of its order (*Scrophulariaceæ*) have already been referred to and are nowhere better seen than in it. The corolla is generally described as *campanulate* and somewhat flattened, while the didynamous and epipetalous stamens are exceedingly well marked. The inflorescence is the best example obtainable of a *raceme*; in this the order of expansion of the flowers is *centripetal*, or *indefinite*, that is from the circumferences inwards, or, which is the same thing, from the bottom upwards. The foxglove can always be found with a number of fruits at the base and buds at the apex of the stem. It will be noticed that the flowers are all *stalked* and arranged at different heights on a *rachis*. This is always the case in the raceme, and serves to distinguish it from the *spike* and the *corymb*, in both of which the order of expansion is indefinite, but the former has the flowers sessile and at different heights, while the latter has them at different heights but with stalks of different lengths, the lengths being so arranged that the flowers form an almost flat topped inflorescence.

Another plant of pharmaceutical note now to be found in flower in moist places is the valerian (*Valeriana officinalis*). It varies in height from 1½ to 4 feet; the leaves are *pinnate*, and the leaflets generally *serrate*, the flowers are pink or lilac, and sometimes even white; the corolla is a well-marked example of the *saccate* or *gibbous* form, so called from the little sac into which its base is expanded; in this sac or pouch is secreted the honey, and the insects which would sip of it must first run the gauntlet of the pollen-discharging anthers, and the pollen-seeking stigma. As in the *Compositæ*, the valerian is *proterandrous*, and this is only one of the points in which the two orders resemble one another. The calyx is pappose, but must be looked for when the fruit has reached a late stage of development. It will be noticed also that the flowers are crowded together, although not so much so as in the capitulum, but that the central ones are the first to expand; this is characteristic of the *cyme*, the type of *definite* or *centrifugal* inflorescence; in everything but the order of expansion of the flowers the cyme of valerian resembles a corymb, it is therefore generally described as a *corymbose cyme*. The odour of valerian when growing is far from suggestive of the pharmaceutical drawer labelled "*Rad. Valer.*" If, however, the root be dug up and dried, it becomes at once apparent, even to the first year's apprentice, who has neither lived in the country nor studied systematic botany, that he has got the right thing.

Even at the risk of exceeding our limits of space we cannot leave the lessons of July without some reference to that most interesting of all our British orders, the *Orchidaceæ*. So long as a century ago the remarkable structure of the flowers of this order formed the subject of a treatise by Sprengel. He was succeeded in his investigations by Hooker and Robert Brown; but it was reserved for Darwin to take up all the loose threads at the points where they had been left incomplete by these observers, and by means of his masterly observations to weave them into a fabric of scientific fact than which there is none more beautiful, nor at the same time more difficult to rend. The important bearing of the subject on biology in general and the remarkable nature-interpreting faculty of the worker are brought into greater relief by the remembrance that Darwin's treatise on the subject, extending to nearly four hundred pages, was written amid the storm of abuse, criticism and misunderstanding following the publication of the 'Origin of Species,' which had appeared three years before.

The orchids which are indigenous to tropical countries, and which in England are only to be met with in hot-houses, are so bold in their habit and structure and so brilliant and varied in their colouring that in the popular mind, which is more familiar with nature in a hot-house than with nature at home, these qualities are generally associated with the whole order. So much is this the case that the exhibition of one of our indigenous species often gives rise to a look of disappointment, sometimes of doubt. British orchids, generally speaking, are delicate and retiring in their habits and, when compared with their tropical relatives, not by any means striking in their colouring, although under very favourable conditions they do sometimes show a tendency in this direction. They are, however, no less perfect in their adaptation for fertilization by insects. Perhaps the most showy member of the order is the butterfly orchid (*Habenaria bifolia*), which may be met with now in moist situations. In the neighbourhood of Bridge-of-Allan, N.B., we have met with this in great profusion, forming, indeed, the most conspicuous feature in the vegetation of both sides of the road for miles, and looking "so like an orchid," that it would have been sure to be taken for such by anyone who had been reading popular literature on the subject, and who would accordingly have a tendency to place in this order any plant which looked striking or beautiful. Perhaps the most likely members of the order to be met with, however, and also the most suitable for examination at present are the spotted orchis (*O. maculata*) and the marsh orchis (*O. latifolia*). The former is to be met with in woods and the latter in bogs; they are scarcely distinguishable from one another, and differ only in some unimportant particulars. They vary in colour from deep to pale purple, the flowers are in spikes; the leaves radical, lanceolate, generally spotted, and parallel veined (characteristic of *monocotyledons*). The roots are tuberculated, and the tubercules which compose them are divided in a *palmate* manner. The envelope of the flower is called a perianth, because it consists of a whorl representing the petals, and one representing the petals but indistinguishable from one another. The lower petal is large and hangs down like a *lip*, and is hence called the *labellum*. If this is traced backwards it will be found to end in a long *spur*. The ovary is *inferior* and twisted, and appears to form a stalk to the flower. If the ovary be traced forward into the mouth of the flower, it will be found to end in the stigma, which is sessile, broad, and sticky. Rising from the upper side of the stigma are two little elongated sacs, which are the anther lobes, and form with the stigma a single column; the flower is therefore said to be *gynandrous*, that is, having stamen and pistil forming one mass. Each of the anther lobes contains a mass of pollen glued together to form a club-shaped mass and provided with a stalk. The lower ends of the stalks are provided with a sticky disc, and curve towards one another just above the stigma, being concealed by a little process called the *rostellum*. The moment an insect's proboscis or head touches the rostellum, it becomes depressed, the insect comes in contact with the sticky discs attached to the *pollinia*, and in the act of pulling its head back pulls the pollinia out of their pouches; the cement on the discs sets hard and the insect flies away with two horn-like bodies attached to its head. If these remained in their original position it will be seen that if the insect visited another flower of similar structure they would not get near the stigma, but would touch the pollen pouches only, and therefore fail in their purpose. Nature, however, never does things by halves. As soon as the pollen masses are removed from their pouches the stalks—or *caudicles*, as they are called—begin to bend over, until they assume a position at right angles to their original one; thirty seconds it takes to complete the process, and by this time the insect has generally reached another flower, and the pollinia are placed on the centre of the stigma, whose sticky surface relieves the unconscious insect of its precious burden. The whole mechanism may be studied in either of the orchids mentioned by substituting for the insect's head the point of a pencil, and the veriest novice who watches the process and understands its purpose cannot fail to be impressed with the wonderful adaptive power of nature, and the high state of perfection to which she has brought some of her favourites.

THE PARIS UNIVERSAL EXHIBITION.

(*Continued from page* 3.)

As previously stated, by far the greater number and the more important of the exhibits in connection with chemistry and pharmacy in the Paris Exhibition are to be found in the French court on the east side of the principal building. The actual area of this court is given as 1667 metres, of which about 700 metres are covered by the cases. The general appearance of these cases marks a most important difference in the control exercised over French exhibitors as compared with that which obtains generally in exhibitions in this country. Instead of allowing each individual an excessive latitude as to the design and ornamentation of the case in which he exhibits his goods, the cases in this court are all constructed on a harmonious plan, being, with one or two exceptions, either tall glass cabinets continuous along the walls, or isolated quadrangular blocks of uniform size, all painted black and moderately set off with gold.

When attention is turned to the contents of the cases it soon becomes apparent that strictly pharmaceutical exhibits are far from being relatively numerous, and do not form so prominent a feature as they did even in the corresponding part of the exhibition of 1878. This may partly explain the fact, which is made the subject of editorial complaint in *L'Union Pharmaceutique*, that the French Jury of Awards for the class of Chemical and Pharmaceutical Products, though it includes professors and manufacturers, has not a single practical pharmacist among its members. Now, as then, probably among the first things that will catch the pharmacist's eye, in consequence of their beauty of colour and generally fine appearance, will be the dry extracts prepared *in vacuo*, which by a little atmospheric manipulation towards the close of the operation are made to assume an elegant frothed appearance. Whether any further real advantage results from this treatment is perhaps somewhat problematical, nor does the frequency of their appearance as exhibits suggest that they are making any particular progress in pharmaceutical favour. Such preparations are to be seen in the case of Adrian and Co. (Société française de produits pharmaceutiques), of Paris, and in that of A. Grandval, of Reims, who shows, among others, alcoholic extracts of nux vomica and coca, and aqueous extracts of rhubarb, rhatany, red cinchona and roses, the last mentioned especially being of very fine colour. In addition to frothed dry extracts, Duboé-Dausse and Boulanger, of Paris, exhibit a series of very good-looking soft extracts, the fine colours of which are made manifest by placing thin layers between glasses comparable to lantern slides and suspending them in suitable lights. By this means the extract of Indian hemp is shown to be of a rich olive green colour, while the beautiful red of the extract of Provence roses is equally well brought out. Saccharated pharmaceutical extracts and various alcoholates and concentrated tinctures are also shown by C. Mouyssot, of Asnières. Extract of malt is shown in the French court by E. Déjardin, of Paris, who with somewhat unusual frankness gives to his preparation the alternative name "bière diastasée." This exhibitor also exhibits several allied preparations in which malt extract or "wine" is combined with various medicinal substances, as, for instance, coca. In the British court the makers of the well-advertised "Kepler" extract of malt are represented. Mention may be made here also of the preparations of pepsin and pancreatin and of the peptones produced by their action upon various alimentary substances. One of the most interesting exhibits of these is to be found in the case of J. J. T. Defresne, of Paris, which renders more regrettable a report that this exhibitor has, by a breach of etiquette in the offer of a bribe, deprived himself of any possibility of official recognition. This display includes peptone produced by the action of pancreatin upon meat, peptonized milk, cod liver oil emulsified by pancreatin, pepsin said to be able to convert 150 parts of fibrin, and diastase saccharifying 500 parts of starch and dissolving 2000 parts, claims which, by the way, are fairly moderate when compared with some that are put forward now-a-days on behalf of such substances. The activity of the pancreatin is practically demonstrated by the exhibition of a skeleton suspended in liquid in a bottle, as representing the undigested remains of a fowl that originally weighed eight kilograms. More interesting, perhaps, from a scientific point of view are the shining transparent scales of "steapsine," and the bright lemon-coloured scales of "amylopsine," which according to Defresne are the active constituents of pancreatin, the former being capable of breaking up twenty-four times its weight of fat, but not affecting starch, whilst the latter can saccharify twenty-five times its weight of starch, but does not attack fat. Other allied exhibits will be found in the cases of Chassaign and Co., of Paris, who show a series of "graded" pepsines; in that of P. Boeuf, of Paris, who displays pepsin in paste, powder, scales, granules and liquid, and in wine and pastilles, as well as some dry and syrupy peptones; and in that of J. A. Chassevant, who also shows pepsine pastilles. In the Belgian court A. Denaeyer and Co., of Brussels, exhibited his "liquid peptonate of iron," and similar preparations.

Another class of preparations that will force themselves upon the attention of the pharmaceutical visitor consists of the dragées, pilules, granules and perles that have taken so much more prominent a place in medicine during recent years. Concerning the exhibits little more can be said than that if efficacy depended only upon elegant appearance these preparations would be as nearly perfection as possible. In fact, it is in the presence of this marvellous perfection of external manipulation, lying far beyond the possibilities of most individual pharmacists, that the suspicion gathers force whether in some quarters the time has not come when in the words of a French contemporary "le pharmacien ne fait plus qu'acheter les médicaments." All well-wishers to the art of pharmacy, and in fact to the science of medicine, will, however, join in the hope expressed that there will always remain a certain number of pharmacists with a proper respect for their art, who will deem it a point of honour to make all their preparations with materials purchased by themselves and tested or analysed in their laboratories, since this is the only way by which they can place themselves in a position to guarantee the purity and quality of the medicines sent out from their establishments. With this reservation only words of praise can be used in respect to the general appearance of the exhibits of A. Le Couppey (Société de perfectionnement), of Paris, which includes dragées of ergotin and granules of santonin in the shape of comfits; of the perles, capsules, pastilles and pilules of Rigaud and Chapoteaut, of Paris, Duperron fils, of Flers, and of Vée and Co., of Paris, as well as of the "confiserie pharmaceutique" of Roudel frères and Genestout, of Bordeaux. Lastly, Homolle and Blaquart, of St. Denis, exhibit granules of Homolle's digitalin side by side with preparations of their "fer Quevenne." Closely associated with these are the capsule preparations, also of French origin, which are well represented in the case of Capgrand-Mothes, of Paris, and C. Thévenot, of Dijon. One of the substances exhibited, thus inclosed in capsules, by A. Lamouroux, of Paris, is the apiol of Joret and Homolle. It may be remarked that this exhibit is just one of those that might be made very much more interesting by a little added information. In this case, beside the capsules, are tall glasses containing liquids labelled respectively "apiol," "light oil of parsley," and "heavy oil of parsley," as well as a white crystalline substance. Now the substance to which the name "apiol" was first applied by Joret and Homolle was a yellow, oily, non-volatile liquid, denser than water, and having a peculiar taste and smell, obtained by exhausting parsley seeds with alcohol (sp. gr. 0·890), treating the tincture with animal charcoal and driving off the spirit (*Pharm. Journ.*, [2], iv., 270). It was this heavy oily liquid that was put forward originally in 1855 as a febrifuge, and which has attained a certain amount of reputation as an emmenagogue. But in 1880 H. C. Whitney asserted that the emmenagogue properties of parsley seed are chiefly, if not entirely resident in the volatile oil of parsley, which occurs in the seeds to the extent of upwards of 4 per cent. and forms a constituent of Joret and Homolle's "apiol." Meanwhile, as if to add to the confusion Gerichten reported that he had obtained from parsley seeds a camphor, to which alone he claimed the name "apiol" must be appropriated. It seems probable that in the articles mentioned as being shown in this case all these substances are represented, but the spectator is unaided in their identification and uninformed as to how far the statements that have been made concerning apiol are accepted or denied by the exhibitor. It may be mentioned that it has been stated that the disagreeable taste of apiol is satisfactorily covered by oil of peppermint. Another now familiar method of administering nauseous powders is shown in the unfermented paste wafers of Limousin and Co., of Paris. Close by these may be seen minute "ampoules" of glass, adapted for holding the liquids used in hypodermic processes of Pasteur.

Ointment bases are represented in very few cases. Lancelot frères, of Paris, exhibit several preparations made with "pétréoline," and the fine green colour of the "pommade épispastique au garou" and the red of the "pétréoline-cerat à la rose" well illustrate the advantages presented by pétréoline and similar hydrocarbons in this direction. Pétréoline, which is described as having somewhat superior consistence to vaseline, over which it is also claimed to present some advantages for the purposes of the pharmacist, is said to melt at 35° C., boil at about 300° and distil without residue, but at the same time to decompose, the products giving off the odour of petroleum. It is admitted also that prolonged exposure to the rays of the sun develops a slight odour of petroleum. At 50° C. it has a density of about 0·840. Pétréoline is said to be also employed by manufacturing perfumers in preference to fatty substances, and there is evidence in more than one part of the exhibition that the mineral hydrocarbons are being now employed as a pommade material. The method of use is said to be the same as with fats and oils, sometimes maceration in a water-bath at 40° C., and sometimes by cold enfleurage. The mineral hydrocarbon is said to possess a greater affinity for odours than either solid fats or oils, whilst it is itself inodorous and incapable of rancidity. Another point is that in recovering the odorous constituent from a fatty mother pommade by extraction with alcohol some of the fat always dissolves together with the essential oil in the alcohol and has to be removed; pétréoline, on the contrary, being insoluble in cold alcohol, does not involve that inconvenience in its use. One interesting statement made with regard to the action of pétréoline upon resin is that whilst this substance will take up the odour and the colourless portion of an aromatic resin, as, for instance, Siam benzoin, it will reject the coloured or oxidized constituents which impart to an alcoholic tincture a resinous and acrid taste. By subsequent liquefaction of the benzoin pommade in alcohol, and shaking, and decantation of the liquor after the mixture has cooled, a very aromatic colourless tincture is obtained that when sweetened is said to constitute a delicious table liqueur. Similarly the resino-acrid principle can be removed from Norwegian tar, which, however, remains coloured, but the pommade yields very aromatic concentrated alcoholic solutions of tar. The only other noticeable exhibit of unguentous material is by Burroughs, Wellcome and Co., of London, who show lanolin and preparations in their case in the British Court. Among other outward applications mention may be made of displays of spread plasters in the case of E. J. Grorichard, of Besançon, and H. Jouisse, of Orleans. But the greater number of preparations of this kind take the form of specialties, to which vesicating and allied applications, from thapsa resin to Rigollot's mustard leaves, supply a large contingent. "Inalterable linseed meal," exhibited in packets, by Boggio and Aulagne, of St. Etienne, is presumably simply ground linseed from which the natural fixed oil has been removed, to be replaced by olive or some other oil when the meal is required for poultice-making. Antiseptic and surgical dressings in general are fairly well represented. Antiseptic gauze and ointment, lint, iodized lint, and lint saturated with 10 or 20 per cent. of iodoform, are shown by A. Beslier, of Paris, and in addition to similar articles C. J. Desnoix, of Paris, shows antiseptic catgut. Le Beuf, of Bayonne, shows certain "emulsions médicamenteuses cicatrisants," said to be adopted in the Paris hospitals, the preparations consisting apparently of tolu balsam, oil of cade, coal-tar and similar substances emulsified by means of saponin. Bougies, suppositories and similar articles are shown by Reynal, of Paris, as well as the pencils, or "porte-rémèdes," associated with his name.

It only now remains to mention, before leaving this section of the subject, that several cases in the French as well as in the foreign courts are devoted to specialties more or less approximating to quackery, pure and simple. Some of the specialties, however, are particular preparations of known medicines. As instances of the latter may be mentioned the case of A. Langlebert, of Paris, where will be found preparations of *Convallaria majalis*, with which his name is associated in pharmaceutical literature, and of *Plantago psyllium*, which is claimed to be useful in affections of the alimentary canal, and, indeed, according to Dymock, the seeds of the plant have a special reputation in India as a remedy in dysentery. This case is made additionally attractive to the general visitors by the bed of it being covered by a mass of a very good imitation of lily of the valley.

In the next notice it is proposed to refer especially to the pharmaceutical and fine chemicals that are to be seen in the exhibition.

(*To be continued.*)

THE SPONGE FISHERY AND TRADE OF THE UNITED STATES.*

BY RICHARD RATHBUN.

(*a*) *The Commercial Importance of Sponges.*—The sponge trade of the United States is very extensive, and supplies are obtained from all the principal sponge-producing regions of the world, not the least important of which is the coast of Florida.

All of the various grades of commercial sponges belong to a single genus, called Spongia, and, according to an eminent authority on the subject, may be divided into four natural species, including at least nine sub-species and a great number of varieties. One of these species, the Spongia graminea, an inferior grade of the grass sponges, is peculiar to Florida, but the other three species are common to both the Old World and the American grounds. They are as follows: Spongia officinalis, including the Levant toilet sponge and the Turkey cup sponge of the east, and the glove sponge of Florida and the Bahamas; Spongia equina, containing the horse sponge, the Venetian bath sponge and the Gherbis sponge of the Mediterranean, and the noted sheepswool sponge, the velvet sponge, and a portion of the grass sponges of American waters; Spongia agaricina, including the Mediterranean Zimocca sponge, and the American yellow sponge and "hard head."

The several varieties of sponges, based upon differences in structure, and the numerous qualities, resulting in part from the diverse influences of environment during growth, have given rise to the many commercial grades according to which sponges are classified and sold in the markets. The Florida grades, strangely enough, have never been increased in number above the six sub-species recognized by naturalists as belonging to that region, and they are designated under five names—the same term, grass sponge, having been applied to two of the sub-species. These grades, arranged about in the order of their value, are as follows: Sheepswool, velvet, yellow, grass and glove. The sheepswool sponges are by far the the finest in texture of any of the American grades, but the relative qualities of the other grades are not always clearly defined; at least the dealers differ greatly in their opinions regarding them, and the market quotations do not always place them in the same order. The Bahama sponges, although identical subspecifically with the Florida, and including the same five principal grades, are still further subdivided, making a total of about fifteen grades recognized by the New York dealers. The secondary divisions are based mainly on differences in shape and on the comparative openness of the texture. The Mediterranean grades number as many as twenty-five, in the classification of some of the New York importers, but not a few of these must be founded on differences of slight importance.

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* From the Report of the United States Fish Commission. Reprinted from the *Oil, Paint and Drug Reporter*, June 5.

The finest grades of sponges are the so-called Turkey sponges of the Mediterranean, the wholesale prices of which range from about $5 to $50 dollars per pound. Next in quality are the sheepswool sponges of Florida and the Bahamas, bringing from $1·50 to $2·25 per pound. Notwithstanding this great difference in price between the Turkish and the sheepswool sponges it is not now generally considered that the latter is so inferior in quality to the former as their respective market values would appear to indicate, and for many of the nicer purposes for which sponges are used, the Florida sheepswool grade is often preferred. The sheepswool sponges are not quite so fine and close in texture, but they are equally elastic and far more durable, and when properly prepared, greatly outlast the Turkish sponges. The fact that the latter are more carefully bleached, and therefore generally present a cleaner appearance, and also that they are an imported article adds greatly to their value in the opinion of most persons. The American trade in foreign sponges is very extensive, all of the New York sponge houses engaging in it, while two or more deal in no other kinds.

The Florida sheepswool sponges are now regarded more favourably in the New York market than the Bahama sponges of the same name, the difference in quality being due, it is said, partly to the character and mode of growth, and partly to the method of preparation. Although belonging to the same species, the texture of the former is naturally somewhat the finer, and the masses grow in better and more compact shapes. An examination of a large assortment of Bahama sheepswool sponges as received from the producers will show that a considerable percentage are pierced from below by large and irregular cavities, which sometimes penetrate nearly to the top. These are said to be mainly produced by the irregular character of the bottom on which they grow, but they probably also arise from a natural tendency to form a more open structure than the Florida sponges.

This grading of sponges according to compactness or solidity of structure is also recognized in classifying the Turkish and other Mediterranean varieties. For instance, the Turkish sponges are first graded according to their texture, into fine, coarse, etc. Then the finer and other grades are again sorted with reference to shape and solidity, the rounder and more compact forms being regarded as the best, while those of a flattened or very irregular shape, or with very many holes, are considered as inferior. So great is the difference between these several divisions of each grade, as determined by shape and solidity, that while the best shapes and structures of the finest textured Turkish sponges sell sometimes at as high a price as $50 a pound, the inferior shapes and loose structures of the same textures bring but a few dollars a pound. Shape and solidity as well as texture, must, therefore, be considered in grading sponges of all varieties, and many of the numerous grades of foreign sponges are formed in this manner.

Marketable sponges range in weight from about 1 ounce to 1 pound, but the smaller sizes within these limits are most in demand. The supply of good grade sponges, of both the Florida and foreign varieties, is unequal to the demand, and very many more could be sold annually than the fishing grounds have yet been made to yield. One dealer informs us that the demand upon him for the better qualities of Florida sponges is ten times greater than he can supply. There are, therefore, no indications at present of an overstocked market, but the question naturally arises as to whether there is not great danger of the fishing grounds becoming exhausted from the continuous drains being made upon them. Certain sections of the Florida coast, which have been most diligently fished over, have become more or less depleted, but new and extensive grounds are being constantly discovered, and the yield has not varied greatly from year to year. Still, there is strong foundation in fact for the belief expressed by many, that the present indiscriminate fishing will sooner or later result unfavourably for the Florida coast at least, and several of the New York buyers have expressed a desire for immediate legislation prohibiting the taking of the better qualities of sponges under a certain size, that size to be equivalent to a weight of about 1½ ounces. In this manner the younger growths would be protected, and the future supplies of large specimens would be more or less insured. This subject is one which merits prompt attention, and it derives an additional interest from the recent successful attempt at artificial sponge culture about Key West.

Sponges have hitherto been bought and sold in large quantities entirely by weight, but some of the New York dealers advocate their sale by count, in order to circumvent certain fraudulent practices which are now largely indulged in, such as sanding and liming, and also because of their well known absorptive qualities causing them to weigh much more in moist climates than in dry. This new method of buying and selling has already been started to a slight extent.

At the fishing ports, of which Key West is the principal one in Florida, the sponges brought in by the vessels are, after drying, graded by the agent, each grade being packed separately in bales or cases, and are then ready for shipment to market. New York is the only distributing centre for Florida sponges, and receives nearly all the foreign sponges imported into this country.

(*To be continued.*)

THE CONVERSION OF OLEIC INTO STEARIC ACID.

BY P. DE WILDE AND A. REYCHLER.

By heating oleic acid with 1 per cent. of iodine in sealed tubes to 270°–280° a mixture of fatty bodies results, containing 70 per cent. of stearic acid. This fatty acid can be separated by melting the contents of the tubes with tallow soap, boiling with acidulated water, and then distilling with superheated steam. One-third of the iodine is obtained as hydriodic acid in the resulting liquors, but the remainder is difficult to recover, being retained in the tarry residue formed. Bromine acts similarly, yielding a solid acid melting at 51·5°, whilst with chlorine an acid melting at 81·5° results. The addition of colophony facilitates the reaction in each case. It is suggested that the unsaturated oleic acid first takes up iodine, that then hydriodic acid is given off, and this acts upon the oleic acid with the formation of stearic acid and regeneration of iodine.—*Journ. Soc. Chem. Ind.*

The Pharmaceutical Journal.

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SATURDAY, JULY 13, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE SALE OF "MEDICATED" WINE.

THE difficulties arising from the sale of medicated wine still continue to perplex chemists, as may be seen from the Report of the discussion that took place on the subject at the meeting of the North British Branch Executive. Quite recently, also, we have received letters of inquiry as to what may be done in that respect without danger of incurring liability to prosecution by the Excise. Broadly we may reply to these inquiries by stating that in point of fact the sale of any kind of wine whatever without a licence to do so is unlawful. It is really in virtue only of a concession on the part of the Excise authorities that the sale of medicated wine is permissible. This aspect of the matter will perhaps be regarded with some surprise by many of our readers, but it is nevertheless correct, and it will be well to bear in mind that it is the business of the Excise authorities to take measures for preventing the sale of any kind of wine without a proper licence. In the performance of that duty it has, however, long been the custom to recognize certain exceptions in favour of wine that has been so far medicated as to become unsuitable for ordinary use as a beverage. As a case in point we may refer to quinine wine, which has been made the subject of a special general order that can be taken as expressing the principle upon which the action of the Board of Inland Revenue is based. In that order it is stated that orange wine compounded with quinine sulphate in the proportion of one grain of quinine in every ounce of such wine may be sold by druggists without any objection, and without a licence. One of the reasons given for this concession is the fact that such a preparation is described in the British Pharmacopœia as a medicine. But it is not merely on that account the exception is made. A further, and in fact a stronger reason for it is that wine so compounded is no longer fit to be used as a beverage, and that is really the point to which the attention of the Excise authorities has to be directed. We take it that in any similar case where wine is so medicated as to be unfit for use as a beverage, no demand would be made for its sale under a licence. Ipecacuanha wine, as well as the other vinous preparations of the British Pharmacopœia, and probably also pepsin wine, would be allowed to rank in the same category, but in any case the power to decide whether a wine preparation is so far medicated as to be unfit for use as a beverage rests with the Excise authorities, and each case must be decided by them upon its merits. A wine preparation in which the medication is so trifling as not to interfere with such use would certainly be held to need a license for its sale. It is not always that this essential condition of sufficient medication obtains with the so-called medicated wines which are now largely recommended to the public by advertisement. In several instances, it has been shown that they partake of the nature of wine "pick me up," and it is thus that chemists who sell them have been placed in a position of difficulty on the one hand to meet the requirements of their customers and on the other hand to avoid the annoyance of prosecution for breach of the Excise law.

We thoroughly agree with the opinion expressed by Mr. WATT in the discussion above referred to, that it is highly undesirable for the pharmacist to have anything to do with a licence for the sale of wine. To hold such a licence is altogether incompatible with the position a pharmacist ought to occupy. The mischievous results of such trade has been witnessed in America, and it is to be hoped that they may never be experienced here. Bitter complaints are now met with in American journals that in some of the States the drug business has been ruined in this way, and from the first it has been urged that a conscientious druggist had better leave the liquor business severely alone. Even if wine licences were generally taken out by chemists, to allow of the sale of the articles in question, it is doubtful whether the object in view would be achieved. As regards the grocer's licence, which must be obtained through the magistrates, there is reason to believe that any large increase in the number of applicants for it would be likely to provoke opposition from grocers and possibly from temperance advocates. Such opposition might result in refusal of licences to some of the applicants, on the ground that sufficient opportunity was already afforded for the supply of medicated wines by one or two chemists in a town or district having a licence for that purpose. Then the ten pound licence appears to be too costly to be worth taking out, although it has the advantage of being more easily obtainable. On the whole it would seem to be the safer course for chemists to limit their sale of medicated wines to such articles as will meet the requirements of the Excise authorities in being to such an extent really medicated as not to require a licence for their sale. This plan might involve some sacrifice of business, but in the end it would, we believe, be the best policy. As was pointed out by Mr. BOA, many of the so-called medicinal wines are not really medicinal at all, but are sold for another purpose, and if the sale of such wines by chemists were extended, chemists would be practically brought to the level of the publican. If that were to be the case many of the further difficulties we have already mentioned might be anticipated, and the consequences would be damaging to the interests of chemists. Even the plan we have suggested as a possible one to meet the case, by having a kind of stamp duty to compensate for the licence duty, would not be free from the objection that it would be the means of introducing into the business of the chemist the sale of articles that he had better not have anything to do with.

A NEW AUSTRIAN PHARMACOPŒIA.

A SEVENTH edition of the Austrian Pharmacopœia is now in course of publication. It is now nearly twenty years since the Pharmacopœia that has been in force was issued, and several fresh issues of it have been found necessary meanwhile. This was found to be the case again in 1887, and the Board of Health then considered that the time had arrived for a revision of the work, so as to bring it up the present state of science and to allow of the introduction of new medicinal preparations. The requisite authority having been obtained for the execution of this work, a Committee was appointed for the purpose, consisting of four physicians and three pharmacists. The first work of this Committee was to prepare a list of the drugs and preparations to be included in the new Pharmacopœia. This list was submitted to the heads and clinical professors of the three hospitals in Vienna for consideration, and in order to ascertain whether the articles of materia medica now in general use were sufficiently represented, and which of the older methods of preparation might with propriety be omitted. With the aid of information thus obtained the editing of the Pharmacopæia was then proceeded with. The leading principles upon which this work was carried out were the following. In the selection of medicinal agents for insertion in the Pharmacopœia scientific considerations and clinical experience were taken as guides. By this means all articles were excluded which have at the present time only a limited application, as well as those which are uncertain in their action on account of varying characters, and all drugs that are not ingredients of medicinal preparations, but are only now and then used in making particular preparations. In addition to established articles of the materia medica there have been introduced such of the more modern as have been not only found useful by clinical experience, but also tested by experimental investigation. Regard has also been paid to their origin and constant composition and the means by which this is to be determined.

As regards chemical preparations that are obtainable in commerce of good quality, it was considered that this fact, as well as the difficulty and extra cost of their preparation by pharmacists, were sufficient reasons for not continuing directions for their preparation in the Pharmacopœia. At the same time it was thought all the more necessary to define the particular characters of each of these preparations. In every instance therefore the external appearance and physical characters of these articles are stated, as well as the chemical reactions by which their identity can be ascertained, and their nature determined both qualitatively and quantitatively. Tests for detecting adulteration or deterioration are also given. In regard to drugs of animal or vegetable origin the outward appearances and pharmacognostic characters of each is given, and directions are given as to the state in which they are to be kept in pharmacies. Effect has been given to the generally expressed desire for greater uniformity in the preparations of the Pharmacopœia. This object has met with special attention in the case of poisonous preparations, and in the preparation of tinctures and extracts the methods adopted in the principal modern Pharmacopœias have been followed, so far as these are calculated to ensure the greater uniformity and better quality of the several preparations. The rule has been adopted with most of the tinctures to make them so that ten parts represent the soluble constituents obtainable from one part of the drug employed. In the preparation of the extracts of cubebs and male fern, ether has been substituted for alcohol. A large number of the extracts are directed to be prepared by the method of percolation. The amount of hydrocyanic acid in bitter almond water and cherry laurel water has been altered from 0·6 per cent. to 1 per cent., and the amount of arsenious acid in Fowler's solution has been reduced to 1 per cent.

The nomenclature used in the previous edition of the Pharmacopœia has been retained, with the exception that the drugs derived from the vegetable kingdom are arranged in the same order as in manuals and other Pharmacopœias, with the name of the plant yielding a particular drug and a prefix of the part used in medicine, whether bark, leaves, flowers, fruit, seed, etc. The synonyms used in the previous Pharmacopœia, which have now become for the most part obsolete, and are not used much or at all by physicians in their prescriptions, have been omitted from the place they formerly occupied, and placed in a separate list. In the place of these synonyms the names employed in foreign Pharmacopœias have been introduced to meet the more important requirements resulting from increased international intercourse. Considerable additions have been made to the section describing the apparatus and methods of testing, and there are at the end of the work tables giving maximum doses, as well as directions as to the preparations that are to be kept apart from others in a closet that can be locked.

We regret to announce the death on the 6th inst., in her eightieth year, of Mrs. Mary Ann Hellowell, who was elected an annuitant on the Benevolent Fund in 1881.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

The following are the questions that were set for the First or Preliminary examination on Tuesday, July 9:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin :—*

1. I will give the boy a letter.

2. These useful works are not yet finished.

3. Those very beautiful books which were given to my sister by her master have been lost.

4. There is no doubt that many men in that legion fought bravely.

5. Very many ships being broken, when the rest were useless to sail, a great alarm possessed the whole army.

II. Translate into English either A. (Cæsar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CÆSAR.

1. Cæsar hac oratione Lisci Dumnorigem, Divitiaci fratrem, designari sentiebat; sed quod pluribus præsentibus eas res jactari nolebat, celeriter concilium dimittit, Liscum retinet; quærit ex solo ea, quæ in conventu dixerat. Dicit liberius atque audacius. Eadem secreto ab aliis quærit; reperit esse vera. Ipsum esse Dumnerigem, summa audacia, magna apud plebem propter liberalitatem gratia, cupidum rerum novarum; complures annos portoria, reliquaque omnia Æduorum vectigalia, parvo pretio redempta habere, propterea quod illo licente contra liceri audeat nemo.

2. Capto monte et succedentibus nostris, Boii et Tulingi, qui hominum millibus circiter quindecim agmen hostium *claudebant*, et novissimis præsidio erant, ex itinere nostros latere aperto aggressi circumvenere; et id conspicati Helvetii, qui in montem sese *receperant*, rursus instare et proelium redintegrare *cœperunt*. Romani conversa signa bipartito *intulerunt*: prima ac secunda acies, ut victis ac summotis resisteret; tertia, ut venientes exciperet.

Grammatical Questions.—For those only who take Cæsar.

1. Decline in full—*eas res*, *complures annos*, *illo licente* (Par. 1).

2. Write in full the indicative present and subjunctive perfect of the verbs in italics (Par. 2).

3. Parse the following words:—*quæ*, *audacius*, *redempta*, *liceri* (Par 1).

4. How in Latin do you express motion *to* and *from*, and position *at*, with names of cities? Give some examples.

B. VIRGIL.

1. "*Aspice* bis senos, lætantes agmine, cycnos,
Aetheria quos lapsa plaga Jovis ales aperto
Turbabat cœlo: nunc terras ordine longo
Aut capere, aut captas jam despectare *videntur*.
Ut reduces illi *ludunt* stridentibus alis,
Et coetu cinxere polum, cantusque dedere;
Haud aliter puppesque tuæ pubesque tuorum
Aut portum *tenet*, aut pleno subit ostia velo.
Perge modo, et, qua te ducit via, dirige gressum."

2. Huc cursus fuit,
Quum subito assurgens fluctu nimbosus Orion
In vada cæca tulit, penitusque procacibus Austris
Perque undas, superante salo, perque invia saxa
Dispulit; huc pauci vestris adnavimus oris.
Quod genus hoc hominum? quæve hunc tam barbara morem
Permittit patria? hospitio prohibemur arenæ:
Bella cient, primaque vetant consistere terra.

Grammatical Questions.—For those only who take Virgil.

1. Decline in full—*vestris oris*, *hoc genus* (Par. 2).

2. Write in full the indicative present and subjunctive perfect of the verbs in italics (Par. 1).

3. Parse the following words:—*captas*, *aliter*, *qua*, *dirige* (Par. 1).

4. How in Latin do you express motion *to* and *from*, and position *at*, with names of cities? Give some examples.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. A farmer refused an offer of 2½ guineas a quarter for 237½ quarters of wheat; he afterwards sold 126 quarters of it at £2 15*s.* 9*d.* a quarter, and the remainder at £2 8*s.* 4*d.* a quarter. What did he gain or lose in consequence of the delay?

2. After the value of a business had been increased by $\frac{1}{5}$, $\frac{1}{16}$ of it was sold for £164,368 1*s.*; find its original value.

3. Subtract $\cdot 03$ from $\cdot\dot{0}\dot{3}$, and divide the result by $\cdot 10\dot{2}$.

4. Reduce $10\cdot 41\dot{6}$ of 633 sq. po. — 11·15 of 3 ac. 7 po. + 7·6 of 14 ro. 5 po. to the decimal of 6¾ acres.

*5. Write down the Metric system of weight, and give the equivalents in English weights.

*6. If 20 men can dig a trench 160 metres long, 2 metres wide, and 1 metre 2 decim. deep in 8 days, what will be the depth of a similar trench 90 metres long, 1 metre 80 centim. broad, which 24 men can dig in 4½ days?

7. Find the cost of papering a room 16⅔ ft. long, 13½ ft. broad, 10½ ft. high, with paper 2½ ft. wide at 3½*d.* a yard?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following:—

"*Ill* fared it then with Rhoderick Dhu
That on the field his targe he threw,
Whose brazen studs and tough *bull-hide*
Had death so often *dashed* aside."

2. Parse the words in italics in question 1.

3. Correct the following sentences, giving your reasons:—

(i.) Either I or thou is making a mistake.

(ii.) Neither poverty or riches were injurious to him.

(iii.) I should not differ with them if I was him.

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—but when they reminded him of the ruin which he had brought on his brave and loving followers of the blood which had been shed of the souls which had been sent unprepared to the great account he was touched and said in a softened voice i do own that i am sorry that it ever happened they prayed with him long and fervently and he joined in their petitions till they invoked a blessing on the king he remained silent sir said one of the assistants do you not pray for the king with us.

†5. Write a short composition on one of the following subjects:—

(i.) Sources of happiness.

(ii.) The force of example.

(iii.) Thrift.

(iv.) "Reading maketh a full man, conference a ready man, and writing an exact man."

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* At least one of these two questions must be attempted by every candidate.

† This must be attempted by every Candidate.

JACOB BELL SCHOLARSHIPS AND REDWOOD SCHOLARSHIP, 1889.

The following are the questions that were set at the examination for the above Scholarships, held on Tuesday, July 9:—

Part I.—Time allowed, three hours (11 *to* 2).

In awarding marks the neatness and legibility of the writing will be taken into account.

Notice.—In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

LATIN.

Translate into English:—

1. Tum vero omne mihi visum considere in ignes
Ilium, et ex imo verti Neptunia Troja.
Ac, veluti summis antiquam in montibus ornum
Quum ferro accisam crebrisque bipennibus instant
Eruere agricolæ certatim; illa usque minatur,
Et tremefacta comam concusso vertice nutat:
Vulneribus donec paulatim evicta, supremum
Congemuit, traxitque jugis avulsa ruinam.
Descendo, ac, ducente Deo, flammam inter et hostes
Expedior; dant tela locum, flammæque recedunt.
Ast ubi jam patriæ perventum ad limina sedis,
Antiquasque domos, genitor, quem tollere in altos
Optabam primum montes, primumque petebam,
Abnegat excisâ vitam producere Trojâ,
Exsiliumque pati

Vergilii Æneis. Lib. ii., 624–638.

2. Give perfect and supine of *concusso*, *evicta*, *avulsa* and *tollere*; compare *imo* and *summis*; parse *ornum*, *comam* and *ducente*; decline in the plural *bipennibus*, *vulneribus*, *locum* and *domos*; why was *Troja* called *Neptunia*?

ENGLISH.

1. Parse fully the words in italics in the following lines:—

"*His years but* young, *but* his experience *old*;
His head *unmellowed*, but his *judgment* ripe;
And, in a word (*for far* behind his worth
Come all the praises that I now bestow),
He is complete in feature and in mind,
With all good *grace to grace* a gentleman."

2. Write a short essay on one of the following subjects:—

The Cultivation of a Hobby. Cycling. The French Revolution.

ARITHMETIC.

1. What decimal divided by 0·48 will equal—

$$\tfrac{9}{10} \text{ of } 6\tfrac{1}{3} + \tfrac{4}{7} \text{ of } \tfrac{1}{2} + 7\tfrac{1}{2}\,?$$

2. What is the weight in centigrams of thirty minims of glycerin having a specific gravity of 1·260?

3. What fraction must be added to—

$$\frac{4\frac{1}{3}+7\frac{2}{3}}{13\frac{1}{4}-9\frac{3}{4}} \times 1\frac{11}{24} \div \frac{2\frac{1}{4}+3\frac{5}{8}}{8\frac{1}{6}-1\frac{5}{16}}$$

that the sum may be equal to 6?

4. What sum of money will amount to £797 9*s.* 7*d.* in 8½ years at 7½ per cent. simple interest?

FRENCH OR GERMAN.

The candidate is at liberty to choose either French or German, and is not required to show a knowledge of both. Marks will only be awarded for one.

French.

1. Translate into English:—

Spenser fut le poète célèbre sous Elisabeth. L'auteur éclipsé de Macbeth et de Richard III. se montrait à peine dans les rayons du *Calendrier du berger* et de la *Reine des fées*. Montmorency, Biron, Sully, tour à tour ambassadeurs de France auprès d'Elisabeth et de Jacques I^er^, entendirent-ils jamais parler d'un baladin, acteur dans ses propres farces et dans celles des autres? Prononcèrent-ils jamais le nom, si barbare en Français, de *Shakespeare*? Soupçonnèrent-ils qu'il y avait là une gloire devant laquelle leurs, honneurs, leurs pompes, leurs rangs, viendraient s'abimer? Hé bien! le comédien de tréteaux, chargé du rôle du spectre dans *Hamlet*, était le grand fantôme, l'ombre du moyen âge qui se levait sur le monde, comme l'astre de la nuit, au moment où le moyen âge achevait de descendre parmi les morts: siècles énormes que Dante ouvrit, que ferma Shakespeare.

CHATEAUBRIAND, Essai sur la Littérature Anglaise.

2. Translate into French:—

The lion never attacks man unless he is provoked. Henry, who rode there, arrived first. Be calm, I will neither act against you nor against them.

German.

1. Translate into English:—

Alexander der Grosze kam auf seinem Zuge nach Asien durch eine Sandwüste, in der kein Wasser zu finden war. Endlich brachte ein Soldat etwas in seinem Helme dem Könige, der eben so sehr wie das ganze Heer vor Durst lechzte. "Wie" sagte Alexander, "soll ich der Einzige sein, der da trinkt, während meine braven Kameraden verdursten? Nein, das will ich nicht," und mit diesen Worten gosz er das edle Getränk in den brennenden Sand. Die Krieger, erstaunt über diese Groszthat riefen mit Jauchzen: "Führe uns wohin du willst, edler König, wir sind nicht ermattet, unter einem solchen Fürsten halten wir uns nicht für sterblich."

2. Translate into German:—

Why ought we to honour father and mother? in order that we may live long upon earth. What is there written on that window? I read the words: "French spoken here."

Part II.—Time allowed: Two hours (3 *to* 5).

Chemistry and Pharmacy.

1. What is meant by the quantivalence of an element, and how is it expressed symbolically? Give examples of univalent, bivalent, trivalent and quadrivalent atoms.

2. State the source, mode of preparation, and tests for phosphorus, and describe its chief characters.

3. Describe the official process by which Acidum Phosphoricum Concentratum is made, and explain the reaction by means of an equation. State what precautions are necessary to be observed in preparing it.

4. How is Liquor Ferri Dialysatus made, and what is the nature of the product so called?

5. Define dialysis, and state some of its possible applications to Pharmacy.

Botany.

1. What functions does Starch perform, and in what parts of plants is it found most abundantly?

2. Describe briefly the principal forms of inflorescence, and name the chief varieties of the "spike."

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The Council of the Society held the usual stated monthly meeting at the offices, 11, Harcourt Street, Dublin, on Wednesday, July 3.

There were present, Dr. Tichborne and Messrs. Charles Evans, W. Hayes, Payne, Simpson, Merrin, McConnell, Beggs, W. F. Wells, jun., and Dr. Gordon.

On the motion of Mr. Payne, seconded by Mr. Wells, the chair was taken by Dr. Tichborne.

The Chairman: Gentlemen, before we proceed to our general business I may say I have great pleasure in seeing amongst us two new members, one of whom I am sure we all feel delighted to see once more amongst us; and the other we all welcome as a new member of the body.

Mr. Ferrall, Registrar, then read the minutes of the previous meeting.

Mr. Payne raised a question as to whether Dr. Whitla, of Belfast, not being a member of the Council, could be elected one of the Committee to organise for a conference of the Pharmaceutical body in London next year.

The Chairman thought they could appoint anyone they liked.

Mr. Payne: My reason for raising the question was that when I read the Journal I thought it was Mr. Whitla, a member of the Council, that was appointed. However, I do not press the matter, more particularly as the appointment made is a most desirable one.

The matter dropped.

Mr. Wells drew attention to the fact that there was no entry in the minutes of the objection having been raised at the last meeting, that seven members were not present when the President and Vice-President signified their intention to resign.

Mr. Hayes said that the meeting was a legally constituted one, even though seven members were not then present, as the requisite number were in attendance when business commenced, but left before this particular business came on and before the meeting had adjourned.

The Chairman said the objection had certainly been raised that the meeting was not a lawfully constituted one, seven members not being present at the time of the resignation, but the minutes did not record the fact.

Mr. Hayes admitted that the objection was raised.

Mr. Payne said it was his idea that no resolution could be passed without seven members being present. It was resolved to amend the minutes by recording the fact that the objection had been raised, but was afterwards withdrawn.

The Chairman: The next business before us, gentlemen, is the very important question of electing a President.

Mr. Wells: I rise with great pleasure to propose a gentleman for the office of President, and I think it is only necessary to mention the name of Mr. Charles Evans, to meet with the approbation of every member around the table. I have known Mr. Evans for a great many years, and I know that as to his standing in pharmacy you could not have a man holding a better or a more honoured position in the city of Dublin. He is able, with the assistance of his brother, to carry on the first pharmacy business in the three kingdoms, and surely if he is able to fill that position with credit to himself and satisfaction to his customers, he ought to be able to carry on the business of this Society with honour to himself. In his presence I will say no more than that. I have great pleasure in proposing Mr. Evans as President of the Society.

Mr. Payne: It gives me the greatest possible pleasure to second the proposal. It is unnecessary for me to say it is of the utmost importance we should have a good practical President, and one to be always found on the spot. That is one of the necessities of the Society, that the President should be resident in the city. As Mr. Wells has observed, Mr. Evans is connected with one of the principal pharmacies in the three kingdoms. Therefore I think that the young men who are coming forward need have no fear that their President would treat them unfairly in any way. The licentiates must also feel confidence that Mr. Evans, understanding the practice of pharmacy, in him they will have one who will look after their every interest. I have great pleasure in seconding the nomination of Mr. Evans as President of the Society.

The Chairman: I do not like to say too much, because Mr. Evans is present, but I do not think you could possibly have made a better choice, if we consider the point already dwelt upon, that from the fact of Mr. Evans being one of the practical workers of one of the most important establishments in Dublin, he is thoroughly identified with the interests of the licentiates. He understands their requirements, and therefore the appointment is a most desirable one from that point of view. Independently of that, Mr. Evans has fulfilled, greatly to our satisfaction, the post of Examiner. This will make him appreciative of the wants and requirements of the forthcoming candidates for the license of this Society. Therefore I think you could not possibly have made a better appointment.

Mr. Hayes: I have great pleasure in supporting the proposition. I do not think that from among the members of this Society you could have selected one who will give more universal satisfaction from his position in pharmacy, his gentlemanly demeanour on every occasion, and his ability to hold the position. Having spoken to his brother at first when we found ourselves without a President—Mr. Charles Evans was absent—his brother said he did not think he would undertake the duties, and on his return home, on making further inquiry, I heard he had declined, but when I heard again that there was a possibility of changing his mind, it gave me the utmost satisfaction to feel that such a gentleman would be at the head of this Council. Perhaps some of our members think that I, with some other members, or late members, of the Council, do not take an interest in pharmacy or in the prosperity of the Society, because everything has not gone on as we desired, but those who think so are greatly mistaken; at all events, I can speak from my own personal knowledge and personal feeling in the the matter. I look on this Society as a child of my own. Our late Treasurer, Mr. Hodgson, and I, took the leading part in getting the Act passed which gave us the position we occupy as a Pharmaceutical Society in this country, and therefore I must always feel a deep interest in the work of the Society, even though I am not put on the Council. At all events I have great pleasure in supporting the proposition that Mr. Evans be President of the Society. I hope that he will find it convenient to continue in that position for the longest period that he can retain it.

The Chairman put the motion, and declared it passed unanimously.

Mr. Evans then took the chair amidst applause.

The President: Gentlemen, before proceeding with our business, will you allow me to thank you very sincerely for the honour you have conferred upon me by electing me President of the Society. I deeply regret the course that has obliged you to elect a new President at such a time, and that you were unable to persuade our worthy friend, Professor Tichborne, to fill the office this time, knowing that he could fill it better than I; but as it is the unanimous desire of the Council that I should accept the office, I do so with great pleasure. I trust that our labours in the future will be for the benefit of the Society, and that our duties will be discharged free from any remarks that might cause friction, however slight.

Mr. Hayes: I beg to propose the election of a Vice-President. I am sure we all feel gratified at seeing among us to-day Mr. Payne, whom I look upon as one of our leading northern lights. It was with very great regret that I heard of his resignation some time ago. However, he is here among us again, and though it may not be as convenient to you, sir, as if you had the Vice-President on the spot to refer matters of difficulty to, yet the facilities for travelling between Dublin and Belfast are so great that I think it would be an advantage to the Council and to the Society to have as Vice-President a member we could all look up to and feel he would be always found when it became necessary to take his advice, or put him in your place in case of your temporary absence. I need not say anything about Mr. Payne more than that we all feel very happy at his presence among us to-day, and I trust he may long continue to assist in the work of the Society. I have great pleasure in proposing Mr. Payne as Vice-President of the Society.

Dr. Tichborne: Perhaps you will allow me the privilege of seconding that proposal. For a long time I have been a strong advocate for paying a country member the compliment of having one of them Vice-President, and we could not do better than by selecting the important city of Belfast for the honour. There is another reason why we are lucky in having a man of such experience as Mr. Payne. We all know how he worked in connection with the Society on committees and in other ways that makes him a most desirable Vice-President. Therefore it gives me great pleasure to second the proposal.

Mr. Wells said he always thought that Belfast being such a place as it is it would be only right to have their Vice-President there. Belfast was almost as large as Dublin, and as far as pharmacy was concerned it might be more strongly represented there than in Dublin. Therefore he was very much pleased to see Mr. Payne selected for this office. Mr. Payne had a great interest in the Society, and he could not be surpassed by any member of the Council. He had worked for them in the north of Ireland and in committees in a way that the Society knew nothing about, and it was only reasonable they should pay him the honour and through him Belfast.

Mr. Simpson said Mr. Payne had always taken a great interest in the Society, and came regularly to the meetings, often when they did not expect him to come such a long distance. He hoped he would for a long time continue to be their Vice-President.

The President, in putting the motion to the meeting, said they could not have made a better choice, and he was much pleased Mr. Payne was to have the burden with him, for when he looked back at the able men who preceded him in the President's chair he was somewhat diffident in accepting the post. He had great pleasure in declaring the resolution unanimously passed.

Mr. Payne in returning thanks said, I little thought a month ago that I should be a member of the Council of the Pharmaceutical Society of Ireland again to-day. I can assure you it was with a feeling of sorrow that I found it necessary to separate myself from you some two years ago. As some of you know I was the first Licentiate of the Society who was elected on the Council. Therefore, like Mr. Hayes, I still have a practical interest in it. I had nothing to do with the original formation of the Society, but I had a great deal to do with the working out of the resolutions and regulations that were framed after the Council got into working order. I should not have attempted to take the post which you so kindly thought me fit to take, had I not been assured of the help of your President, Mr. Evans. I take it that my duty will be very light indeed. Therefore, I cannot help thanking you for the honour you have shown the city of Belfast in electing me as Vice-President, and in thanking you also for the honour you have done myself.

The Registrar read a letter from Mr. Allen, resigning his seat on all committees.

Mr. Payne suggested that Mr. Allen should be asked to retain his position on the committees until October, with a view of reconsidering his letter.

Mr. Simpson said that Mr. Allen had always taken a great interest in the Society, and had been on the committees since its formation, and was a regular attendant.

Mr. Hayes seconded Mr. Payne's proposition, which was passed unanimously.

The Registrar read a letter from Mr. Hodgson, resigning his seat on the Council, in consequence of the President and Vice-President having resigned their positions.

Dr. Tichborne thought that the resignation of Mr. Hodgson, their Treasurer, would entail a great loss to the Society, and he therefore proposed that he be requested to reconsider his resignation.

Mr. Hayes seconded the motion, which was supported by Mr. Wells and Mr. Payne, who thought it would be a great calamity to the Society to lose the services of so valuable a member.

The President, in putting the motion, which was unanimously adopted, said he was greatly pleased they came to such a unanimous decision, as the loss of Mr. Hodgson to the Society would be most deplorable.

The Registrar next read a letter from Mr. John F. McArdle, enclosing a practical pharmacy certificate, signed by Mr. John Henry, father of the late Mr. George Ambrose Henry, L.P.S.I., for approval. Mr. McArdle, the Registrar explained, had been in Mr. Henry's employment before he became a licentiate of the Society, and he had written to him to the effect that his time could only count from the date when Mr. Henry became a licentiate.

The action of the Registrar was approved of, and it was resolved that an affidavit should be had from Mr. Henry's father that Mr. McArdle was in his son's employment from the date of obtaining his license until his death.

The Registrar then read a letter from Mr. Samuel J. Smith, forwarding certificates received from the Intermediate Education Board for Ireland for acceptance in lieu of the Society's Preliminary examination.

Mr. Simpson pointed out that although the certificates were of a very high order they did not include the subjects of botany or chemistry, which the rules of the Society required.

On the motion of Mr. Payne, seconded by Mr. Wells, it was resolved to inform Mr. Smith that if the General Medical Council passed him on the intermediate certificates they would adopt the action of the Medical Council.

The Council then went into Committee for the purpose of considering some alleged breaches of the Act.

On resuming business,

The Registrar reported a donation from the Pharmacy Board of New Zealand, of copy of the Pharmaceutical Register of New Zealand for 1889.

Mr. Beggs moved a vote of thanks to the Board for their donation.

Dr. Gordon seconded the motion, which passed unanimously.

The Registrar read report from the Certificates Committee, which was adopted.

Mr. Wells proposed, and Mr. Whitla seconded, that Mr. Samuel R. Henry, L.P.S.I., of the Diamond, Monaghan, be admitted a member of the Society.

Motion passed unanimously.

Mr. Merrin proposed that Mr. John M'Clelland, L.P.S.I., of the Medical Hall, Ballyshannon, be admitted a member of the Society.

Mr. M'Cormack seconded the motion, which was adopted.

On the motion of Mr. Baxter, seconded by Mr. D'Arcy, Mr. Thos. O'Connor, L.P.S.I., of the Medical Hall, Dungarvon, was admitted a member of the Society.

The Registrar reported that Messrs. Casey and Clay, solicitors, had furnished an account *re* the Pharmacy Amendment Bill, amounting to £10 10*s*.

Referred to the Law Committee.

Mr. Payne said he had a communication to make from some pharmacies in Belfast to the President and members of the Council. The last communication he had made was not very well received, but he had no doubt this would be better received. It was to propose the following as members of the Society:—Wm. Pratt, L.P.S.I., Medical Hall, 20, Castle Place, Belfast; Johnston Montgomery, L.P.S.I., Medical Hall, Royal Avenue, Belfast; James Tate, L.P.S.I., Medical Hall, 9, Royal Avenue, Belfast; Andrew McNaught, L.P.S.I., Medical Hall, 32, Schomberg Terrace, Belfast; George A. Webb, L.P.S.I., Medical Hall, 141, York Street, Belfast; David W. Elliott, L.P.S.I., Medical Hall, 36, Royal Avenue, Belfast; James R. Cochrane, L.P.S.I, Medical Hall, Antrim Road, Belfast; John B. Robinson, L.P.S.I., Medical Hall, Crumlin Road, Belfast; James W. Nicholl, L.P.S.I., Medical Hall, 25, High Street, Belfast; Patrick J. Lyons, L.P.S.I., Medical Hall, 120, Royal Avenue, Belfast; Wm. C. Dobbin, L.P.S.I., North Street, Belfast; Hustin Lanceshire, L.P.S.I., Medical Hall, 68, Church Street, Ballymena; James Walker, L.P.S.I., Medical Hall, High Street, Ballinahench; John B. Hay, L.P.S.I., Medical Hall, County Square, Newtownards; Solomon Donovan, L.P.S.I., Medical Hall, Main Street, Larne.

Mr. Wells said he would second the election of these gentlemen. Their joining showed they approved of the action taken by himself and others.

The motion was unanimously adopted.

Mr. Wells proposed, and Mr. McCreary-Hill seconded, that the following be elected members of the Society:—John Simpson Robinson, Robert Jones, Cavan; Thos. Dawson Tate, Robert John Galvey, Henry Cunningham, John J. Bernard, John Smith, L.P.S.I., 49, Dawson Street, Dublin; James North Hardy, L.P.S.I., 17, Lower Sackville Street.

Motion passed unanimously.

The Registrar reported the names of the persons who had entered for the examinations for the Licenses which took place on 3rd, 4th and 5th inst., and also for the Preliminary examinations on the 1st prox.

On the motion of Mr. Wells, it was resolved to allow the Irish Pharmaceutical Chemists' Association to hold their meetings at the offices of the Society when the room would not be required by the Council of the Society.

The proceedings then terminated.

JULY EXAMINATIONS.

Preliminary:—Messrs. Stewart, Montgomery, Watson, Beck, Cleeland, McClean (Lees, McLoughlin, Murray), Doyle, (Evans, and Kennedy) passed.

Seven were rejected.

License:—Messrs. Whelan, Herriott, Clark, Shanks, Anderson, Forrest and Bourke.

Nine were rejected.

Society of Chemical Industry.

NINTH ANNUAL MEETING.

The ninth annual meeting of this Society was held on Wednesday, July 10, in the Theatre of the Royal Institution, Albermarle Street, Mr. Ludwig Mond, President, in the chair.

Mr. Cresswell (Secretary) having read the minutes of the last meeting, which were duly confirmed, Mr. Levinstein, of Manchester, and Mr. Allen, of Sheffield, were appointed Scrutators.

Report of the Council.

Mr. Cresswell then read the report of the Council as follows:—

"The Council has the honour to report that the membership of the Society has increased from 2395, as reported at the last meeting, to 2445, or a net increase of 50 members. During the year 223 members have been elected, and 173 have been removed by death, resignation, and other causes.

"The losses by death have been unusually heavy, and include the following names eminent in pure and applied science:—Dr. J. Peter Griess, F.R.S., the discoverer of the azo-compounds; Dr. Wm. Wallace, City Analyst of Glasgow, an authority on sanitation; J. J. Coleman, Chairman of the Glasgow and Scottish Section, the inventor of the Bell-Coleman mechanical dry air refrigerator; R. D. Silva, Professor of Analytical Chemistry at the Ecole Centrale, Paris; John Williams, a Vice-President of our Society, and at one time President of the Pharmaceutical Society, an authority of great weight in pharmacy, and one whose genial presence and counsel we greatly miss; Dr. Warren de la Rue, F.R.S., a former President of the Chemical Society, whose researches in chemistry, electricity and astronomy are historical: Dr. R. S. Newall, F.R.S., identified with the invention of wire rope and the manufacture of submarine cables: and Dr. John Percy, F.R.S., late President of the Iron and Steel Institute, author of 'Percy's Metallurgy.'

"During the year 55 papers and 5 communications have appeared in the Journal. Our thanks are due to those who have favoured the Society by reading these papers.

"The Journal daily increases in importance as a work of reference, and every effort is made by the Publication Committee to add to its value. Within the last few weeks Mr. Watson Smith has arranged to give up his lectureship at the Victoria University, and, taking up his abode in London, has agreed to make the editing of the Journal his main occupation, and this on terms which, after full deliberation, have been deemed satisfactory. The Council hopes that, in securing for the future his services, which have been so valuable in the past, it has promoted the best interests of the Society, in whose continued prosperity the Journal is so important a factor.

"This step has been rendered possible by the satisfactory state of our finances. On June 21 last the Treasurer reported the sum of £3688 15*s.* 9*d.* invested and £1214 4*s.* 5*d.* in the bank, as against £2088 11*s.* 9*d.* invested and £1761 12*s.* 9*d.* in the bank a year ago. The revenue last year, as will be seen from the balance sheet, amounted to £918 14*s.* 9*d.* more than the expenditure, due mainly to increased profit from advertisements in the Journal, and economies in printing and publishing effected without in the least detracting from the quality of the Journal. This year the profits from advertisements will be less, as the Council has agreed to accept a lower sum, on the representation of the publishers, who had over-estimated the returns from this source.

"The increased salary of the Editor under the arrangement alluded to above, the cost of providing further office accommodation, the cost of housing and binding the books presented by Mr. Raphael Weldon, referred to in the last report, and the improbability of large accessions of members in the future, render this surplus most welcome, and we are thus enabled to face the future with confidence and hope.

"Among minor matters connected with the Journal, the following may be mentioned:—A new class called 'Photographic Materials and Processes' has been added to the Journal and Patent Literature, the code of rules for those engaged in the production of the Journal have been revised, the Journal is now printed in uniform type throughout, and we shall publish at the end of 1890 a collective subject-matter index of the first nine volumes."

From the Statement of Revenue and Expenditure it appeared that the total revenue of the Society during the year 1888 had amounted to £3681 13*s.* 8*d.*, the principal items being £2991 17*s.* 10*d.* received in subscriptions and £780 3*s.* 10*d.* for journals sold and advertisements. The expenditure, including £1951 7*s.* 11*d.* on account of the Journal, amounted in the same time to £2762 18*s.* 11*d.*, leaving a balance of revenue over expenditure amounting to £918 14*s.* 9*d.*

Mr. Hugo Müller moved that the report of the Council be adopted, which was seconded by Mr. Makin, and carried unanimously.

Mr. Rider-Cook (Treasurer) said he would not read the balance-sheet, as it was already in the members' hands. Although they had invested £1500 this year, there was at present over £1200 in hand, which would be sufficient to carry them on until the receipts from next year came in. The investments had been £770, being the amount received for life compositions, and £3000, the balance of receipts over expenditure.

The President moved, and Mr. Spiller seconded, a vote of thanks to Mr. Rider-Cook, which was carried unanimously.

Mr. Makin then moved the re-appointment of Messrs. Theobald Bros. and Mall as Auditors. This was seconded by Mr. John Pattinson, and carried.

The Next Annual Meeting.

Professor F. Clowes, of Nottingham, in moving that the next meeting be held in Nottingham, said the programme at present was only a sketch, but if the Society thought fit to accept the invitation, and attend in large numbers, he could promise that every effort would be made to make the visit a pleasant one.

Sir Lowthian Bell seconded the motion, which was carried unanimously.

The President's Address.

The President, after alluding to the remarks he made at the Inaugural Meeting of the Society in 1881, proceeded to give an account of the work he has been engaged in for many years, in relation to obtaining new and abundant supplies of ammonia and to investigations connected therewith. He referred to the great value of ammonia as manure, more particularly for the old world, which now imports from South America 650,000 tons of nitrate of soda, a substitute for ammonia, representing a value of £6,500,000, and to the immense importance of saving this expenditure by securing this commodity from sources at our own command.

After referring briefly to the processes in use and proposed for producing ammonia, Mr. Mond described his own researches for obtaining this product from the nitrogen of the atmosphere, which after trying a great many different methods he found possible by improving a process invented by Messrs. Sourdeval and Margueritte, which consists in heating a mixture of carbonate of barium and carbon in the presence of nitrogen, thereby producing cyanide of barium. This being treated with steam yields ammonia and regenerates the carbonate of barium employed.

In consequence of the difficulty of finding retorts which would last at the high temperature required this process was not persevered in, particularly as Mr. Mond had in the meantime found that it was possible to obtain a very large supply of ammonia from the immense store of combined nitrogen in any coal at a reasonable cost.

Mr. Mond proceeded to describe in detail the process he has adopted and the plant he uses for obtaining ammonia from coal, which is burnt by means of a mixture of air and steam in gas producers. The ammonia is recovered from the gas by absorbing it in scrubbers with sulphuric acid. By subsequently washing the gas in another scrubber with water, which becomes heated by the steam contained in the gas, and using the hot water so obtained in another scrubber for warming the air used in the producers, and saturating it at a temperature of 76° C. with moisture, Mr. Mond has succeeded in recovering the greater part of the steam required for this process, and thus to render it more economical. Mr. Mond obtains for every ton of fuel burnt in the producers gas and tar equivalent in heating power to 80 per cent. of the fuel used, and in addition 70 lbs. of sulphate of ammonia, which can thus be produced on a large scale at a cost of about £5 per ton, exclusive of maintenance and depreciation, and which at present fetches £12 per ton in the market. Mr. Mond does, however, not think that this process is suitable for small consumers of fuel. The total quantity of sulphate of ammonia which could in this way be obtained from the 150,000,000 tons of coal annually consumed in the United Kingdom would be 5,000,000 tons, so that it would suffice to treat one-tenth of this total consumption of fuel to produce the 500,000 tons of ammonia required to replace the whole of the nitrate of soda now imported into Europe.

Mr. Mond subsequently described a gas battery invented by himself and Dr. Carl Langer, which has been designed to produce electricity direct from the gases made in his producers; and a new process for converting the carbonic oxide and carbohydrates contained in these gases into their equivalent of hydrogen, by passing them together with steam over metallic nickel or cobalt at a moderate temperature, so as to make them suitable for use in the gas battery. It was shown long ago by Mr. Justice Grove that two strips of platinum partly immersed in dilute sulphuric acid, one in contact with hydrogen and the other with oxygen, produced electricity, and acting on this idea Dr. Carl Langer had been at work under his direction, and he would now call attention to the last result of their extended labours, which they hoped would mark a great step in advance in the economical production of electricity. The distinguishing feature was that the electrolyte was not employed as a liquid, but in a *quasi* solid form, and the name of Dry Gas Battery had therefore been given to it. It consisted of a number of elements, which were formed of porous diaphragms of non-conducting material; in this instance, plaster of Paris impregnated with dilute sulphuric acid. Both sides of these diaphragms were covered with very fine platinum leaf perforated with numerous small holes; over this was a thin film of platinum black, and these coatings were in contact with frameworks of lead and antimony, insulated from each other, which conducted the electricity to the poles of the battery. The diaphragm lying between the two frames was covered with an insulating mixture on the inside, the ribs of the frame being in contact with the platinum leaf, and the electricity passing through these ribs to the poles of each individual element. The leaf was the finest which could be procured, and was perforated. These elements were put together into sets side by side with insulating frames of paste-board between, so as to form narrow chambers on both sides of the diaphragm, and through these chambers were passed on one side of each element a current of gas containing hydrogen, and on the other side a current of air. Such a battery of seven elements was exhibited, producing enough current to keep a small glow lamp in action. This construction enabled a very large amount of duty to be got out of a small quantity of platinum. A battery of seven elements in a total effective surface of half a square metre contained only 2½ grams of leaf and seven grams of platinum black, and it produced a current of 2 ampères, and 5 volts or 10 watts, when the outer resistance was properly adjusted, which was equal to nearly 50 per cent. of the total energy obtainable from the hydrogen absorbed in the battery. This was an immense increase upon the best results obtained by steam engines and dynamos, which do not utilize more than 8 per cent. of the energy in the fuel employed. Mr. Mond concluded his address, which was illustrated by models, diagrams and the gas battery in full work, by remarking that the saying, "necessity is the mother of invention," no longer holds good in our days when by the progress of science we are enabled to foresee and forestall our wants, but that it may truly be said that steady methodical research is the father of industrial progress.

Sir Lowthian Bell then proposed a vote of thanks to the President for his address. He remembered at different periods various substances being put forward as a mark of the civilization of the people. Dr. Moore had said that sulphuric acid was the most accurate exponent of the civilization of a nation, but this had given way to soap. After what they had heard that morning he should be inclined to make soap give way to ammonia, as sulphuric acid in its turn had given way to soap. Anyone, therefore, who showed a nation how to produce ammonia plentifully and at small cost was a great benefactor to his country.

Mr. J. C. Stevenson, M.P., in seconding the motion said, no paper could be more interesting and valuable than the one they had heard from the President. He was struck in listening to the early part of the paper with the valuable services Mr. Mond had rendered in investigating the old processes devised for the manufacture of ammonia.

The vote of thanks was carried by acclamation and briefly acknowledged by the President.

The New Council.

The scrutators then brought in their report, the list of persons elected as the executive for the ensuing year being as follows:—President, Sir Lowthian Bell, Bart., F.R.S.; Vice-Presidents, R. Forbes Carpenter, Prof. F. Clowes, D.Sc., Sir J. Neilson Cuthbertson, Prof. James Dewar, F.R.S., Jas. Duncan, Dr. John Evans, F.R.S., S. H. Johnson, Ludwig Mond, Dr. Hugo Müller, F.R.S., Dr. W. H. Perkin, F.R.S., Dr. Edw. Schunck, F.R.S., Prof. W. A. Tilden, F.R.S.; Members of Council, L. Archbutt, S. B. Boulton, Jno. Brock, Jno. Calderwood, Alexander M. Chance, A. E. Fletcher, B. E. R. Newlands, Jno. Pattinson, Jno. Spiller, E. C. C. Stanford, J. C. Stevenson, M.P., A. Norman Tate; Treasurer, E. Rider Cook; Foreign Secretary, Dr. Ferdinand Hurter.

The President then moved a vote of thanks to the manager of the Royal Institution, by whose kindness the members were able to hold the meeting in that historic building. This motion having been seconded was carried unanimously.

The President then moved a vote of thanks to the officers of the sections, and to the editor and staff of the Journal, which was seconded by Mr. David Howard and passed unanimously.

Visit to Messrs. Doulton's Works.—In the afternoon a number of the members assembled in the Art Pottery Show Rooms of Messrs. Doulton, on the Albert Embankment, where luncheon was provided for them by the company. Afterwards the members visited the studios and chemical sanitary potteries.

Conversazione.—In the evening the President, Mr. Ludwig Mond, held a Reception and Conversazione in the Grosvenor Picture Gallery, New Bond Street, which was very numerously attended.

On Thursday, the arrangements included a steamboat excursion from London Bridge to Hammersmith to inspect the Manbré Saccharine Company's Works, followed by a visit to Kew Gardens, and then by the Annual Dinner at the "Star and Garter," Richmond.

On Friday, the programme included visits to Truman, Hanbury, Buxton and Co's. Brewery, Spitalfields; Cowan's Sugar Refinery, Barnes; the new Kingston and Surbiton Sewage Works; the Brush Electric Light and Engineering Company's Works, Lambeth; Brin's Oxygen Company's Works, Westminster; and Tebbit Brothers' Works, Bermondsey, to see Groth's Electric Tanning Process in operation.

Proceedings of Societies in London.

ROYAL COLLEGE OF PHYSICIANS.

[CROONIAN LECTURE.]

RELATION BETWEEN CHEMICAL STRUCTURE AND PHYSIOLOGICAL ACTION.

BY T. LAUDER BRUNTON, M.D., F.R.S.

(*Continued from Vol. XIX., page* 1067.)

ANTISEPTICS IN LOCAL DISEASES.

The application of germicides is not only useful in cases where the microbes form poisons, which by their absorption may cause general poisoning, but is also of service where the microbes produce only local mischief. Thus, resorcin and iodoform have been of great service in the treatment of skin diseases, such as lupus, where the disease appears to depend upon, or at least to be constantly associated with, the presence of bacillus. In such diseases it is easy to apply the remedy freely to the part affected, and also at the same time to remove such parts of the tissue as have been completely infiltrated with the microbes. Even malignant disease has been said to yield to the influence of local antiseptic treatment, and a spindle-cell sarcoma of the tonsil is said to have disappeared under the action of iodoform, although confirmation of such a result is desirable.

TREATMENT OF CONSUMPTION.

The most important result which could be obtained by the local use of antiseptics would certainly be the cure of consumption, and numerous have been the attempts to destroy the tubercle bacillus in the lung by means of antiseptic remedies, either inhaled or conveyed to the lungs through the blood. Carbolic acid, salicylic acid, aromatic oils of various sorts, and especially eucalyptus oil, have been employed as sprays or inhalations, and iodoform has both been inhaled and applied by insufflation, especially in cases where the tubercle has affected the larynx. In laryngeal phthisis these insufflations are certainly of use, and even where the disease is confined to the lung a certain amount of amelioration of the symptoms has followed the use of antiseptic measures. It has not been shown that any real cure has been effected by them, and this is not at all wonderful when we consider the difficulty of applying them locally in such a way as to destroy the bacillus without affecting the delicate structures of the lung itself. But the idea seemed feasible that one might be able to introduce into the blood some substance which, during its excretion by the lung, would have an antiseptic action and destroy the microbes without damaging the pulmonary tissues. Accordingly, the treatment of phthisis by enemata, containing sulphuretted hydrogen diluted with carbonic acid, was suggested and largely employed for a short time. It was stated by Claude Bernard that sulphuretted hydrogen is very rapidly eliminated by the lungs; so rapidly, indeed, that hardly any passes into the left side of the heart and arterial system. Therefore the risk of poisoning by enemata of the gas ought to be very small; yet Orfila had shown many years before that enemata of sulphuretted hydrogen might cause poisoning very rapidly. A case of poisoning by the formation of this gas in the intestines has been recorded by Senator, and experiments by Cash and myself on the absorption of gas from the intestines confirmed Orfila's results. The practice, therefore, seemed not to be without risk, and the occurrence of a fatal case, as well as the smallness of the beneficial results which have been obtained from it, have caused the practice to fall into disuse.

The principle, however, appears to be rather a good one, and the direction in which one would now look is for some substance which would undergo slow decomposition in the intestine or in the body generally, and give rise to volatile antiseptic products which would be slowly but constantly eliminated by the lungs, so that during the whole twenty-four hours the tubercle bacilli would be exposed to its action. Though a volatile substance which would be excreted by the lungs is most likely to be beneficial, yet perhaps it is not absolutely necessary that it should be volatile. A soluble substance circulating in the blood might be efficacious if it possessed a specific power to destroy the tubercle bacillus without injuring the tissues of the lung or acting as a poison to other organs of the body. Such properties are said to be possessed by helenin, which M. Korab found to destroy tubercle bacilli when kept in contact with them. This is a form of camphor which occurs along with alantic oil and alantic acid in the root of elecampane (*Inula helenium*). These are all, like other forms of camphor, antiseptics, arresting putrefaction, but having in addition a special power to destroy tubercle. The experiments of Marpmann appear to show that the latter two substances may possibly be useful, as animals to which they were administered did not die when inoculated with tubercle, while others similarly inoculated and which did not receive the medicine died. They have no injurious action upon man, and after their prolonged administration to phthisical patients, the tubercle bacilli disappeared from the sputum. In cases of phthisis where I have prescribed helenin the patients appeared to improve.

In a most suggestive paper by Dr. Burdon Sanderson he mentioned the destructive effect which phenylpropionic acids had been shown by Klein and Lingard to exert upon the bacillus tuberculosis. In consequence of this Dr. Theodore Williams tried these substances in cases of phthisis, and apparently with very good results. They may, however, sometimes cause sickness and discomfort in the patient, and are not quite so well borne as helenin. Farther trials are required in order to establish the utility of any of these substances, and to ascertain whether other remedies, having a similar character, may not be discovered and found to be more efficacious.

ACTION OF MICROBES IN THE BLOOD AND TISSUES.

We may now turn from the consideration of microbes and their action when in contact with mucous membranes or raw surfaces to their effect after they have gained an entrance into the circulation. The bacilli of anthrax and of septicæmia in mice probably produce their effect chiefly in the blood, while other poisons, such as those of measles, rötheln, scarlet fever, small-pox, acute rheumatism and tetanus, probably act more upon the tissues. Various theories have been proposed as to the mode in which the anthrax bacillus causes death. One idea was that the bacilli, by aggregating together, blocked the capillaries and caused embolism; a second was that they produced a ferment which decomposed the tissues; a third is that they give rise to one or more definite poisons. It is quite possible that all these theories may be, to a certain extent, correct, and that each of them may represent one factor in the production of the symptoms. The third of them is probably the most important, however, and the symptoms probably depend chiefly upon the formation of the poison. Indeed, Hoffa has obtained from pure cultures of the bacillus anthracis a ptomaine which produces the symptoms of anthrax, and death when subcutaneously injected; but it is not unlikely that the presence of a ferment may aid the anthrax bacillus in the production of a poison. Pasteur showed that the anthrax bacilli did not produce a ferment which was capable of causing the disease when injected, for by filtering the blood of animals suffering from anthrax through porous cylinders, and thus keeping back the bacilli, he obtained a filtrate which was inactive. In all probability, any ferment which the bacilli had formed would have passed through in the filtrate, and would have produced the ordinary symptoms after injection; but Nencki proved this in a way still more free from objection, for he inoculated gelatine jelly with anthrax bacilli. These liquefied the gelatine and fell to the bottom, and the clear liquid which remained above produced no effect on animals. Wooldridge, indeed, claims to have transmitted the toxic power of anthrax to vegetable albumen, organisms being absent.

These experiments appear to prove that if the anthrax bacilli produce a ferment at all, it is incapable of producing the disease. At the same time one must remember that after the injection either of the vegetable ferment, papain, or of sterilized septic blood into animals, Rossbach and Rosenberger found their blood swarming with bacilli. This observation seems to show that the ferment had rendered the blood more suitable for the rapid growth and multiplication of the bacilli.

Puerperal Fever.—In puerperal fever it is probable that the production of ptomaines in the tissues plays an important part, for Bouget isolated several toxic bases from the viscera of a woman who had died of this disease. This would not by itself prove that these poisons had been formed during life, and were not simply the products of putrefaction, but he also obtained from the urine of patients similar bases which were highly toxic, and killed frogs and guinea-pigs when administered by injection. The amount of poison in the urine was greatest when the symptoms were most severe, and diminished when the patients recovered. This fact appears to indicate a connection not only between the poison and the disease but between the gravity of the disease and the amount of poison.

Tetanus.—The pathology of tetanus was for a long time doubtful, and it was frequently ascribed to reflex excitability of the nerve centres due to the irritation of a cicatrix. It is now shown to be in all probability dependent on a bacillus present in earth or other matter contaminating a wound. The difficulty of thoroughly cleansing the infective matter from slight punctures, and the risk of wounds about the hand becoming afterwards infected even when thoroughly cleansed at first, explains why tetanus should so frequently follow very trivial injuries.

When animals are inoculated with matter taken from suppurating point or with the medulla of animals which have died of tetanus, the disease is reproduced, and on microscopic examination a bacillus has been found to be present. From pure cultivations of this bacillus Brieger obtained four poisons. The first, tetanine, produces tetanus in mice when injected in minute quantity. Another, which he has not named, also causes tetanus, along with a free flow of saliva and tears. Another, tetanatoxine, first produces tremor, then paralysis, and lastly violent convulsions. A fourth, spasmotoxine, causes severe convulsions both clonic and tonic. This discovery of Brieger's renders it probable that the convulsions in tetanus are due to the action of a poison, but we cannot at once assume that this poison necessarily circulates in quantities with the blood, especially as the flesh of animals which have died of the disease may be eaten with impunity.[*] It is quite possible that it may be formed either entirely or chiefly in the nerve centres, and that only very small quantities of it pass into the general circulation.

Hydrophobia.—In hydrophobia this is very probably the case, and Anrep says that he has isolated a ptomaine from the brain and medulla oblongata of rabbits suffering from a severe form of rabies. This ptomaine is very poisonous, and minute doses cause the earlier symptoms of rabies, while large doses cause the phenomena usually observed in the latter period of the disease. A gradual habituation of the animal to small doses of the ptomaine produced a certain degree of immunity.[*]

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[*] Sormani, *Rendiconti del Reale Instituto Lombardo*, March 28, 1889, quoted in *Nature*, May 2, 1889, p. 21.

Diphtheria.—From cultivations of diphtheria Roux and Yersin have obtained a soluble poison which may cause the symptoms of diphtheria in various degrees of intensity according to the dose. A large dose may cause rapid death, a smaller one may produce paralysis, ending fatally, while a still smaller one may cause only temporary paralysis.[†]

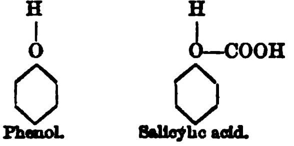
This poison, however, is not a ptomaine, that is, it is not of an alkaloidal nature. It appears to be rather allied to ferments, and is destroyed by boiling for ten minutes. The results of experiments already made render it hopeful that it may be possible by its means to confer immunity from the disease, but this is not yet certain.

Treatment of Diseases Depending upon Infection of the Blood or Tissues by Microbes.

There are two lines of treatment which one would naturally pursue. The first is to destroy the microbes or so weaken them that the leucocytes of the blood or the cells of the tissues may be able to complete their destruction. The second is either to eliminate the poisons they have formed, or to use some remedy which will antagonise their action.

The difficulty of destroying microbes by drugs is still greater in the circulation and tissues than it is in the intestinal canal, or in any of the body cavities; for here the comparative solubility of a remedy will not help us. We require one which will destroy the microbes without injuring, or at any rate without injuring to any great extent, the cells of any of the tissues, for it will be carried to them all by the blood. It is quite clear that if the microbes are few in number, so that the fight between them and the leucocytes or tissue cells is a fairly even one, the balance may be turned by the use of a drug which will hurt the microbes more than the organisms. Even if it should be somewhat injurious to both, the quantity required to kill the microbes will do the organism no great harm, and the total result will be a cure; but if the microbes are very abundant the antiseptic dose required to distroy them may be so great that it would of itself be poisonous to the diseased animal. We can thus see that experiments with the same remedy may yield very different results in the hands of different observers, and that while some may laud it as a certain cure, others might regard it as of no use whatever. From its general antiseptic power carbolic acid was likely to be the remedy first tried, and Bouley, Davaine, and others employed it in cases of anthrax with a certain amount of success.

Salicylic acid, which is closely connected with carbolic acid in its composition, differing from it by the introduction of the carboxyl group, has also been tried in a great number of infective diseases. In most of them it has been of little use, but in acute rheumatism it certainly lessens the pain and reduces temperature, giving the patient great relief. Whether it cuts short the disease, however, is a question which is not yet finally settled, although possibly the difference in opinion on this subject may be partly due to the different modes in which it is administered. It is evident, however, that amongst the enormous number of antiseptic compounds we may yet expect to find many drugs which may be useful as disinfectants in the blood and tissues.



Phenol. Salicylic acid.

Treatment by Elimination: Purgation: Diuresis.—Another method consists, as I have mentioned, in increased elimination. Free purgation was formerly resorted to, and apparently in many instances with good results, nor is this to be wondered at when we learn that fæces contain large quantities of ptomaines as well as of microbes.

But the most ready channel for the elimination of soluble poisons is the urine, and diuretics have long been used in the treatment of febrile diseases, and are still trusted as amongst the most efficient remedies. Acetate of ammonia with spirit of nitrous ether are still amongst the most favourite remedies as antipyretics.

Washing Poisons out of the System.—One of the best diuretics is a free supply of water, and Ringer pointed out the possibility of lessening the effect of poisons by washing them, as it were, rapidly out of the system.[*] This plan has recently been followed by Sanquirico,[†] with very striking results. In his experiments he injected quantities of a weak saline solution directly into the veins, immediately after the poison had been administered, or just when the symptoms of poisoning began to appear. By treatment in this way he found that three times the ordinary lethal dose of strychnine had to be administered before death occurred. The poisonous action of chloral, alcohol, urethane, paraldehyde, caffeine, and aconitine was also diminished, but not very much, while that of morphine and nicotine was unaffected. In all cases the beneficial effect of the treatment was most marked when the diuresis was greatest. No doubt the effect of fluids is likely to be greater when they are introduced directly into the veins than when they are introduced indirectly through the alimentary canal, but the effect in both cases will be the same in kind, though different in degree. I think we sometimes follow this plan unwittingly in febrile diseases by feeding the patient on milk, and more especially on milk diluted with soda and potash water. We thus administer a larger quantity of liquid than we would otherwise be likely to do, and the carbonic acid in the effervescing water tends both to aid absorption from the stomach and to stimulate excretion by the kidneys.

Leucomaines.—With the exception of peptotoxine, which is formed by the action of pepsine, I have hitherto spoken of alkaloids which owe their formation to microbes, and which are called ptomaines. But the cells of living organisms also break down albuminous matter in the course of the functional activity, and alkaloids are formed in the healthy body, to which the name of leucomaines has been given. An interesting observation has been made by Bouchard, to the effect that the alkaloids formed during sleep have a stimulating action, so that when they accumulate to a certain extent they tend to excite the nervous system and make the person awake. Those, on the other hand, which are formed during the waking hours have a depressant action, and tend to bring about a condition of sleep. There is thus a sort of self-regulation in the processes of life, by which waking and sleeping are alternately ensured. To this point, however, I shall have to refer again in considering the action of soporifics.

Uræmia.—In health all the poisonous substances formed during tissue-change are excreted chiefly in the urine; but when the kidneys are diseased, or have been in any way rendered functionally inactive, the alkaloids may accumulate and give rise to those symptoms of poisoning which are usually known by the name of uræmia. In cases of disease of the kidney where such a condition has been threatening, an exclusively milk diet proves of the greatest service, and probably does so in a great measure by washing the poison out in the way I have just mentioned, although it is also likely that such a diet tends to limit their production. The objection may be raised that in a good deal of what I have just been saying there is no very obvious relation to chemical constitution. This is quite true, because, though Brieger has pointed out that most of the alkaloids that he has obtained are either amines or diamines, or else more complicated compounds of nitrogen and carbon allied to uric acid, yet the chemical structure of many of those formed in the body either in health or disease has yet to be discovered. When we know their chemical nature we may be able, in a case of uræmic poisoning, at once to administer an antagonistic remedy and save our patient, instead of standing, as at present, almost hopelessly by. A knowledge of the relation of chemical constitution to physiological action is likely to guide us also in our investigations regarding the nature of the poisons of the uræmia. One set of poisons is probably allied to uric acid, and may include guanidine, methylguanidine, and other derivatives of urea.

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[*] Anrep, *Vratch*, No. 2, 1889, p. 52, abstracted in the *British Medical Journal*, Feb. 9, 1889, p. 319.

[†] Roux and Yersin, *Annales de l'Institut Pasteur*, 1888, Nos. 11 and 12.

[*] Husemann, *Arzneimittellehre*, 2te Aufl., p. 570.

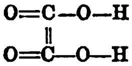
[†] Rossbach, *Berl. klin. Woch.*, 1889, No. 42.

In health the greatest parts of the products of albuminous waste are excreted by man in the form of urea; uric acid occurs only to a small extent. But in various disturbances of nutrition we find that the quantity of uric acid is greatly increased, and that sometimes along with it oxalate of lime makes its appearance. We might, therefore, naturally look for compounds of oxalic acid as among the substances likely to give rise to symptoms of poisoning if retained in the body.

Symptoms of Uræmia.—For my own part, I have sometimes been struck with the extremely rapid pulse in cases of uræmia, although there was no rise of temperature to account for it. This rapidity could hardly occur unless the vagus were either paralysed or inactive, and resembled so much the effect of atropine that I have been inclined sometimes to think that an atropine-like body was giving rise to the symptoms.

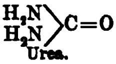
Hypothesis as to the Nature of the Poison in Uræmia.—Now there is a substance allied in its chemical constitution to oxalic acid, namely, oxalethylene, which has the power of paralysing the vagus and producing great rapidity of the pulse, just like atropine, which it also resembles in its action upon the pupil and brain, dilating the pupil and exciting the brain. When one atom of hydrogen in this body is replaced by chlorine so as to form chlor-oxal-ethyline, we obtain a body which no longer dilates the pupil, acts upon the brain like morphine, but still paralyses the vagus. We thus have a group of symptoms which closely correspond with those occurring in certain cases of uræmia. Should this substance, or any one nearly allied to it, be found to be present in cases of uræmia, experiments could readily be instituted with a view of finding antagonistic compounds, and the end we desire might be attained. In some cases of uræmia the injection of pilocarpine has arrested the convulsions, and it appears to me more likely to have produced these effects by antagonising the convulsing compound, than simply by producing profuse sweating, although such an action might possibly tend to help elimination. This appears to be more likely from the observation of Sänger that pilocarpine is only of use before the occurrence of coma, for this symptom probably indicates either the presence of another alkaloid not antagonised by pilocarpine or an accumulation of poison to an extent which cannot be neutralized.

In Fraser's experiments on antagonism he showed that, while atropine and physostigmine counteracted each other up to a certain point, yet when the dose was too great the presence of both appeared to cause death even more quickly than either the one or the other alone.



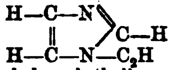
$$\begin{array}{l} O{=}C{-}O{-}H \\ \quad\ \| \\ O{=}C{-}O{-}H \end{array}$$

Oxalic acid.



$$\begin{array}{l} H_2N \\ H_2N \end{array}\!\!\Big\rangle C{=}O$$

Urea.



Ethyl-glyoxal-ethyline or oxalethylene.

PREVENTIVE TREATMENT OF INFECTIVE DISEASES.

In the early part of my lectures I mentioned that just as we can prevent the growth of a crop by destroying the seed or rendering the soil barren, so we may prevent the occurrence of infective diseases, either by destroying the microbes which form the disease germs or by altering the soil, namely, the organism in which they are to grow. We read in history of an ancient custom of rendering the soil of an enemy's city, which had been rased to the ground barren and waste by sowing it with salt, and in our day we see a similar plan made use of to prevent the growth of grass and weeds on gravel walks. The beneficial results of vaccination for small-pox showed the possibility of sterilizing the organism for particular microbes, so that they could no longer thrive in it; and Pasteur's treatment of anthrax with a weakened virus induced men to ask the question—How is insusceptibility to disease induced? and to try whether it was possible to prevent disease by the administration of chemical substances instead of by inoculation with microbes. One of the most powerful of all disinfectants is corrosive sublimate, and it has the advantage of exerting its antiseptic powers in all kinds of liquids. Koch used it, but without success, as a cure for anthrax, administering it after the disease had already been established. Cash administered it to animals as a preventive, and found that those which had received it for some time before inoculation remained well, while those not so treated died after inoculation. The possibility of preventing infective disease by the administration of remedies was thus proved. Pasteur, with the prophetic insight of true genius, arrived at the conclusion that the active agent in preventing hydrophobia was a chemical substance formed by a microbe and not the microbe itself, and upon this idea his plan of preventing hydrophobia is based. Wooldridge found that when anthrax bacilli were cultivated in beef broth, and the bacilli themselves were removed by filtration, the filtrate containing, as it did, the products which they had formed during their growth rendered an animal into which it was injected proof against anthrax inoculated afterwards. Pasteur and Perdrix found that the blood of animals suffering from anthrax when sterilized and injected into rabbits appeared to protect them against subsequent inoculation. Chantemesse and Vidal have found that the administration of sterilized cultures of the typhoid bacillus protects against subsequent inoculation with germs, and similar results have been obtained by Roux and Chamberland in regard to septicæmia.

Salmon and Smith have found that a similar treatment with a sterilized culture of the hog bacillus will protect pigeons against inoculation of the said disease, but they have not yet succeeded in protecting pigs. Lately, also, Pasteur and his assistants have succeeded in cultivating the organism which gives rise to diphtheria. They find that the poison which it produces is most virulent, so that an exceedingly minute quantity of it will produce death. Like the disease itself, this poison will produce paralysis of motor nerves, and it seems probable that the symptoms of the disease are, to a great extent, due to the absorption of the poison from the surface of mucous membrane upon which it is formed. This poison appears not to be of an alkaloidal nature, but rather of an albuminous character, and it is allied to ferments by the fact that it is quickly destroyed by boiling. Inoculation with minute doses of the poison, gradually increased in quantity, will finally not only render an animal insusceptible to the large quantities of the poison, but protect it against the diphtheria when the disease germs themselves are afterwards inoculated.

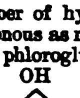
MODE OF ACTION OF PREVENTIVE INOCULATION.

The tolerance of poison which has been established in the case of diphtheria is probably similar in its character to what occurs during the habitual use of morphine. But perhaps the simplest case of acquired toleration is observed in salmon and other fishes which live at one time in salt, and at another in fresh, water. If such a fish be transferred directly from sea water to river water, or *vice versâ*, it would quickly die, the water to which it was unaccustomed at the time acting as a poison to it. But if the transition occur gradually, as it does in the migrations of the fish, where it passes from salt water to brackish, and then to fresh, or *vice versâ*, the tissues of its body, especially of its gills, become adapted to the gradual change, and no harm ensues. In the ordinary course of invasion of an organism by microbes, the microbes appear to have the power of secreting some substances which will destroy the cells of the organism. If these are, however, protected against the poison by previous gradual inurement to its action, they resist the microbes and destroy them. The whole subject is still in its infancy, but the results already obtained raise great expectations for the future. There is one point, however, which seems doubtful, and that is the duration of the immunity which may be thus conferred.

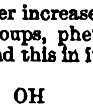
Sewill has found that by inoculation with small quantities of snake venom, he can establish a certain tolerance for larger quantities of the poison injected at once; but this tolerance wears off after six months, so that it rather resembles the tolerance which is established for morphine by its continuous use than the immunity against small-pox which is conferred by vaccination. It is possible that the germs of a disease may establish in the cells of the organism which it attacks a power of producing some substance inimical to their growth, and that this power may continue for years unchanged without any external evidence of its presence. Possibly some evidence of such an alteration might be found by careful examination of the poisons excreted in the urine of an animal before and after preventive inoculation of anthrax, and careful comparison of the action of these substances upon the life of anthrax bacilli. But the whole question is a very wide one, and an enormous amount of patient and laborious investigation will be required before we get any accurate knowledge on the subject.

CHEMICAL STRUCTURE AS AN INDICATION TO THE CHOICE OF ANTISEPTICS.

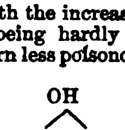
But there is one inquiry which is of still more immediate practical interest, and that is, which compound is likely to be most powerful as an antiseptic, and least likely to produce at the same time unpleasant or dangerous symptoms. Phenol itself has an antipyretic action, but its poisonous and antipyretic properties run too nearly parallel to allow of its being much used to reduce temperature. On comparing the action of phenol with similar compounds in which two or three atoms are replaced by hydroxyl instead of one, as in phenol, it has been found that the toxic action is, upon the whole, rather increased with the increased number of hydroxyl groups, phenol being hardly so poisonous as resorcin, and this in its turn less poisonous than phloroglucin.



Phenol.



Resorcin.



Phloroglucin.

The rapidity of action of these drugs is in inverse ratio to their toxic power; phenol, which is less toxic, acts most quickly, and phloroglucin mostly slowly. Resorcin is apparently intermediate.

But we have not merely to consider the number of hydroxyl groups in the body. We must consider also their position in relation to the benzene nucleus. This nucleus consists of six carbon atoms united together to form a close ring, and to each one an atom of hydrogen is attached, so that we have six hydrogen atoms attached to six carbons, and the formula is C_6H_6. It is not quite certain how the carbon atoms are united amongst themselves. According to Kekulé, they are alternately united by double and single affinities, while others have proposed connections between atoms on opposite sides of the ring.

We must bear in mind that this ring is simply hypothetic, but it gives us a convenient means both of representing aromatic substances and of studying their relationship.

Whatever the real nature of the connection may be, it appears that the benzene nucleus is symmetrical; and that if we replace an atom of hydrogen in it by hydroxyl, chlorine, methyl, or any other radical, the product is the same whichever atom of hydrogen is replaced. But, if we replace a second atom, the case is different, for the fact that one atom in the original nucleus has been already replaced has rendered the nucleus unsymmetrical. If the second replacement occurs on a carbon atom next to the first, it is represented in a formula by the figures 1 : 2, and is said to be in the ortho position. If on the next atom but one it is represented in a formula by 1 : 3, and is said to be in the meta position, and if in the next but two, it is represented as 1 : 4, and is said to be in the para position. The position of radicals replacing hydrogen in the benzene nucleus affects the chemical behaviour of the compound very considerably.

Thus if an alkyl, such as methyl, be attached to one carbon atom, the attachment of a second negative radical, such as hydroxyl, to the nucleus in the ortho position prevents its oxidation in acid solutions, but hastens it in alkaline ones, and there can be little doubt that the relative position of the radicals attached to the benzene nucleus will affect the processes of oxidation and reduction which it undergoes in the organism, as much as it would do in the hands of a chemist. We have, perhaps, too few data as yet to come to a definite conclusion regarding the exact alterations which the position of a group in the benzene nucleus will effect in its physiological action, but a number of most interesting data have already been obtained. Thus it has been found that in the case of the dioxybenzenes, where two hydroxyls occupy the ortho position, the action is most powerful. It is weakest in the meta position, and is intermediate in the para position in the benzene nucleus.

In the case of the trioxybenzenes where we have three hydroxyls, we find that when these are in position, 1, 2, 3, or are consecutive, as it is termed, the toxic action is greater than when they are in the position 1, 3, 5. In the first instance, as in pyrogallol, any two hydroxyls are to each other in the ortho position, whereas in the second, phloroglucin, any two are in the meta position to each other. If we replace the hydroxyl in phenol by carboxyl (COOH), we lessen its toxic power very considerably, though the substance we obtain—benzoic acid—still has considerable antiseptic power. If we replace one atom of hydrogen in the benzene nucleus by hydroxyl, and a second by carboxyl, we find that the same rule holds good as for the di-oxy compounds. Here, too, the rule regarding position holds good, for salicylic acid, in which the hydroxyl and carboxyl are in the ortho position, is more powerful than either of its congeners meta and para-oxy-benzoic acid, in which they are in the meta and para position respectively.

Provincial Transactions.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

As previously arranged the outing this year took the form of a picnic, and was held at Paradise, Monymusk, through the kindness of Sir Arthur Grant, Baronet.

The party met at the appointed rendezvous at 9.30 a.m. (on Wednesday, 3rd inst.), when there were in waiting two "four-in-hands," which were soon comfortably filled with 35 pleasure seekers. The day was fine, the sun scorching, and dust *ad lib.*, in a perfect state of pulverization. After a pleasant ride of an hour and a half, Dunecht—the local residence of the Earl of Crawford and Balcarres—was reached, where refreshments were served. The company was then, through the kindness of Dr. Becker (the Earl's astronomer), shown over the observatory—which by the way is soon to be removed to Edinburgh. Afterwards the party enjoyed a pleasant ride through the "policies," passing the spot where the late Earl's body lay hid, and which is now marked by a handsome granite monument with a descriptive inscription and the words:—"Astra: Castra: Numen: Lumen: Munimem."

After a further ride of about an hour and a half Monymusk was reached, the party, walking up to Paradise. On the island a most sumptuous lunch was waiting the weary wayfarers and was most amply done justice to. After lunch a few complimentary toasts were neatly and humorously proposed and replied to. The company seemed loth to leave the cool breezes and shady walks of Paradise and it was well nigh 6 p.m. ere many had left.

Tea was served to the ladies in the Grant Arms Hotel, Monymusk, and at 7 p.m. the "four-in-hands" were again in waiting.

After a drive of 2½ hours, Aberdeen was again reached by way of Kennap—with its mineral springs—and the Hill of Tyrebagger (tire-the-beggar).

Parliamentary and Law Proceedings.

SUPPOSED POISONING BY A NARCOTIC.

An inquest was held at Buckland, Hampshire, on the 9th inst., before Deputy-Coroner Lapthorne, touching the death of John Bloomfield, seven months old. It appeared that the child being unwell the mother took it to Mr. Harry Lea, assistant to Mr. Merrett, Kingston Road, and he gave her two powders, one of which she was to administer at once. Soon after the powder was taken the child was sick, in the evening it became drowsy, and slept all that night and throughout the whole of Sunday. At intervals it became sufficiently aroused to take the breast, but dropped off to sleep again immediately. At seven o'clock on Sunday evening, as the child continued to be drowsy, Dr. Emmett was summoned.

Dr. Emmett said that he found the child was under the influence of a narcotic. He took possession of one of the powders given by Mr. Lea, sealed it, and handed it to the police. From the first he was convinced that it was a hopeless case. Mr. Lea had shown him how he made up the powder, and if the ingredients were as administered to the child in question, the powder was quite harmless It was a strong powder for a delicate child, but there was no narcotic in the powder made up in his presence by Mr. Lea. Coma, due to a narcotic, was the cause of death.

Mr. Harry Lea, who volunteered his evidence, said he was manager to Mr. Merrett. Mrs. Broomfield came to the shop on Saturday evening and asked for a teething powder. She told him that the child was restless and very fretful. He gave her two powders out of twelve that he had made that morning. Each powder contained quarter grain calomel, half grain of scammony, and two grains of sugar. The powder that he showed to Dr. Emmett was one of the twelve. He had sold the remaining powders after the doctor left the shop; and he was sorry now that he had done so; but he had received no complaints. He did not consider the dose he gave would be injurious to any child. The dose was so small that he did not think it worth while to inquire as to the health of the child. He did not think it was possible for an opiate to have got into this powder by accident.

The jury were divided on the question as to whether the powder should be analysed, there being five for and eight against.

The Coroner said the only verdict possible was that death was the result of narcotic poisoning, but by whom administered there was no evidence to show.

The jury returned a verdict in accordance with this direction.

Obituary.

Notice has been received of the death of the following:—

On the 19th June, at Shilton, near Coventry, suddenly, while on a visit, Mr. Isaac Dickson, Chemist and Druggist, High Street, Alcester. Aged 54 years. Mr. Dickson had been a member of the Pharmaceutical Society since 1875.

On the 4th of July after a brief illness, Mr. Francis Earle, Pharmaceutical Chemist, Market Place, Hull. Aged 54 years. Mr. Earle had been a member of the Pharmaceutical Society since 1861, and for a period of about eight years filled the office of Local Secretary. He was also for two years a member of the Executive of the Trade Association. Mr. Earle was much respected by his fellow-townsmen, and a large concourse attended his funeral, among whom were the President, Vice-President, and Honorary Secretary and most of the members of the Hull Chemists' Association.

On the 5th of July, Mr. John Dymoke Elliott, Chemist and Druggist, Woolwich Road, Greenwich. Aged 78 years.

ANSWERS TO CORRESPONDENTS.

Erratum.—In the List of Local Secretaries, page 11, after Carmarthen *read* "Lloyd, Walter," *instead* of "Davies, Richard Morgan."

Forceps.—We are not acquainted with any compound that answers to your requirements.

Sherringham.—*Listera ovata.*

A. H. Allen.—We have received from Mr. A. H. Allen a copy of a lengthy correspondence between himself and Professor Dunstan in reference to the methods of analysing nitrites by the use of a nitrometer and by titration with iodide of potassium. Mr. Allen appears to think that the Professor should have made special mention of his name, as connected with the introduction of these methods, in the paper that was published in this Journal, March 16, p. 741. We fail however to perceive that any such mention was necessary, inasmuch as both methods had then become to such an extent general property as to make special reference to their originators or improvers unnecessary.

A. Coleman.—We think it very undesirable to prolong a vague discussion of the matter referred to in your letter.

Cymro.—The occurrence of germs in the favourable nidus afforded by the ammonium salt.

L. M. C.—You will find a reply to your inquiry on another page of the Journal this week.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Clague, Downes, Walker, Trooke and Co., Umney, Lawson, Revilo, Subscriber since 1842.

PICRASMA QUASSIOIDES, BENN.

BY W. DYMOCK AND C. J. H. WARDEN.

This plant, a native of the sub-tropical Himalaya and China, is a small tree or large bush with unequally pinnate leaves, and the aspect and foliage of *Ailantus.* It bears axillary stalked cymes of small diœcious or polygamous flowers, which have the calyx four- or five-parted. The fruit is a pea-like, red drupe, and is edible. Royle first drew attention to the bark and wood as being quite as bitter as quassia, and Stewart states that the leaves are used in the Punjab to cure scabies, and the wood to kill insects. The bark has been recommended by Macardieu as a febrifuge, and under the name of *Brucea* (*Nima*) *quassioides*, the plant is noticed as a likely substitute for quassia in the Indian Pharmacopœia. In this work the bark is said to be sold under the name of *Bharangi* in Bengal; but this we are unable to confirm, as several samples of bharangi which we have obtained in Bengal and elsewhere all proved to be the roots and stems of *Clerodendron serratum.* In the Punjab Himalaya, from whence we obtained the wood, the tree is known as *Kashshing.*

The wood consists of pieces of the larger branches from three to six inches in diameter; it is covered with a dark brown bark, which has a somewhat netted surface, and is marked by transverse scars. On rubbing off the outer layer of suber an olive-green surface is exposed. The bark from a stem of 3 inches in diameter was ⅛ inch thick and very compact. The wood and bark are of a light yellow colour; in the former a transverse section shows numerous fine, close medullary rays which intersect well-marked, irregular rings. The centre of the stem is occupied by a cylinder of pith. In short, in appearance and taste the drug bears a close resemblance to quassia.

Under the microscope a transverse section of the bark exhibits an outer layer of brown suber, within which are two or three rows of empty transparent cells, followed by eight to ten rows of cells containing chlorophyll; these are succeeded by the liber tissue, which is divided into layers by about six rows of yellow stone cells; lastly comes the cambium layer. The medullary rays consist of about fifteen vertical layers of cells; the single layers contain from one to five rows of cells. The tissue of the bark contains resinous deposits and crystals of oxalate of lime, which are so numerous towards the exterior portion that they produce opaque patches, visible to the naked eye.

The wood so closely agrees with the microscopic description of quassia by Pocklington (*Pharm. Journ.*, [3], v., 321; 'Year Book,' 1875, p. 190), that we think it unnecessary to reproduce the particulars.

Chemical Examination.—The wood reduced to fine powder, and dried at 100° C., lost 5·46 per cent. of moisture. The ash amounted to 1·61 per cent.; there was nothing special to note regarding its composition; it did not contain any trace of manganese.

In order to determine the nature of the bitter principle, 30 grams of the air dried powder were exhausted with 80 per cent. alcohol in the cold, and the resulting tincture evaporated to dryness; the weight of the alcoholic extract dried at 100° C. was 4·46 per cent. During percolation of the powder the percolate exhibited a most marked greenish fluorescence, while the liquid was of a yellow colour.

The alcoholic extract, which was of a dark brown colour, was mixed with water and acidulated with acetic acid, and the turbid mixture repeatedly agitated with ether. During agitation dark yellowish amorphous particles separated. The ethereal solution was bright yellow, and did not exhibit any fluorescence; its extract dried at 100° C. amounted to 0·66 per cent. The amorphous particles, insoluble in ether, dried at the same temperature, amounted to 0·293 per cent. These fractions we term A and AA respectively. They will be further referred to later.

The aqueous acid solution after separation of the ether was repeatedly agitated with benzole. The benzole solution did not exhibit any fluorescence; its extract amounted to 0·035 per cent. (extract B.). The aqueous solution, after separation of benzole, was made slightly alkaline with carbonate of soda and repeatedly agitated with chloroform. The chloroform solution exhibited a very marked greenish fluorescence. The extract amounted to 0·076 per cent. (extract C).

Lastly the alkaline aqueous solution was agitated again with benzole; the extract amounted to 0·012 per cent. (extract D). Regarding the properties of these various fractions we made the following notes:—

Extract A was yellow and soft; on heating with water a bright yellow solution was obtained, and a light yellow-coloured soft residue left. The yellow aqueous solution was strongly bitter; it yielded no precipitate with Mayer's reagent; with tannic acid it gave a white precipitate, and yellow flocks with phosphomolybdic acid.

Resin AA, which was insoluble in ether, was easily dissolved by alcohol, a very dilute solution showing a most marked green fluorescence. Examined spectroscopically no absorption bands could be detected; there was, however, marked absorption towards the violet end of the spectrum. The alcoholic solution was strongly bitter. In water this principle did not dissolve, either in the cold or on heating. In alkaline hydrate solutions it was soluble, yielding a brownish-yellow solution from which acids precipitated reddish-yellow flocks. On agitating this turbid, acid mixture with chloroform, the chloroform became slightly coloured, but was not fluorescent and the flocks remained undissolved. The chloroform left on evaporation a trace of residue which was strongly bitter. The insoluble flocks were washed and dissolved in alcohol, in which they were now readily soluble; the alcoholic solution did not exhibit any fluorescence; it was very bitter.

Benzole extract B was slightly yellowish and indistinctly crystalline; it had an odour like that of violets, and was extremely bitter. In alcohol it was soluble, the solution exhibiting a slight greenish fluorescence.

Chloroform extract C was slightly yellowish; residue very bitter, soluble in alcohol, with marked greenish fluorescence.

Benzole extract D was yellowish and very bitter. The above-described extracts, with the exception of AA, were mixed and agitated with boiling water. A yellow solution was obtained, and a soft insoluble residue left. The aqueous solution was concentrated, and when cold precipitated with a watery solution of tannic acid. The precipitate was collected on a filter, slightly washed with cold water, well mixed with recently precipitated plumbic carbonate, and the mixture evaporated to dryness. The dry powder was then boiled with absolute alcohol several times, the alcohol driven off on the water-bath, and the residue repeatedly agitated with chloroform and water. The chloroform solution was yellow and exhibited a well-marked greenish fluorescence; on evaporation 0·079 per cent. of a soft yellow extract was left, extremely bitter and easily soluble in alcohol, from which white microscopic needles in masses separated on slow evaporation. The mother liquor was of a bright yellow hue.

The amount of material was far too small to admit of any attempt at purification of these crystals from the yellow mother liquor with which they were contaminated. Judging, however, from the amount of crystallized matter separated, we are of opinion that it would probably weigh less than half the weight of the total chloroform extract.

In place of extracting the powdered wood with alcohol, in another experiment we boiled 70 grams five times with about 300 c.c. of water, pressing the marc well each time. The expressed liquids were mixed and concentrated on the water-bath to a bulk of about 50 c.c. To this turbid yellow fluid, when cold, aqueous tannic acid in slight excess was added, and then common salt in crystals, in amount more than sufficient to saturate the liquid. We added salt because we found that the tannin precipitate aggregated better, and was easier to filter. No attempt was made to wash the precipitate thus obtained; it was allowed to well drain on the filter, and then the filter paper with the contained precipitate was placed in a mortar, recently precipitated moist plumbic carbonate added, and the filter, precipitate and carbonate well rubbed together. The mortar was now placed on a water-bath, and when moisture had been expelled, the residue was reduced to powder. The powder was moistened with dilute alcohol, dried, placed in a flask and repeatedly boiled with 80 per cent. alcohol. The filtrates were evaporated to dryness, and the yellow residue mixed with water, and agitated three times with a large volume of chloroform. The chloroform solution was yellow, and possessed a marked greenish fluorescence, especially during the last extraction. On evaporation 0·156 per cent. of softish, dark yellow residue was left. This residue was easily soluble in alcohol with a greenish fluorescence; the taste was extremely bitter.

The filtrate from the tannic acid precipitate, as it possessed a slightly bitter taste, was acidulated with hydrochloric acid and agitated with chloroform. The chloroform extract amounted to 0·019 per cent.; it was soft, yellow, very bitter, and dissolved easily in cold absolute alcohol without fluorescence. On spontaneous evaporation, whitish particles separated, which when examined microscopically did not possess crystalline structure. This fraction was not further examined.

The chloroform extract obtained from the tannic acid precipitate amounting to 0·156 per cent., we attempted to purify in the following manner. We dissolved the extract in dilute caustic soda and gitated the alkaline solution repeatedly with hloroform. The chloroform extract amounted to 0·063 per cent. The extract was bitter, easily soluble in alcohol with greenish fluorescence. The alcoholic solution was allowed to evaporate spontaneously, and the residue in the capsule was then treated with cold ether, and the insoluble matter, which was of a yellow colour, collected on a filter. Dried at 100° C. the insoluble residue amounted to 0·021 per cent. This residue was yellow, brittle, and extremely bitter; it dissolved in alcohol with a yellow colour, and the solution on spontaneous evaporation left a yellow, varnish-like residue, destitute of crystalline structure.

The alkaline solution after separation of the chloroform was acidulated with acetic acid and agitated with chloroform. The chloroform extract was of a yellow colour, and amounted to 0·061 per cent. It was not easily soluble in alcohol, without fluorescence, and possessed an extremely bitter taste.

The ether used for treating the chloroform extract in the manner already described left on evaporation a yellow, extremely bitter residue. By treatment of the chloroform extract with an alkaline solution, and subsequent agitation with chloroform, it was thus divided into two fractions, the alkaline chloroform extract, and the acid chloroform extract; the alkaline chloroform extract, by subsequent treatment with cold ether, being separated into a portion soluble in ether and a portion insoluble in ether, which we take to be crude quassiin.

Our experiments indicate that the wood contains a crystallizable principle, probably quassiin, a fluorescing bitter resin-like principle, and at least one other non-crystallizable, bitter, resinous body, probably the uncrystallizable quassiin of Adrin and Morceaux. There are several points of interest connected with the examination of *P. quassioides* to which we would refer. Firstly, the wood is not so bitter to the taste as ordinary quassia wood. Secondly, the authors of the 'Pharmacographia' state that they obtained 7·8 per cent. of ash from quassia wood dried at 100° C.; the ash of *P. quassioides* obtained by us amounted to only 1·7 per cent. Thirdly, a watery solution of ordinary quassia wood is stated to display a slight fluorescence, especially if a little caustic lime has been added. According to Flückiger and Hanbury this is apparently due to quassiin. We have repeated the experiment with a sample of ordinary quassia wood, with negative results. The *P. quassioides* wood, when treated with water or alcohol, affords solutions which display a very marked greenish fluorescence. Regarding the content of quassiin, it appears to vary considerably. A. Christensen (*Archiv. der Pharm.*, [3], xx., 481) states that he found the amount to vary greatly, some specimens yielding scarcely any. Stillé and Maisch give the yield at 0·15 to 0·05 per cent. ('National Dispensatory'). The authors of the 'Pharmacographia,' at about 0·1 per cent. Messrs. Adrin and Morceaux (*Répert. der Pharm.*, xi., 246—50) obtained 0·125 to 0·15 per cent. of white crystalline quassiin. Oliveri and Denaro (*Gazzetta Chim. Ital.*, xix., 1–9) obtained only 0·03 per cent. of the pure principle. While Goldschmiedt and Weidel in 1877 failed to isolate quassiin, they obtained a yellow resin, the presence of which had been previously noticed in the wood by Flückiger and Hanbury.

The amount of crystallizable principle present in the wood we examined, for reasons we have already stated we are unable to accurately give. As a rough approximation we do not consider that it would amount to more than ·02 to ·03 per cent. as an outside limit.

Regarding the methods of analysis, extraction of the wood by alcohol, and subsequent boiling of the dry alcoholic extract with water, concentrating, and precipitating with tannin, appears to give better results, as far as a crystalline product is concerned, than the method we subsequently adopted.

ADDITIONAL NOTE ON PICRASMA QUASSIOIDES.

BY W. DYMOCK AND C. J. H. WARDEN.

In order to ascertain whether any of the jaborandi alkaloids were present in the wood or not, we made the following experiments:—An alcoholic extract of the wood was digested with water, acidulated with 1 per cent. of hydrochloric acid, the solution filtered from insoluble resinous matter, and evaporated to a small bulk. When cold the deep yellow solution was precipitated with phosphomolybdic acid, filtered, and the precipitate washed with water containing a trace of hydrochloric acid. The precipitate was then treated with baryta water, the excess of barium removed by CO_2, and the liquid with precipitate evaporated to dryness. The residue was then boiled with 96 per cent. alcohol. On evaporating off the alcohol a non-crystalline varnish-like residue was left. This residue was bitter, partly soluble in water, and responded to the usual alkaloidal reagents. The amount obtained did not exceed a trace.

The method of extraction above described was subsequently modified in the following manner:—An alcoholic extract obtained from 263 grams of the wood was digested at a gentle heat for some hours with water acidulated with 2 per cent. of hydrochloric acid. The deep yellow solution was filtered, rendered alkaline with ammonia, and agitated with chloroform. The separated chloroform was then agitated with dilute hydrochloric acid, the acid liquid separated, made alkaline with ammonia, and again agitated with chloroform; and this operation was repeated a second time. Finally the chloroform was evaporated off, and left an amber-coloured, non-crystalline, transparent, varnish-like residue. In water this extract was only slightly soluble, but in water acidulated with a few drops of nitric acid it was wholly soluble, with the exception of a few flakes. On spontaneous evaporation of the nitric acid solution a yellowish non-crystalline residue was obtained, not easily soluble in cold 96 per cent. alcohol, slightly soluble in cold water, and not wholly soluble in warm water. An aqueous solution was of a deep yellow colour and possessed the following properties:—Taste distinctly pungent, very slightly bitter and acrid. With alkaloidal group reagents very marked precipitates were obtained; with very dilute solutions, however, phosphomolybdic acid was one of the few reagents which afforded a reaction. Frohde's reagent gave no colour reaction in the cold or on heating.

The physiological action of the principle was tried by the following experiments:—A solution containing ·0009 gram of the principle injected hypodermically below the skin of a frog produced no symptoms. A solution containing about ·002 of a gram hypodermically injected below the skin of a cat's thigh yielded negative results. One of us swallowed a solution containing ·0036 of a gram without any symptoms whatever ensuing. A strong solution applied to a cat's eye caused no contraction of the pupil.

The amount of this principle separated from the wood, though we had operated on a fairly large amount, was insufficient for further experiments. Our experiments indicate, however, the presence of a distinctly alkaloidal principle in the wood, in addition to the principles to which we referred in our first note. As far as our experiments have gone there is no evidence to show that the alkaloidal principle is related to the jaborandi alkaloids.

THE PARIS UNIVERSAL EXHIBITION.

(Continued from page 25.)

In referring to the pharmaceutical and fine chemicals in the Paris Exhibition, the first place is undoubtedly due to the Collective Exposition of French Pharmacists, a most interesting collection brought together especially to illustrate the discoveries the world owes to French pharmacists. The active agent in bringing this collection together has been M. André Ponthier, but he would appear to have received wide and ungrudging co-operation, for the catalogue contains a list of no less than fifty eminent French pharmacists who have contributed towards making it as perfect as possible. And it must be confessed that the display is one gratifying to national as well as professional pride. Referring only to the isolated active principles of plants among the substances shown as having had their chemical history worked out by French pharmacists, these are represented in the case by quinine, quinidine, cinchonine, strychnine, brucine, igasurine, emetine, narceine, narcotine, thebaine, solanine, sabadilline, veratrine, delphinine, anagyrine, colchicine, and coumarin. These substances are associated with such honoured names as Pelletier, Caventou, Magendie, Derosne, Robiquet, Guibourt, and Desfosses. Some similar substances that will occur to the mind as the discoveries of French pharmacists are not to be found in this case, apparently because they occur in other separate exhibits that will be mentioned subsequently. Among other interesting substances included in this display is some lævotartaric acid prepared from dextrotartaric acid by Jungfleisch, practically demonstrating that the differences between the varieties of tartaric acid are dependent upon physical conditions; oxycinchonine and cinchoniline, two of the numerous derivatives recently obtained by the same chemist from cinchonine; pterocarpin and homopterocarpin, the crystalline colouring matters obtained two years since from sandal-wood by Cazeneuve; "chloralaniline," in sugar-brown crystals; fine white crystals of phosphoglycerate of potassium, prepared by Jolly; a crystallization of anhydrous sulphuric acid; and chirkestite and bidenguébinose, the two sugars obtained from the new varieties of manna that were the subject of a note in this Journal a few weeks since. Close by, and illustrating the remark made just previously, is another very interesting case, in which C. J. Tanret, of Paris, exhibits independently the compounds that have been discovered or introduced by himself. Here will be found the four volatile alkaloids isolated by him from pomegranate bark (*Pharm. Journ.*, [3], x., 829), one of which, pelletierine, has taken a prominent place among tænifuges. Pelletierine sulphate is shown in fine white needles; pseudopelletierine, the only one of the four that is solid in the free state, and its phosphate, in fine white crystals; and isopelletierine and methylpelletierine as liquids. The ergotinine associated with Tanret's name appears, as shown, of a yellow colour, having become discoloured by exposure to light; it is also accompanied by ergosterin, the crystalline substance resembling cholesterin isolated from ergot by the same pharmacist a short time since (*Pharm. Journ.*, Feb. 2., p. 606). Besides these there are shown different substances isolated from the bitter orange peel, including aurantiamarin, the glucoside to which the bitterness is principally due, hesperidin and isohesperidin (*Pharm. Journ.*, [3], xvi., 924); also vincetoxin, the curious glucoside from *Asclepias Vincetoxicum* root, which has the property of gelatinizing when heated and liquefying again when cooled; and a fine preparation of inosite from walnut leaves. Nor must mention be omitted of the soluble double salts of caffeine which Tanret was the first to introduce, the cinnamate, salicylate and benzoate of sodium and caffeine all being shown. In the next case is another exhibit of great chemical interest, in the shape of a specimen of the alkaloid pilocarpine prepared synthetically by Hardy and Calmels in 1887, and proved to possess the same properties, physiological and chemical, as the alkaloid derived from jaborandi leaves (*Pharm. Journ.*, [3], xviii., 89). In this case also, which contains besides exhibits by F. Gallois and E. Delpech, may be seen anagyrine, the base isolated not long since from *Anagyris fœtida*, a "false senna," and some of its salts, as well as hydrochlorate of adonidine, and ammonio-mercuric peptone. For another good record of personal work it is necessary to go to the "colonial palace" in the Esplanade des Invalides, where among the Gold Coast exhibits will be found a number of substances representing the subjects and products of researches by Heckel and Schlagdenhauffen. Among others may be mentioned doundaké bark (*Sarcocephalus esculentus*, Afz.), a rubiaceous febrifuge from which they separated two nitrogenous principles and a beautiful yellow pigment, thought worthy the attention of dyers; the kola nut (*Sterculia acuminata*), from which they obtained caffeine and theobromine; and two "false kolas" (*Garcinia Kola* and *Heritiera littoralis*). Still another instance of the kind is the case of C. Verne, of Grenoble, in which are shown in addition to boldo leaves and preparations, boldine, the alkaloid separated by him from the drug, together with several of its salts.

There are several fine general displays of pharmaceutical chemicals, which are especially notable for the beautiful appearance imparted by the brilliancy of the crystalline compounds. In the case of E. A. Petit, of Paris, the visitor has the opportunity of seeing together most of the chemical compounds that have been introduced recently into medicine. In a prominent place stands a good sample of "exalgine," or methylacetanilid, the compound so strongly recommended recently by Drs. Dujardin-Beaumetz and Bardet as an anodyne. It is only fair, however, to say that the most striking exhibit of exalgine is to be found among the fine show of tar products in the case of Brigonnet and Naville, where there is a quantity of it in needles two inches long, and also a mass not quite so definitely crystallized. A similar remark applies to antipyrin, which will be found in large crystalline masses in the case of the Compagnie Parisienne de Couleurs d'Aniline. Associated with exalgine in M. Petit's case are analgésine, the French representative of antipyrin, sulphonal, acetylphenylhydrazin or hydracetin, methacetin, benzanilid, and ethoxycaffeine. There is also a specimen of synthetically prepared cocaine, together with benzoylecgonine. A fine sample of eserine, or as it is perhaps more frequently called in this country, physostigmine, is accompanied by some salicylate of eserine, the salt that is official in the United States and German Pharmacopœias, and by the red and blue colouring matters associated with the alkaloid, the nature of which the exhibitor helped to explain. Another good display is that of Adrian and Co., of Paris, which includes two large glass bottles of atropine and sulphate of atropine, prepared by M. Moriaux; eserine nearly, but not quite colourless; sulphate of sparteine; fine crystallizations of aconitine and digitalin; quassiin crystallized and amorphous, and a dishful of lustrous red brown crystals of hæmaglobine. Under the name of Duquesnel and Millot, the former of whom will be remembered for his work on crystallized aconitine, are shown a number of similar substances, including digitalin, "light" and "heavy" atropine, salicylate of atropine, hyoscyamine, sulphate and salicylate of eserine, columbine, picrotoxin and helenin. Crystallized strophanthin of great merit and in quantity will be found in the case of A. H. Catillon, of Paris, where it is accompanied by specimens of the seeds of *Strophanthus hispidus*, *S. Kombé* and *S. glabrus*, the root of *S. hispidus*, and by dark green and pale yellowish green oil derived from the seeds. The Société du Traitement des Quinquinas (A. de Lisle) makes a very good display of the cinchona alkaloids and their salts, among which are some rather unusual compounds, such as quinine saccharinate, malate, camphorate, succinate, formate, arseniate, picrate and a crystalline nitrate. Another good display of cinchona alkaloids is that of E. L. Viennot, of Ivry-Port, where are to be found compounds that are called respectively "soluble quinine chlorhydrate for hypodermic injections," "quinine bichlorhydrate," "quinine bibromhydrate," and "basic quinine bromhydrate." Cinchona alkaloids are also exhibited by L. A. Taillandier, of Argenteuil. One case, that of G. de Laire and Co., of Paris, is somewhat pleasantly aggressive in its attack on the olfactory organs, its contents consisting of artificial vanillin, cinnamic acid, anisic acid and a number of aromatic alcohols, aldehydes, ethers and acids, many of them intended for use in confectionery and perfumery. Carbolic acid, or as our French neighbours prefer to call it phenic acid, and its compounds, occupy the case of G. Déolat, of Paris, where may be seen phenic acid of good colour in fine crystals, the phenates of caffeine, cocaine and quinine, sulphophenic acid and a number of sulphophenates, together with compounds of phenol with resorcin, chloral and camphor, the last two being liquids. Another exhibit of an allied character is that of the Compagnie Générale des Produits Antiseptiques, of Paris, which consists mainly of salicylic acid and its compounds. Here are to be seen salol, salicylic acid and the salicylates of sodium, lithium, bismuth and quinine. In addition there are some fine crystals of potassium chlorate, described as having been prepared by electrolysis, and liquid carbonic acid. Lithium salicylate and benzoate are also exhibited by H. Mourrut and Co., of Saint Ouen, as well as the salicylates of bismuth, lead, sodium, mercury, arsenicum and cadmium, the last in white glistering scales. H. Fournier and Co., of Paris, exhibit a number of chloral compounds, among which are "ethylate of chloral," or chloral alcoholate, having the appearance of a downy mass of acicular crystals; a fine crystallization of chloral hydrate, the effect of the crystals being increased by their being placed vertically; and some "chloral-antipyrin" in crystals. There is also in this case a bowl, the bottom of which is covered with a fine crystallization of quinine hydrochlorate. But this part of the subject should not be closed without calling attention to the exhibit of Crudenaire and Chanut, of Paris, in whose case will be found several compounds which are better known in French than in British pharmacy. Among these may be mentioned lactophosphate and chlorhydrophosphate of lime, used in phosphate preparations; sodium sulphovinate, which has some reputation as a mild purgative; "soluble" cream of tartar; citro-ammoniacal pyrophosphate of iron, in large bottle-green scales; and some other allied preparations. There is also a fine specimen of metaphosphoric acid, in appearance like pieces of clear plate glass, and another similar one of metaphosphate of soda. Enough has however been said to show that French pharmacists are well abreast of the times in this part of their business and are not open to the reproach of being dependent upon Germany, or any other country, for a supply of the definite organic chemical compounds that are now so widely and increasingly ordered by medical men in the treatment of disease.

In adding a few lines about the fine chemicals not so closely associated with pharmacy, reference must be made especially to the magnificent display by E. A. Billault, of Paris, which has probably been unequalled since the exhibit by the same firm in 1878. The beautiful play of colours in the platinocyanides, platinochlorides and other coloured compounds has again been utilized in an extremely artistic manner, so as to make the case one of the most attractive, even to the ordinary visitor, in this part of the exhibition, and not only are the specimens remarkable for their evident quality, but for the quantity shown in almost every instance. There is the platinocyanide of magnesium in cubes that are violet-red by transmitted light, with a shimmer of green on the sides on which the light falls. The platinocyanide of lithium and potassium occurs in long orange-red prisms, having a violet tinge; that of potassium and sodium in bright orange crystals with a pink and blue reflection; whilst the barium compound is in crystals that appear green when looked at in one direction, and yellow in another. Then there is a dish of tungstate of tungsten and sodium in orange granules, and another of the corresponding potassium salt in crystals of a garnet colour. Almost all the lithium salts are represented, among those noticed being the acetate, tartrate, citrate, sulphate, ferricyanide, ferrocyanide, nitroprussiate, binoxalate, carbonate, hippurate, chloride and bromide. Rubidium and several of its salts are also shown; osmium, osmic acid, osmide of iridium in steel-coloured granules, glucinum carbonate, selenium and selenious acid, ruthenium, calcium, and other of the rarer metals. Effective use is also made of some magnificent crystals of erythrite and the peacock iridescence of crystallized bismuth. Another case worthy of mention is that of Poulenc Brothers, of Paris, in which there is a good display of cobalt salts; a specimen of nitrate of uranium in lemon-yellow fluorescent prisms; isatin in red prismatic crystals, and a pretty crystallization of bismuth.

(*To be continued.*)

PROPRIETARY VERSUS LEGITIMATE PHARMACY FROM A MEDICAL POINT OF VIEW.*

BY WELLINGTON ADAMS, M.D.

Along with the many beneficial effects an increased liberty of thought and action has enabled us to enjoy, there have grown up abuses that require serious attention. When greater opportunities have been afforded for enlightened discussion and development of opinion, in like measure has been the freedom extended to malice, charlatanism and peculation. With improved intercommunication and increased national wealth, the opportunities for ill-doing have been proportionately augmented; as communities have widened, and attainable knowledge of our neighbour's character diminished, the chances for speculation, swindling and traducing have increased.

A century since, the people were divided, with few exceptions, into small communities, where the position and character of every citizen was well known; now, however, we are compelled to rely almost entirely upon our newspapers and journals for such information. Not only are we so dependent upon them, but the majority are led by their representations (through advertisements and notices) to place trust in schemes of which they otherwise have no knowledge. It therefore devolves upon editors of lay, trade and professional journals to exercise a careful surveillance over all that appears under their authority. In arrogating to themselves the functions of educators and reformers, they should be quite sure that their pretensions bear no unfortunate disproportion to their actions; and as abuses naturally arise in this as in all other departments of every-day life, the law should, when possible, afford ample and thorough redress, and not leave too much to the "editorial conscience." There are three principal classes of these proprietary medicines:—

I. Those secret compounds, familiarly known as "patent medicines," which seek the patronage of the public alone, and are advertised directly to the public without disguise, and dispensed alone for self-treatment; each package being accompanied by full directions for use, and a long list of symptoms common to numberless affections, which, when glanced at by the imaginative, the ignorant and the foolish, are almost certain to impress nine hundred and ninety-nine people out of every thousand such, that they are subject to one or more of them. Examples of this class of proprietary medicines are "Warner's Safe Cure," "Pierce's Golden Medical Discovery," "Ayer's Cherry Pectoral," etc. These are quack medicines *undisguised*, and the ordinary physician requires no caution with respect to them, although we are aware of a case where a so-called physician, not many miles from here, makes a habit of prescribing "Pierce's Golden Medical Discovery;" but such men are without the pale of the legitimate profession, and such cases are not worthy of our serious thought.

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* From the 'Kansas City Medical Index.' Reprinted from the *Western Druggist*, June.

II. Proprietary pharmaceutical specialties, as compounds of old and well-known drugs, claiming to be new discoveries in pharmaceutical science in regard to some alleged peculiarity in their method of manufacturing, the true or working formulas of which are usually trade secrets, and the names of which are claimed as trademarks by their manufacturers, who depend upon physicians' prescriptions for their patronage. Proprietary medicines of this class are usually provided with labels containing information for self-treatment, consisting of what pretends to be full directions for use, and a list of the affections for which the medicine is intended.

The physician who prescribes this second class of proprietary compounds not only gives countenance and support to a system which is fundamentally opposed to legitimate pharmaceutical and medical progress, but he also inflicts injury upon himself and his hard-working, self-sacrificing professional brethren, who work conscientiously day and night in preparing themselves to alleviate human suffering in every phase and emergency, making it difficult for them to eke out a bare subsistence, while the proprietor of the compound, so advertised by the doctor, revels in untold wealth, and laughs at the credulity of physicians.

III. The third class of proprietary medicines comprises those simple new drugs whose arbitrarily selected names are controlled by a patent or a trademark, as well as those articles which, under a peculiar form of dispensing, receive arbitrary names which are either patented or trade-marked; both of which at first address themselves exclusively to the medical profession, but subsequently fall into class two and are thoroughly advertised to the public, after the unsuspecting physician has thoroughly endorsed and brought them before the public for the ultimate benefit of the proprietor and manufacturer. Examples of this class are: Ingluvin, antifebrin, antipyrin, salol, soziodol, urethan, sulphonal, svapnia, pancrobilin, compressed tablets of muriate of ammonia, tabloids, valoids, elixoids, pilloids, parvules, alkatrits, alkametric granules, alkadermic pellets, alkassayed fluids, and so on *ad nauseam*.

The whole system of protected medicines, involving an individual proprietorship, and including the three classes mentioned, creates pernicious monopolies which permit the proprietor or manufacturer to charge an exorbitant price, far beyond a legitimate profit, and thereby unfairly obtain immense fortunes out of the ills of humanity. Not content with the protection afforded by patenting and copyrighting labels and names, these patented and proprietary medicine fiends now come before the public in a new role, having developed a new scheme for prosecuting their nefarious business, consisting of patenting the process and the apparatus by which these various drugs are manufactured. Surely this is the time to call a halt, for it must be conceded that, in very many cases, the new chemical products possess real merit; as, for instance, in the case of salol, antipyrin, sulphonal, etc., where the physician finds their use advantageous, but finds himself confronted with the evil principle of a protected proprietorship with its consequent monopoly. The manufacturer in such cases generally deserves but little credit, if any, since some scientist has previously invented the process, having made a limited amount of the drug and published the results, only to find himself subsequently prevented from using the drug without paying an enormous tribute to the manufacturer.

Should the inventor prove unscrupulous and unethical, then he will combine with the manufacturer and share in its profits, in which case, of course, the inventor will do all in his power to advance the sale of the pro- ct by writing articles over his name and scientific title, h, because of his professional standing, will be received by the current medical and pharmaceutical literature of the world; thus opening a dangerous avenue for misrepresentation and unwarranted claims. Under the name "acetanilid," which has been adopted by the profession of this country for the protected article known as antifebrin, we may purchase the drug from whomsoever we choose at a reasonable price; while under the latter or protected name we must pay a greatly advanced price.

We can perhaps imagine in what position we shall soon find ourselves if this system is persisted in, by considering in what position we would now be placed if this system had been discovered and adopted at an earlier date in the history of medicine. For instance, suppose the name "pepsin," when it first came out, had been trademarked, and the process and apparatus patented. The product would, in all probability, be as poor to-day as when first adopted by the Pharmacopœia, having a digestive strength of but 1·50; for in that event no one could, except by an entirely different process, produce pepsin without infringing upon certain parts of the process adopted, for instance, by Scheffer. So that under such conditions no one would have exerted himself to place upon the market a pepsin superior to that of Scheffer. But since the name pepsin and the process and apparatus for manufacturing it were not patented, free competition has enabled leading scientific manufacturers to investigate and bring upon the market a number of varying grades of pepsin of superior strength, the last of which has reached the strength of 1200. It is, therefore, obvious from this single example, that monopoly in any chemical product throttles competition and consequent improvement in the product, leaving both science and humanity to suffer thereby. In other and older countries this abuse of the patent and trademark system is not allowed. In France, for instance, antipyrin cannot be trademarked, or its processes and apparatus for manufacturing patented. Every French manufacturer, therefore, is at liberty to make and sell antipyrin under that name. A legitimate trademark, however, is allowed for the product manufactured by the inventor or by anybody else, under their respective names; as, for instance, "Antipyrin Knorr." If the physician believes that the antipyrin manufactured by Knorr is superior to that made by others, he is, therefore, at liberty to prescribe "Antipyrin Knorr," and this product must be supplied. Under the names "Antipyrin Merck," "Antipyrin Gehe and Co," etc., these respective manufacturers are entitled to the protection afforded by this character of trademark. Thus "Pepsin Boudault" is likewise a legitimate trademark allowed in France, so that if this article is prescribed the product manufactured by Boudault or supplied by his agents must be furnished. But in this case also any person or firm has the right to improve the process for the manufacture of pepsin, and to place on the market a product superior to Boudault's pepsin, should it be found possible to prepare one, with the legitimate protection afforded by the title, for instance, of "Pepsin Jensen," "Pepsin Fairchild," "Pepsin P. D. and Co.," as the case may be.

Should this scheme continue, there is no telling what the future may bring forth. We may at least rest assured that all progress will be seriously hampered, mischievous monopolies will be created, and the name for every new article will be protected by trademark, the process and apparatus for preparing the article will be patented, and the physician's therapeutical armamentarium will be needlessly glutted with trademark names. Suppose manufacturers had availed themselves of this method before, what an immense advantage and monopoly the first manufacturer of cocaine would have had; again, fancy the dastardly injury to humanity the discoverer of quinine would have had the power to inflict.

The Pharmaceutical Journal

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SATURDAY, JULY 20, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

AMERICAN PHARMACEUTICAL ASSOCIATION.

ATTENDANCE at a pharmaceutical meeting involving a journey of some four thousand miles is an undertaking that would probably astonish the average Britisher, but with our transatlantic cousins, who are more accustomed to big things, the case is different, and within the last few weeks this feat has actually been performed by no small number of them. The meeting of the American Pharmaceutical Association at San Francisco, opened on the 24th of last month with an attendance of about one hundred members, gathered together from all parts of the United States. After the usual inaugural formalities, the President, Mr. M. W. ALEXANDER, of St. Louis, delivered his address, in which he briefly referred to the rapid increase of members and to the fact that the annual expenses were becoming greater than the receipts. The suggestion that has been made to exclude from membership of the Association all who are not for the time being engaged in retail pharmacy was condemned as suicidal, and the opinion was expressed that it would be better to welcome all —whether wholesale druggists, manufacturing pharmacists, or teachers in colleges—as workers in one common field. The official representation of the Association in the seventh decennial revision of the national Pharmacopœia was naturally alluded to as being the first time it has enjoyed that right, and it was held that the importance of this step should not be lightly regarded. A hope was also expressed that the metrical system would now be fully adopted and that the system of parts by weight would be retained. Finally reference was made to the approaching meeting of the American Medical Association at Newport, and the proposed establishment in that body of a section on pharmacy, and it was stated that Professor REMINGTON was then on his way to attend that meeting as the accredited delegate of the American Pharmaceutical Association. In accordance with the usual custom the presidential address was referred to a committee to consider and report upon its recommendations. This seems a useful arrangement for giving vitality to suggestions in such addresses, which might otherwise be forgotten or fail to be carried into effect. Notwithstanding the increased expenditure mentioned by the President, the present financial position of the Association appears to be satisfactory, for according to the Treasurer's report the balance in hand amounts to about six hundred pounds.

The papers read at the several sittings of the Association were, judging from their titles, of fair pharmaceutical interest. Professor REMINGTON discussed compound galenical preparations and the propriety of retaining them in the Pharmacopœia. The conclusion arrived at by him is that all which have established their usefulness should be retained, but that all others should be dropped out. In a paper by Professor J. U. LLOYD on the "Effect of Moisture as a Preparation in the Extraction of Drugs," it was recommended to use enough water to soften plant integuments, and to spray the water on the powdered drug so as to avoid lumping; then to allow the water-moistened powder to stand for a considerable time in a closed vessel, and when possible to sprinkle it with alcohol, before packing in the percolator, so as to bring the liquid in it to the composition of the menstruum to be used in percolating. One of the advantages claimed for this mode of proceeding is that a coarsely-powdered drug may thus be extracted more easily than by the usual method of operating. In a paper by Professor GALLOWAY, the effects produced by arsenic in wall papers were described as constituting a grave evil in regard to public health and one that was constantly on the increase. Dr. OLDBERG, in a paper on "Pharmacopœial Nomenclature," recommended that no name should be used that does violence to established knowledge or perpetuates error; that each name should be clear and descriptive as far as consistent with necessary brevity; and that no name should be used which is capable of essentially different interpretations, or which has been, or is applied to more than one thing. Professor C. S. HALBERG, of Chicago, read a paper on "Wool Fat," in which he showed that it had been in use at the time of Herodotus, as it is now, combined with water. In a paper on "Glucose Syrup," by F. A. ROMETSCH, the author contended that this syrup should not be used at all. Professor EBERT disputed this opinion, maintaining that glucose syrup containing a certain amount of cane sugar is the best that can be used for soda water fountain purposes, and for several other uses in pharmacy. The relative value of pepsin tests was treated of by F. A. THOMPSON in a paper that led to a sharp debate. Professor HALBERG declared that it was nothing but an advertising dodge for a "patent medicine," and EBERT stated that a packing house in Chicago furnished nearly all the pepsin put into the market by the various rival makers. In Professor J. U. LLOYD's paper on "Maize Oil" it was claimed that this oil can be used in pharmacy, and that it has many advantages over cotton-seed oil or the other oils now in use. In liniments much less separation takes place when maize oil is used than is commonly the case with other oils. G. W. **Kennedy**, in another paper on the same subject, took a similar view. A. B. **Rockwell**, of Ann Arbor, read a paper giving much information respecting the Pichi tree, of Ecuador, with some hints as to the pharmaceutical preparation and uses of its products. S. A. **McDonald**, of San Francisco, read a paper on the alcoholic extract of cod liver oil—morrhuol—which is proposed for use as a substitute for the oil itself. In addition to these, several other papers were read, of which we must defer further mention until they can be published in full.

At the meeting of the American Pharmaceutical Association it is customary to discuss subjects of a more political character than those above mentioned, and at the late meeting there was frequent opportunity for doing so. In the Section on Pharmaceutical Education Professor **Bedford**, the Chairman, delivered an address on this subject, sketching the growth of the educational system in America from the time when there was but one college of pharmacy, now sixty-nine years ago, down to the present time, when there are a dozen schools and a score of colleges. He stated among other things that there are 38,000 drug stores in America, employing 75,000 persons in handling, selling and dispensing medicines. He suggested as topics for consideration and future discussion the queries, What is the duty of the fraternity towards the pharmaceutical educational institutions? What suggestions can be advanced to better the methods of teaching now followed? What can be done to secure greater interest in and larger classes for educational advantages? The report of the Committee on Preliminary Examinations gave rise to an animated discussion, and it was referred to a committee for publication. Several papers on educational subjects were read in this section. In the section on commercial interests the subject of the liquor trade was discussed with considerable animation and much difference of opinion. The rebate plan next came under consideration with much the same result. Messrs. **Painter**, of New York, and **Kilmer**, of New Jersey, objected to the system as prejudicial to the retailer, while Mr. J. **Vernor**, of Detroit, considered that it might be a necessary evil, since the proprietary remedies, with which it was originated and is connected, constitute over forty per cent. of all the goods sold by pharmacists in the States. The matter was finally referred to a special committee to report upon. The question of interchange of certificates by boards of pharmacy was also discussed and referred to the Legislative Committee. At the afternoon sitting of this section, however, the care for commercial interests had been so far tinguished by the attraction of various entertainments, that a messenger had to be dispatched to head-quarters for a reinforcement of members to make a meeting, and eventually the section had to be adjourned. The various arrangements for entertaining the visitors appear to have been numerous and well managed. During the session there was an exhibition of pharmaceutical preparations, drugs, etc., which is described as having been a decided success, notwithstanding the distance and the cost of transport. The exhibit of Messrs. **Parke, Davis** and Co., is especially mentioned as having been the finest display of its kind ever seen in the country. The place of meeting decided upon for next year was the town of Old Point Comfort, Va., and Professor **Emlen Painter**, of New York, was elected President.

The meeting of the German Apotheker-Verein, which had originally been arranged to take place in Wurzburg, has now been transferred to Mayence, and it will be opened on the 8th of September with a social gathering and an exhibition of objects of pharmaceutical interest. The following four days will be devoted in the mornings to sittings of the Council and general meetings of the members. On Monday evening a concert will be given in the Stadthalle, or in the adjoining gardens, according to the state of the weather. On Tuesday afternoon arrangements have been made for a visit to the "Kupferberg" Sektkellerei, where the local production of effervescing wine will be inspected, and in the evening a concert will be given with fireworks in the new town gardens. The dinner of the members will take place on Wednesday at the Stadthalle, and on Thursday an excursion by steamer will be made to Rudesheim and Bingen, affording opportunity for visiting some places of interest in the neighbourhood.

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The Dublin correspondent of the *Lancet* states that the Council of the Royal College of Surgeons has adopted a resolution in reference to pharmacy certificates for the first professional examination of the conjoint scheme of the College of Physicians and Surgeons to the effect that after October the College will not accept any pharmacy certificate unless taken out at a hospital or medical school. It is remarked that this resolution strikes at the pharmaceutical chemists, who may be said to prepare at least three-fourths of the students taking out the certificate, and that as no complaints have been heard of the way their pupils are prepared, it appears a hardship to cancel a regulation that worked fairly. The *Medical Press and Circular*, on the contrary, states that the regulation has been largely taken advantage of by certificate mongers, who supply certificates for a nominal fee and without any real study. It is represented that a certificate of three months' study of pharmacy could be had at ten minutes' notice from certain well known traders for 10*s*, and that the colleges have been obliged to take means to prevent evasion of the regulations in this way. Of course, it will be understood that this applies to Ireland.

Transactions of the Pharmaceutical Society.

EXAMINATION PAPERS.

SCHOOL OF PHARMACY.

The following are the questions that were set at the recent Sessional Examinations in the Society's School of Pharmacy:—

CLASS OF PRACTICAL CHEMISTRY.

PROFESSOR ATTFIELD.

SESSIONAL EXAMINATION FOR A SILVER MEDAL AND THREE CERTIFICATES OF HONOUR.

Hours: *Half-past* 10 *to* 5. *July* 9.

Books and Memoranda permitted.

Standard number of Marks, 100.

1. What percentage of citric acid is present in the accompanying sample of "Lime Juice?"

2. How much real acid is present in one fluid ounce of the "Hydrocyanic Acid" supplied to you?

3. What proportion of free sulphur is present in the "Milk of Sulphur" placed before you?

NOTE.—*Manipulation as well as results will be scrutinized.*

CHEMISTRY AND PHYSICS.

PROFESSOR DUNSTAN.

SESSIONAL EXAMINATION FOR A SILVER MEDAL AND THREE CERTIFICATES OF HONOUR.

Part I.—Physics.

Time allowed: 10 *a.m. to* 1 *p.m.* *July* 12.

1. Give an account of the British and Metric Standards of Weight. How are these standards connected with each other?

2. Describe the principle on which is founded the Victor Meyer method of determining vapour densities. Make a sketch of the apparatus which is employed. Describe minutely how you would determine the vapour density of quinoline by this means, including the necessary corrections and calculations.

3. What is the law of the Conservation of Energy? By what experiments has the correctness of this law been demonstrated?

How do freezing mixtures act, and how may the low temperatures produced by them be recorded?

5. Explain the construction and mode of action of "primary" and "secondary" batteries.

6. Write a short account of the emission or corpuscular theory of light, and compare it with the undulatory theory which is now accepted.

Part II.—Chemistry.

Time allowed: 2 *p.m. to* 5 *p.m.* *July* 12.

1. Write a short account of the Periodic Law and show how it may be employed to control the accuracy of atomic weights.

2. Describe the methods of preparation and properties of the compounds designated by the formulæ NH_3, N_2H_4, NH_3O.

3. Describe the preparation, and contrast the properties of the elements phosphorus, arsenic and antimony.

4. Describe the methods of preparation, reactions and constitution of Lactic Acid.

5. Exhibit the points of similarity and difference between the varieties of alkyl hydroxides known respectively as "alcohols" and "phenols."

6. State the chief characteristics of the vegetable alkaloids. Write a short summary of Ladenburg's researches on the constitution of conine.

BOTANY.

PROFESSOR GREEN.

SESSIONAL EXAMINATION FOR A SILVER MEDAL AND THREE CERTIFICATES OF HONOUR.

Hours from 11 *till* 2. *Wednesday, July* 10.

1. Describe the structure of a typical root of a flowering plant and give an account of its functions. What modifications of such structure are most common. Explain the reasons for such modifications as you describe.

2. Explain the appearance of starch in plants. Describe the structure of starch grain, and show how these bodies are formed in parts of plants not exposed to light.

3. What is a "natural order?" Give some account of the natural order Rosaceæ. Mention its nearest allies and show how you would discriminate between them.

4. Describe the prothallium of a fern.

Hours from 3 *till* 6. *Wednesday, July* 10.

1. Give some account of the more commonly occurring movements that may be observed in different parts of plants. How are such movements brought about in parts that have ceased to grow.

2. Describe the chief modifications of the ground tissue of plants, pointing out where each one you describe may be met with.

3. Give an account of the structure and life history of *Volvox globator*.

4. What are the characteristics of the sub-class Thalamifloræ? Enumerate the chief natural orders of the British Flora comprised in this sub-class and mention their distinguishing features.

PRACTICAL BOTANY.

Hours from 11 *till* 2. *Saturday, July* 13.

1. Make such microscopic preparations as you think necessary to display the structure of the specimen A. Mount them in glycerine.

2. Sketch your preparations and point out in your sketches the points which you consider important.

3. Describe in botanical language the specimen B. Draw its floral diagram and refer it to its natural order.

4. Refer the flowers given you to their several natural orders.

MATERIA MEDICA.

MR. HOLMES.

SESSIONAL EXAMINATION FOR A SILVER MEDAL.

Hours from 11 *till* 1. *Thursday, July* 11.

1. Examine under the microscope the portion of leaf placed before you, and state from what medicinal plant it is derived.

2. Examine the powder placed before you, under the microscope, and give your opinion as to its constituent or constituents and their purity.

3. Name the articles of Materia Medica placed before you and mention the physical characters by which you recognize them.

4. How would you ascertain the quality of a commercial specimen of opium?

Hours from 2 *till* 5. *Thursday, July* 11.

1. Mention the varieties of the following drugs met with in English commerce, and point out the differences by which they may be recognized: Anise, Caraway, Dill, Henbane, Jaborandi, Liquorice Root and Senna.

2. From what plants are Menthol, Safrol and Thymol respectively obtained? Can either of them be prepared artificially?

3. To what natural orders of plants do the following articles of materia medica belong: Iceland moss, Irish moss, Boldo, Hop and Storax.

4. Mention the impurities liable to be met with in

powdered scammony and the means you would employ to detect them.

5. What is the botanical source of Pareira Brava? Whence is the drug imported, and what is known of its active principle?

6. What are oak galls? Mention their active constituents, and the physical characteristics of galls of good quality.

PHARMACY AND PRACTICAL PHARMACY.

MR. INCE.

SESSIONAL EXAMINATION FOR A SILVER MEDAL.

Time allowed—11 *a.m. to* 2 *p.m.* *Monday, July* 8.

1. Enumerate and comment on, the official preparations in which ether is employed.

2. Describe modern improvements in filtration, and discuss the question as to the use and misuse of the process generally.

3. Give in detail the pharmaceutical applications of Oleum Terebinthinæ and the methods by which it may be dispensed.

4. Classify the Unguenta of the British Pharmacopœia. (a) according to their bases. (b) according to their chemical composition. Note special modes of preparation.

JUL 22 1890

Proceedings of Societies in London.

ROYAL COLLEGE OF PHYSICIANS.

[CROONIAN LECTURE.]

RELATION BETWEEN CHEMICAL STRUCTURE AND PHYSIOLOGICAL ACTION.

BY T. LAUDER BRUNTON, M.D., F.R.S.

(*Continued from page* 39.)

We now pass from the prevention of diseases to another subdivision of our subject, viz., their control and cure. Antiseptics find their most important application in the prevention of disease. But many bodies belonging to this class have other actions which are extremely valuable in relation to the control and cure of disease. More especially is this true of their power to reduce temperature and relieve pain. We might therefore pass from antiseptics straight on to antipyretics. Or we might take another course, and on leaving antisepsis, one of the two greatest discoveries of modern therapeutics, we might turn to the other, viz., anæsthesia, and proceed to the consideration of anæsthetics. Both plans have advantages of their own. If we take anæsthetics first, it allows us to a certain extent to follow the subject of the relation between chemical structure and physiological action historically, and it has the further advantage of allowing us to begin with bodies of simple chemical structure and to proceed from them to the more complex. Such an arrangement would undoubtedly be best in a text-book, but as my object here is not to give you a full account of all that is known in relation to the connection between chemical structure and physiological action, but rather to point out its relations to the treatment and cure of disease, I shall take the other method and pass from antiseptics directly to antipyretics. There is a natural link between those two classes of remedies. Not only are antiseptic and antipyretic properties generally possessed by the same substances, but we use the same remedies to destroy microbes both outside and inside the body, and also to reduce the fever which the microbes cause after their entrance into the organism.

Besides this, a number of new facts have been ascertained regarding the functions of protoplasm by the use of bodies belonging to the aromatic series. I wish particularly to call your attention to those facts because they may help us to explain the action of other classes of drugs as well as that of antipyretics.

MOVEMENTS OF CELLS.

On observing isolated cells, such as the leucocytes of the blood, we can see that they are endowed with life, and will continue to move about on the stage of the microscope as independent organisms for a considerable time after the death of the animal from which they have been taken. Their movements are of two kinds, viz., one of simple contraction or extension of the protoplasm in various directions, while the cell remains in its place, and secondly, movements from place to place. I call your attention specially to those kinds of movement because both are probably of practical importance. The movements from place to place enable the leucocytes, as was first observed by Addison and then by Walter, to move out of the blood-vessels. The importance of this diapedesis and of the further movements of the leucocyte amongst the cells of the tissues has been clearly demonstrated by Cohnheim and his followers, but it seems probable that movement of the protoplasm in a cell while it remains *in situ* may be no less important.

RESPIRATION IN CELLS.

Kühne showed that isolated cells have the power of absorbing oxygen, by placing them under the microscope in water containing a little oxy-hæmoglobin. After a while they absorbed the oxygen from the hæmoglobin and reduced it. The reduction was discovered by looking at the solution with the microspectroscope, and noticing that it gave the band of reduced hæmoglobin instead of oxy-hæmoglobin as at first. The experiments of Ludwig and his scholars upon circulation through single organs or parts of the body isolated from the rest, and also those of Pflüger and his school upon the gases of the blood, have shown that oxidation and reduction occur in the tissues, but the amount of each is not always the same, oxidation being sometimes predominant, and, at other times, reduction. Similar results have been obtained in living men by Pettenkofer and Voit. It was found by Harley that the absorption of oxygen and the elimination of carbonic acid by blood could be altered by admixture with various poisons. The power of quinine to lessen such processes was not only discovered by Binz, but brought by him into close relationship with the antipyretic power of the drug, and his researches formed a starting point for numerous investigations into the action of antipyretics generally.

In the admirable lectures which he gave before this college last year, Dr. MacAlister gave such a complete account of the pathology of fever that I need not do more here than just recapitulate one or two of his chief conclusions.

Increased temperature may depend upon (*a*) lessened loss of heat by radiation or conduction, or (*b*) increased formation of heat by greater oxidation in the tissues, and especially in the glands and muscles. The oxidation by which heat is formed in these tissues is regulated by two or three nerve centres within the cranium. Antipyretics, he informed us, appear to lessen oxidation within the body and diminish the formation of heat by stimulating these centres, but he did not discuss the mode in which stimulation of the thermal centres alters the processes of respiration in the tissues and thus lessens oxidation. This point of the question I propose to take up now, but before I can deal with the action of drugs as antipyretics I must ask your attention for a short time to some observations which have been made upon the respiratory functions of the cell.

OXIDATION AND REDUCTION.

For such experiments as those I have already mentioned, it has been known for some time that cells possess the power of taking oxygen from the air, from liquids containing it in solution, or from substances like hæmoglobin, which contain it in a loose state of combination. To this power of removing oxygen from other things the term "reducing" is given, while that of "oxidizing" is applied to the power of giving off oxygen to other substances.

Double Action of Hæmoglobin.—Some bodies, like hæmoglobin, possess both powers to a large extent. A solution of hæmoglobin mixed with air absorbs the oxygen from it, and thus has a reducing action, but if this oxidized hæmoglobin be then mixed with some ferrous sulphate it gives up the oxygen to it, oxidizes it, and forms ferric sulphate. It thus loses its oxygen and becomes reduced, the ferrous sulphate having acted upon it as a reducing agent.

Comparative Degrees of Affinity for Oxygen.—Subances differ in the degree of affinity which they have for oxygen, it being greater in some and less in others. Thus it happens that we might draw up a scale containing a number of bodies, each of which would have a greater affinity for oxygen than the one above and less than the one below it. Each one would therefore abstract oxygen from the one above it, and act as a reducing agent towards it, while it would give up oxygen to the one below it, and thus act as an oxidizing agent.

EFFECTS OF REACTION AND ELECTRICITY ON OXIDATION AND REDUCTION.

Effect of Acid or Alkaline Reaction.—The degree of affinity for oxygen which many bodies possess is greatly altered by the reaction of the fluid in which they are dissolved, so that one which would have a powerful reducing action in an alkaline solution has none at all when it is acidulated.

Effect of Electric Currents.—Moreover electric currents may originate processes of reduction or oxidation. Thus, if an electric current be passed through water, decomposition occurs, the hydrogen being liberated at the negative pole, and oxygen at the positive. If the electrodes are made, as they usually are, of a substance like platinum with which the oxygen or hydrogen cannot combine, these gases are simply given off, but if the positive electrode is made of an oxidizable, and the negative one of a reducible substance, the oxygen and hydrogen will act upon them and they will undergo reduction or oxidation accordingly. By reversing the current, changes of the opposite nature will occur, oxidation giving place to reduction and *vice versâ*.

Formation of Urea.—By means of alternating currents of this sort, Drechsel has succeeded in converting carbonate of ammonia into urea and has rendered it probable that alternate oxidation and reduction are constantly occurring within the tissues of the living body.

SEAT OF OXIDATION AND REDUCTION IN THE BODY.

The exact place where these processes occur and the exact manner in which they take place have still to be made out, but a great deal of information on these subjects has been obtained by Ehrlich in a most interesting and important research.

Oxidation and Reduction of Aniline Colours.—By the introduction of various aniline compounds into the circulation of living animals, either directly into the veins or indirectly by subcutaneous injection, Ehrlich has been able to show that constant processes of oxidation and reduction are going on throughout the animal body generally, but with very different intensity in the different organs and tissues.

Comparative Intensity of Respiratory Processes in Different Tissues.—In those whose functional activity is small, such as connective tissue, these processes go on slowly, but they go on rapidly in organs where the functional activity is great, as in the heart, the brain, and some of the unstriated and striated muscles.

Intensity of Reducing Power of Cells.—The power of the living cell to effect chemical changes in the substances which it absorbs is almost incredible, for alizarin blue, one of the substances which Ehrlich has employed, can only be reduced by the most powerful reagents outside the body, for example, by boiling with caustic potash and grape sugar, and yet it is completely reduced within the living body by the liver and by the cortical substance of the kidney, and is rapidly reduced after death by the heart, liver, and muscular substance. When reduced it becomes white, but when oxidized it becomes blue, and thus the comparative amount of reduction in the tissues can be estimated by their colour.

Limits of the Reducing Power of the Tissues.—The alizarin blue is injected in the oxidized or blue state, and circulates in this condition in the blood, for the serum and also the fluid of the aqueous chamber of the eye have a distinct blue colour. Most of the organs of animals into which it has been injected have a blue colour, with the exception of those I have already mentioned. This shows that the reducing power necessary to change it from blue into white is greater than most of the tissues possess.

By using another pigment—indophenol blue, which is more easily reduced than alizarin blue—Ehrlich found that reduction occurred in almost all the tissues. It is evident then, that, as very few tissues can reduce alizarin blue and almost all can reduce indophenol blue, the reducing power of the cells lies between the limits fixed by those two substances.

Tissues like a "Damped" Furnace.—The fact that the tissues possess this power of reduction shows that they are not saturated with oxygen, and yet they possess a sufficient amount of oxygen to enable them to carry on their functions. Their conditions might be likened to that of a furnace where the entrance of air was so restricted as to allow sufficient but not too rapid combustion to occur, so that if the ventilator were opened and more air allowed to enter the furnace, fires would at once burn more hotly. In the case of the tissues of the greatest functional activity, such as the heart and brain, the supply of oxygen must be very free, and that it is so is shown by the fact that they do not reduce alizarin blue during life, though they rapidly do so after death, and the brain will also do it during life if excited by electrical stimulation. In order to explain the processes of reduction and oxidation going on in cells, Ehrlich supposes that in the protoplasm we have certain chemical groups which will take up oxygen readily and will give it off to others with which it forms acid products.

SEAT OF OXIDATION AND REDUCTION IN THE CELL.

Respiratory Zones of the Cell.—In the living protoplasm he supposes there are three zones, the first having the greatest affinity for oxygen. This is usually saturated, and forms the reserve of oxygen for the use of the cell. The second zone is that which is functionally active during the life of the cell, sometimes oxidized. The third is always unoxidized, and is constantly exercising an attraction for the oxygen of the blood or lymph.

Alteration in Power of Reducing by Changes in Reaction.—It may well be supposed that the affinity of protoplasm for oxygen may be altered in a similar way to that of indophenol white, which, like protoplasm, is readily capable of undergoing alternate oxidation and reduction. In an alkaline solution the affinity of indophenol white for oxygen is very strong, and it readily becomes oxidized to indophenol blue by the oxygen of the air. But in a neutral solution its affinity for oxygen becomes slight, and in an acid solution is completely destroyed, so that in such a solution it no longer tends to attract oxygen, but on the contrary gives it off readily, and consequently reducing agents quickly convert it into indophenol white. When the acid is neutralised and alkalinity restored, the attraction for oxygen is increased, and the oxidized blue product is again formed, notwithstanding the continued presence of a reducing agent in the solution.

On again acidulating, reduction occurs, and the same cycle of changes between oxidation and reduction can be produced at will by mere changes in the reaction of the liquid, until the whole of the reducing substance is oxidized.

Effect of Functional Activity on the Reaction of Cells.—That similar changes of oxidation and reduction in the protoplasm of cells are largely influenced by their reaction has been found by Ehrlich to be the case, for by using another aniline colour which is a delicate reagent for acidity, along with indophenol blue, he noticed that reduction of the latter substance occurred when indication of acid reaction was given by the former.

REGULATION OF OXIDATION IN THE CELL.

The production of acidity, or rather, in most cases, the diminution of alkalinity in the protoplasm, lessens its affinity for oxygen, and thus the process of combustion in the cell is diminished or arrested by the formation of acid, though oxidation again begins as soon as the circulating blood or lymph has restored its alkaline reaction. The activity of the cell tends to generate acid products of tissue waste, and these will be formed all the more quickly the more actively the functions of the cell are going on. But their accumulation will tend to lessen the alkalinity of the cell, and consequently its affinity for oxygen. The processes of combustion will then diminish or stop entirely until the waste products have been removed. There is thus a sort of self-acting mechanism in the cell, which, to a certain extent, regulates oxidation within it. Yet this regulating arrangement, which might be likened to the appetite, which prevents reasonable people from eating too much, does not seem to be enough, for we find a further one, which actually prevents the oxygen from getting to the protoplasm, and, with the few exceptions of the brain, heart, and some of the muscles, the tissues of the body are shown by their reducing power to have only a restricted supply of oxygen, or, in other words, are burning like a furnace fire with partially closed dampers. Now the question arises, how is the supply of oxygen to the protoplasm restricted, and how is it that the supply may be, if necessary, increased? The damper which restrains combustion in the cell is, according to Ehrlich, the paraplasm, or cell juice which surrounds the protoplasm. This paraplasm presents considerable resistance to the diffusion of oxygen through it, and thus restricts the quantity which reaches the protoplasm.

Effect of Contraction of Protoplasm on its Respiratory Processes.—The amount of oxygen which will pass through the paraplasm and combine with the protoplasm will vary according to the thickness of the paraplasm and to the area of surface of the protoplasm. When the protoplasm is contracted to its utmost extent, it will form a globe presenting a minimum surface to attract oxygen, and with a maximum thickness of paraplasm around it. When the protoplasm is extended it will present a maximum surface with a diminished thickness of paraplasm. It will therefore attract oxygen more readily, and combustion will go on more quickly within it.

ATTEMPTED EXPLANATION OF THE ACTION OF ANTIPYRETICS.

Let us now see if we can apply these data in explanation of the action of antipyretics.

In the Croonian Lectures last year Dr. McAlister informed us that a number of antipyretics had been shown to affect the temperature of the body by acting upon definite centres in the brain, but he also told us that the chief seats of combustion in the body by which temperature is maintained are the muscles and the glands. At present, as far as I know, we have no very satisfactory explanation of the mode in which these structures are affected by stimulation of the thermal centres. If we suppose, however, that stimulation of these centres causes contraction of the protoplasm in muscle and gland cells, so that its attracting surface to oxygen would be diminished, and the resistance to the passage to oxygen through the paraplasm increased in the way I have just described, we can see that oxidation would probably be greatly lessened and the temperature correspondingly reduced.

Binz's Work on Quinine.—The study of antipyretics received a great impetus, and, indeed, might almost be said to have started, from the work of Binz on quinine. From his experiments two very striking facts resulted. The one was that quinine had the power to lower the temperature in febrile conditions which were not due to malaria; the other was that quinine had an extraordinary power of arresting the movements of leucocytes, causing them to draw in their pseudopods, and to contract into a sphere. In the case of free cells like the white blood corpuscles we can see that such a contraction as this will considerably lessen the surface of protoplasm exposed to oxidation, but one can hardly see how the change of form is likely to interpose any obstacle between the oxygen contained in the serum surrounding the cell and the protoplasm. The case is different, however, if we take such a structure as the pigment cell of the frog. Here the protoplasm does not fill the whole cell equally at all times; occasionally it stretches itself out into all the ramifications of the branching cell, and then it will not only allow a large surface for oxidation, but will be separated by a comparatively thin layer of paraplasm from the lymph or interstitial fluid by which the cell is nourished. When the protoplasm contracts it forms a rounded mass in the centre of the cell, and then presents a minimum of surface for oxidation, and at the same time a maximum thickness of paraplasm is interposed between it and the cell wall. If we suppose that quinine produces an effect upon the protoplasm of cells composing the tissues of the body similar to that which it has upon leucocytes, we can at once see how it will lessen oxidation in the tissues, and thus act as an antipyretic. Nor is it necessary to assume that it exerts this effect directly upon the tissues themselves. The result will be the same if it stimulates thermal centres in the brain and spinal cord, and causes contraction of the protoplasm through them.

Why Antipyretics do not Reduce the Temperature in Health.—This hypothesis also enables us to explain the fact that antipyretics have comparatively little action upon the temperatures of the healthy body, although they readily reduce the temperature in fever. For if the protoplasm in the cells of the healthy body be in a state of chronic contraction, so that its contour is not far removed from the sphere, contraction will produce but little effect upon it. If, however, it be more diffused through the cell—as we might assume it would be in fever, and, as Lister has shown it to be in inflammation*—the effect of causing it to contract would be very well marked both in regard to the change in shape and the change in its respiratory function.

Relation of Physical and Vital Phenomena.—It seems almost ridiculous to speak of the colour of the skin on a frog's back in relation to the treatment of a patient suffering from fever, but Lister has discussed it in his paper on inflammation, and Edward Jenner, the immortal discoverer of vaccination, noticed it in connection with the occurrence of rheumatism as well as with the swelling of dry wood under the influence of an atmosphere loaded with moisture. His poem on the signs of rain is so good that I feel almost tempted to quote it in its entirety, but, nevertheless, I will restrict myself to quoting the lines directly bearing on this subject. He says:—

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* Joseph Lister, *Phil. Trans.*, 1858, pp. 627–645.

> Hark! how the chairs and tables crack;
> Old Betty's joints are on the rack;
> The frog has lost his yellow vest,
> And in a russet coat is drest.

The experiments of Lister and Brücke have shown that the darker colour is due to the extension of the protoplasm containing dark coloured granules throughout the cell, while the yellow colour is simply due to the contraction of the protoplasm drawing the granules together into one compact clump and allowing the yellow colour of the cells below to appear. In some experiments made by Dr. Cash and myself on the action of various bodies belonging to the aromatic series, I was struck by the fact that in poisoning by some of them contraction of the pigment cells was a somewhat prominent feature.

Some other experiments by Mr. Bokenham and myself on antipyrin have given a contrary result, as the drug seemed rather to produce russet colour. On the other hand, knowing that iodoform had the power of stopping the movements of leucocytes, it occurred to me that it ought to have an antipyretic action, and, on looking up the subject, I found that it had. This subject is evidently one in which a very great deal more investigation is required before any conclusions can be arrived at. Yet I have thought it worth while to bring these facts and ideas before you, both because Brieger's observations seemed to open out whole fields for investigation, and because the relationship which I have endeavoured to trace between them and the explanation of the action of drugs may render them more interesting to men engaged in the practical treatment of disease.*

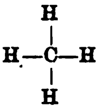
ANÆSTHETICS.

I have already said that one of the greatest improvements in modern surgery is the introduction of anæsthetics.

Alcohol as an Anæsthetic.—The observation that pain can be abolished by alcohol is a very old one, for Solomon makes the drunkard say: "They have beaten me, and I felt it not," and apparently he determined to use it deliberately to prevent pain, for he says: "I will seek it (strong drink) yet again." The use of drugs to abolish pain in surgical operations has probably never been entirely forgotten, but their general and systematic employment only commenced with the use of nitrous oxide by Wells, in 1844, and of ether by his pupil, Morton. Shortly afterwards a great number of substances were tried by Simpson, with the result that he chose chloroform as being the most convenient and safe. The power of producing anæsthesia, or perhaps I should say more definitely, the power not only to abolish pain and thus render an operation unfelt by the sufferer, but to abolish reflex action, so that the surgeon may be able to operate more easily, is common to most of the substances of the fatty or alcoholic series. But it is greatly modified by two circumstances: (1) the position in the fatty or alcoholic group of the radical or alkyl which forms the basis of the substance; and (2) the nature of the element or radical with which the alkyl is combined.

EFFECT OF INCREASE IN THE NUMBER OF COMPONENT ATOMS IN BODIES OF THE ALCOHOL SERIES.

It may be worth while to revert here to the illustration of a pocket-knife which I used at an earlier part of these lectures. Let us imagine it tied to the end of a fishing-rod. The fishing-rod represents the radical, and the number of joints in it determines its position in the series. A single joint might represent methane, CH_3, and each additional joint may symbolize the addition of CH_2 to the radical. A single joint might be too short to reach as far as we wished, but each additional joint would increase not only the length but the weight of the rod, until it became too awkward to be useful or too cumbrous to be lifted at all. Now something similar occurs with the members of the fatty alcoholic series. Every addition of carbon with hydrogen, CH_2, makes them heavier and more cumbrous. The members of the series beginning with methane, or marsh gas, which is a light gas, become gradually heavier and less volatile as the number of carbon atoms they contain increases. Petroleum ether, which is a mixture of pentane, C_5H_{12}, and hexane, C_6H_{14}, is a light, mobile fluid; higher members of the series form the soft paraffin or vaseline, while those that are higher still form hard paraffin.



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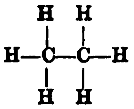
Methane (gas).



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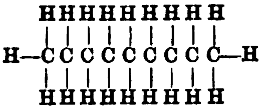
Ethane (gas).



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Nonane (boiling point, 149·5°).

EFFECT OF THE STRUCTURE OF CARBON COMPOUNDS.

But the instrument consisting of a fishing-rod and a pocket-knife can be altered by changing the knife as well as by changing the number of joints in the rod. If in place of opening a gimlet point, which we may compare to hydrogen, I open a knife blade, which we may compare to hydroxyl, I change the character of the instrument. If I open a blade at the end and one at the side I again alter its capacity for cutting, and if I replace the knife altogether by a dumbbell, I may make the instrument into a club rather too heavy to wield.

Effect of Different Radicals on Alkyls.—Thus in the case of the alkyls their action differs according as they are combined with hydrogen in the hydrides, with hydroxyl, OH, in the alcohols, or with both oxygen and hydroxyl, as in the acids.

Moreover, both their physical condition and physiological action may be changed by replacing hydrogen by other elements. Thus, if we replace three atoms of hydrogen in marsh gas, CH_4, by chlorine, which has an atomic weight of 35·5, while that of hydrogen is only 1, we convert the light gas with a molecular weight of 16 into the heavy liquid, chloroform, with a molecular weight of 119·5. If in place of three atoms of chlorine we introduce three of iodine, each having a weight of 127, the molecular weight of the whole compound becomes 394, and in place of a permanent gas like marsh gas, or a heavy fluid like chloroform, we get a solid like iodoform.

The physical condition of the substance may be influenced by the number of atoms of other elements which combine with an alkyl as well as by their nature. Thus, when only one atom of hydrogen in methane, CH_4, is replaced by chlorine, the resulting monochlormethane, CH_3Cl, or methyl chloride, is a gas at ordinary temperature, although it can be condensed by cold and pressure to a liquid which boils at 22°. Dichlormethane, or methylene chloride, CH_2Cl_2, is a heavy liquid boiling at 41°, and the trichlormethane, or chloroform, $CHCl_3$, is a still heavier liquid, which boils at 61°. It appears, then, that we can increase the atomic weight of an anæsthetic, and render it more solid by adding on carbon to the alkyl, or by replacing hydrogen with heavier atoms like chlorine or iodine. The more hydrogen atoms are thus replaced, the denser does it become, so that it may pass from a gas to a liquid, and then to a solid at ordinary temperatures.

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* Another interesting question might be to inquire whether any relationship exists between the power of aromatic substances to remove the russet colour from a frog's back and the rheumatic pains which Jenner notices as indications of approaching rain.

Effect of Alkyls on Nerve Centres.—It is probable, as I have said, that all the substances belonging to the alcoholic series possess the power of abolishing to a greater or less extent the excitability of all the nerve centres within the body. They appear to act upon those centres in the inverse order of their development, destroying first the functional activity of the highest ideational and volitional centres in the cerebrum, those centres which are the latest to be developed, and which not only raise man above the animals, but raise individual men above their fellows. As their action increases nerve centres of a lower development are affected or, as Hughlings Jackson puts it, the most highly organized centres are affected first, while the lowest, most simple, and at the same time most automatic and stable centres are affected last. The perceptive and motor ganglia, the reflex centres of the cord, the vasometer and respiratory centres and the heart, all become paralysed when the action of the members of this group is pushed to its utmost extremity.

Different Action of the Members of the Alcoholic Group.—But they are not all rendered inactive in the same order by each member of the group. On this account some members are useful as hypnotics, simply inducing sleep as one of the first results of their action, although if the dose be large, the sleep may pass into complete unconsciousness and anæsthesia with loss of reflex action. For the production of prolonged sleep we require a substance whose action will be slight and at the same time prolonged. But for anæsthesia, we require a substance which will act rapidly and powerfully, but will be quickly eliminated and cease to act very shortly after its administration is discontinued. We therefore look for hypnotics among the substances which have a heavy molecule, and are either liquid or solid in form, so that they may be given by the mouth, and being absorbed into the blood, continue to act for a length of time. We look for our anæsthetics amongst the lower members of the series which have a light molecular weight, and are either gases or volatile liquids. Although heavy liquids like paraldehyde, or solids like chloral hydrate, will act as anæsthetics when given in large doses, yet their use as such would be very dangerous, for the line between their anæsthetic action and the paralysing action on the respiratory centre or heart is very narrow, and might easily be crossed by very slight excess in dose. The elimination of such substances being slow, we cannot at once get rid of their effects of excess in the same way as we can in the case of those which, like ether, enter the lungs as vapour and are readily eliminated. It will, therefore, be convenient to consider the action of hypnotics and anæsthetics separately, although they may belong to the same chemical group.

MODIFICATION OF ACTION OF ANÆSTHETICS AND HYPNOTICS IN NERVOUS TISSUE.

But it may nevertheless be advisable to consider the mode in which they both act on nervous tissue at this time. We may divide the theories of action into three:

First, that they alter the blood in such a way as to render it incapable of maintaining the functional activity of the nerve cells.

Secondly, that they alter the circulation.

Thirdly, that they affect the nervous tissue itself.

Some anæsthetics, such as nitrogen, nitrous oxide, and possibly marsh gas, and some of the other hydrides of the alcohol series, produce anæsthesia by a sort of process of suffocation, by excluding oxygen from the lungs, while the movements of respiration continue to go on. The reason for supposing that these substances simply act by exclusion of air is chiefly that in an animal breathing nitrous oxide anæsthesia comes on at the moment when the blood becomes quite venous; and the anæsthesia does not come on when the nitrous oxide is sufficiently mixed with air. But for my own part I am inclined to believe that the nitrous oxide has an action of its own on the nerve centres, and does not simply exclude oxygen from the blood. For while we might regard the anæsthesia produced by this gas as simply due to suffocation, we cannot explain its curious stimulant action in this way, the symptoms it produces when mixed with air having nothing in common with those of suffocation.

"*Salt Frog.*"—The second theory that the anæsthetic action of drugs is due to their arresting or diminishing circulation in the nerve centres has been disproved in regard to the most important anæsthetics by a very simple experiment. When all the blood has been removed from a frog and its vessels have been washed out with a weak saline solution, it still remains active for a certain time; but if such a frog be placed in an atmosphere saturated with chloroform or ether, it becomes narcotized.

Effect of Circulation.—But while the action of anæsthetics cannot be wholly explained by exchanges in the circulation, they are very important, as we shall afterwards find, in regard to the action of hypnotics, and anæsthesia has actually been induced and operations performed by suddenly checking the circulation in the brain.

We now come to the third theory—that anæsthetics affect the nervous tissue itself. The experiment already mentioned of anæsthetizing a "salt frog" with chloroform shows conclusively that anæsthesia is due to the action of the chloroform on the brain.

Semi-coagulation.—The nature of this action has been supposed by Heinrich Ranke to consist in a "transient fixation" of the albuminous molecules in the ganglion cells of the cerebral cortex, as well as in the nervous and muscular fibres. Claude Bernard and Binz have expressed similar views, and Bernard has used the term "semi-coagulation" to express the condition which occurs in the nerve cells, and probably this is nearly correct. The condition is, however, so transient that it might perhaps be better compared to the tetanic contraction of muscle, which quickly ceases when the irritant is taken away. In all probability, the condition of anæsthesia and of tetanus are both to be regarded as the first stages of coagulation, and, if sufficiently prolonged, complete coagulation and death of the tissue will occur. A curious likeness, indeed, was found by Ranke between the action of anæsthetics on the brain and on muscles; for they coagulate the albuminous substances extracted from both, and when injected into an artery they produce rigor mortis in the muscles it supplies.

Effect of Different Members of the Alcoholic Group upon Albuminous Substances.—In order to get a chemical basis for the action of alcoholic substances on nervous structures it seemed to me advisable to ascertain the action of such substance on albuminous bodies. Dr. Sidney Martin and I have therefore commenced a research on this subject, and although it is far more complete, we have already obtained the interesting result that while the lower alcohols—methyl, ethyl, and propyl alcohols—coagulate albumen almost completely, the butyl alcohols have less effect, and any precipitate they may produce is soluble, while the higher alcohols—amyl and heptyl—do not coagulate at all.

Chemical Affinity between Narcotics and Nervous Tissues.—There can, I think, be little doubt that there is an affinity between many, perhaps all, the bodies belonging to the alcoholic series and the substances of which the nerve centres are composed. In all probability they enter into a loose combination with the nervous tissue for a time, and interfere with the process of oxidation and reduction on which its activity depends. As Binz has well expressed it, morphine, chloral, ether and chloroform, possess a strong affinity for the substance of the cerebral cortex in man. This combines for a while with the hypnotics carried to it by the blood and by the resulting alteration in its tissue change, "lessening of the dissociation of the living matter," in Pflüger's sense, it becomes unable to perform the functions of the waking condition.

(*To be continued.*)

ROYAL INSTITUTION OF GREAT BRITAIN.

ALUMINIUM.*

BY SIR HENRY ROSCOE, M.P., D.C.L., LL.D., V.P.R.S.

Chemists of many lands have contributed to our knowledge of the metal aluminium. Davy, in 1807, tried in vain to reduce alumina by means of the electric current. Oerstedt, the Dane, in 1824, pointed out that the metal could be obtained by treating the chloride with an alkali metal; this was accomplished in Germany by Wöhler in 1827, and more completely in 1845, whilst in 1854, Bunsen showed how the metal can be obtained by electrolysis. But it is to France, by the hands of Henri St. Claire Deville, in the same year, that the honour belongs of having first prepared aluminium in a state of purity, and of obtaining it on a scale which enabled its valuable properties to be recognised and made available, and the bar of "silver-white metal from clay," was one of the chemical wonders in the first Paris Exhibition of 1855. Now England and America step in, and I have this evening to relate the important changes which further investigation has effected in the metallurgy of aluminium. The process suggested by Oerstedt, carried out by Wöhler, and modified by Deville, remains in principle unchanged. The metal is prepared, as before, by a reduction of the double chloride of aluminium and sodium, by means of metallic sodium in presence of cryolite; and it is therefore not so much a description of a new reaction as of improvements of old ones of which I have to speak.

I may perhaps be allowed to remind my hearers that more than thirty-three years ago, Mr. Barlow, then Secretary to the Institution, delivered a discourse, in the presence of M. Deville, on the properties and mode of preparation of aluminium, then a novelty. He stated that the metal was then sold at the rate of £3 per ounce, and the exhibition of a small ingot, cast in the laboratory by M. Deville, was considered remarkable. As indicating the progress since made, I may remark that the metal is now sold at 20*s.* per lb., and manufactured by the ton, by the Aluminium Company, at their works at Oldbury, near Birmingham. The improvements which have been made in this manufacture by the zeal and energy of Mr. Castner, an American metallurgist, are of so important a character that the process may properly be termed the Deville-Castner process.

The production of aluminium previous to 1887, probably did not exceed 10,000 lbs. per annum, whilst the price at that time was very high. To attain even this production required that at least 100,000 lbs. of double chloride, and 40,000 lbs. of sodium should be manufactured annually. From these figures an idea of the magnitude of the undertaking assumed by the Aluminium Company may be estimated, when we learn that they erected works having an annual producing capacity of 100,000 lbs. of aluminium. To accomplish this required not only that at least 400,000 lbs. of sodium, 800,000 lbs. of chlorine, and 1,000,000 lbs. of double chloride, should be annually manufactured, but in addition that each of these materials should be produced at a very low cost, in order to enable the metal to be sold at 20*s.* per lb.

The works, which now cover a space of nearly five acres, are divided into five separate departments, viz., 1st, sodium; 2nd, chlorine; 3rd, chloride; 4th, aluminium; and 5th, foundry, rolling, wire mills, etc.

In each department an accurate account is kept of the production each day, the amount of material used, the different furnaces and apparatus in operation, etc. In this manner it has been found possible to ascertain each day exactly how the different processes are progressing, and what effect any modification has, either on cost, quantity, or quality of product. By this means a complicated chemical process is reduced to a series of very simple operations, so that whilst the processes are apparently complicated and difficult to carry out successfully, this is not the case now that the details connected with the manufacture have been perfected, and each operation carried on quite independently until the final materials are brought together for the production of the aluminium.

Manufacture of Sodium.

The first improvement occurs in the manufacture of sodium by what is known as the "Castner Process." The successful working of this process marks an era in the production of sodium, as it not only has greatly cheapened the metal, but has enabled the manufacture to be carried out upon a very large scale with little or no danger. Practically, the process consists in heating fused caustic soda in contact with carbon, whilst the former substance is in a perfectly liquid condition. By the process in vogue before the introduction of this method, it was always deemed necessary that special means should be taken to guard against actual fusion of the mixed charges, which if it were to take place, would to a large extent allow the alkali and reducing material to separate. Thus having an infusible charge to heat, requiring the employment of a very high temperature for its decomposition, the iron vessels must be of small circumference to allow the penetration of the heat to the centre of the charge without actually melting the vessel in which the materials are heated. By the new process, owing to the alkali being in a fused or perfectly liquid condition in contact directly with carbon, the necessity of this is avoided, and consequently, the reduction can be carried on in large vessels at a comparatively low temperature. The reaction taking place may be expressed as follows:—$3\,NaHO + C = Na_2CO_3 + 3\,H + Na$.

The vessels in which the charges of alkali and reducing material are heated are of egg-shaped pattern, about 18 inches in width at their widest part and about 3 feet high, and are made in two portions, the lower one being actually in the form of a crucible, while the upper one is provided with an upright stem and a protruding hollow arm. This part of the apparatus is known as the cover. In commencing the operation, these covers are raised in the heated furnace through apertures provided in the floor of the heated chamber, and are then fastened in their place by an attachment adjusted to the stem; the hollow arm extends outside the furnace. Directly below each aperture in the bottom of the furnace are situated the hydraulic lifts; attached to the top of which are the platforms upon which are placed the crucibles to be raised into the furnace. Attached to the hydraulic lifts are the usual reversing valves for lowering or raising, and the platform is of such a size as, when raised, completely to fill the bottom aperture of the furnace. The charged

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[*] Read at a Weekly Evening Meeting, Friday, May 3.

crucible, being placed upon the platform, is raised into its position, the edges meeting those of the cover, forming an air-tight joint which prevents the escape of gas and vapour from the vessel during reduction, except by the hollow arm provided for this purpose. The natural expansion of the iron vessels is accommodated by the water-pressure in the hydraulic lifts, so that the joint of the cover and crucible are not disturbed until it is intended to lower the lift for the purpose of removing the crucible.

The length of time required for the first operation of reduction and distillation is about two hours. At the end of this time the crucibles are lowered, taken from the platforms by a large pair of tongs on wheels, carried to a dumping pit, and thrown on their side. The residue is cleaned out, and the hot pot, being again gripped by the tongs, is taken back to the furnace. On its way, the charge of alkali and reducing material is thrown in. It is again placed on the lift and raised in position against the edges of the cover. The time consumed in making the change is one and a half minute, and it only requires about seven minutes to draw, empty, recharge, and replace the five crucibles in each furnace. In this manner the crucibles retain the greater amount of their heat, so that the operation of reduction and distillation now only requires one hour and ten minutes. Each of the four furnaces, of five crucibles each, when in operation, are drawn alternately, so that the process is carried on night and day.

Attached to the protruding hollow arm from the cover are the condensers, which are of a peculiar pattern specially adapted to this process, being quite different from those formerly used. They are about 5 inches in diameter, and nearly 3 feet long, and have a small opening in the bottom about 20 inches from the nozzle. The bottom of these condensers is so inclined that the metal condensed from the vapour issuing from the crucible during reduction, flows down and out into a small pot placed directly below this opening. The uncondensed gases escape from the condenser at the further end, and burn with the characteristic sodium flame. The condensers are also provided with a small hinged door at the further end, by means of which the workmen from time to time may look in to observe how the distillation is progressing. Previous to drawing the crucibles from the furnace for the purpose of emptying and recharging, the small pots each containing the distilled metal are removed, and empty ones substituted. Those removed each contain on an average about 6 lbs. of metal, and are taken directly to the sodium casting shop, where it is melted and cast, either into large bars ready to be used for making aluminium, or in smaller sticks to be sold.

Special care is taken to keep the temperature of the furnaces at about 1000° C., and the gas and air valves are carefully regulated, so as to maintain as even a temperature as possible. The covers remain in the furnace from Sunday night to Saturday afternoon, and the crucibles are kept in use until they are worn out, when new ones are substituted without interrupting the general running of the furnace. A furnace in operation requires 250 lbs. of caustic soda every one hour and ten minutes, and yields in the same time 30 lbs. of sodium, and about 240 pounds of crude carbonate of soda. With the four furnaces at work 120 lbs. of sodium can be made every seventy minutes, or over a ton in the twenty-four hours. The residual carbonate, on treatment with lime in the usual manner, yields two-thirds of the original amount of caustic operated upon. The sodium, after being cast, is saturated with kerosene oil, and stored in large tanks holding several tons, placed in rooms specially designed both for security against either fire and water.

Chlorine Manufacture.

This part of the works is connected with the adjacent works of Messrs. Chance Bros. by a large gutta-percha pipe, by means of which from time to time hydrochloric acid is supplied direct into the large storage cisterns, from which it is used as desired for making the chlorine. For the preparation of the chlorine gas needed in making the chloride, the usual method is employed; that is, hydrochloric acid and manganese dioxide are heated together, when chlorine gas is evolved with effervescence, and is led away by earthenware and lead pipes to large lead-lined gasometers, where it is stored.

The materials for the generation of the chlorine are brought together in large tanks, or stills, built up out of great sandstone slabs, having rubber joints, and the heating is effected by the injection of steam. The evolution of gas, at first rapid, becomes gradually slower, and at last stops; the hydrochloric acid and manganese dioxide being converted into chlorine and manganous chloride. This last compound remains dissolved in the "spent still liquor" and is reconverted into manganese dioxide, to be used over again, by Weldon's Manganese Recovery Process. Owing to the difficulty of keeping up a regular supply of chlorine under a constant pressure directly from the stills, in order that the quantity passed into the sixty different retorts in which the double-chloride is made can be regulated and fed as desired, four large gasometers were erected. Each of these is capable of holding 1,000 cubic feet of gas, and is completely lined with lead, as are all the connecting mains, etc., this being the only available metal which withstands the corrosive action of chlorine. The gasometers are filled in turn from the stills, the chlorine consumed being taken direct from a gasometer under a regular pressure until it is exhausted, the valves being changed, the supply is taken from another holder, the emptied one being refilled from the still.

Manufacture of the Double Chloride.

Twelve large regenerative gas furnaces are used for heating, and in each of these are fixed five horizontal fire-clay retorts about 10 ft. in length, into which the mixture for making the double chloride is placed. These furnaces have been built in two rows, six on a side, the clear passage-way down the centre of the building, which is about 250 ft. long, being 50 ft. in width. Above this central passage is the staging, carrying the large lead-mains for the supply of the chlorine coming from the gasometers. Opposite each retort and attached to the main, are situated the regulating valves, connected with lead and earthenware pipes, for the regulation and passage of the chlorine to each retort. The valves are of peculiar design, and have been so constructed that the chlorine is made to pass through a certain depth of liquid, which not only by opposing a certain pressure allows a known quantity of gas to pass in a given time, but also prevents any return from the retort into the main, should an increase of pressure be suddenly developed in the retorts.

The mixture with which the retorts are charged is made by grinding together hydrate of alumina, salt, and charcoal. This mixture is then moistened with water, which partially dissolves the salt, and thrown into a pug mill of the usual type for making drain pipes, excepting that the mass is forced out into solid cylindrical lengths upon a platform alongside of which a workman is stationed with a large knife, by means of which the material is cut into lengths of about 3 inches each. These are then piled on top of the large furnaces to dry. In a few hours they have sufficiently hardened to allow of their being handled. They are then transferred to large wagons, and are ready to be used in charging the retorts.

The success of this process is in a great measure dependent—1st, on the proportionate mixture of materials; 2nd, on the temperature of the furnace; 3rd, on the quantity of chlorine introduced in a given time; and 4th, on the actual construction of the retorts. I am, however, not at liberty to discuss the details of this part of the process, which have only a commercial interest. In carrying on the operation, the furnaces or retorts, when at the proper temperature, are charged by throwing in the balls until they are quite full, the fronts are then sealed up, and the charge allowed to remain undisturbed for about four hours, during which time the water of the alumina hydrate is completely expelled. At the end of this time the valves on the chlorine main are opened, and the gas is allowed to pass into the charged retorts. In the rear of each retort, and connected therewith by means of an earthenware pipe, are the condenser boxes, which are built in brick. These boxes are provided with openings or doors, and also with earthenware pipes connected with a small flue for carrying off the uncondensed vapours to the large chimney. At first the chlorine passed into each retort is all absorbed by the charge, and only carbonic oxide escapes into the open boxes, where it burns. After a certain time, however, dense fumes are evolved, and the boxes are then closed, while the connecting pipe between the box and the small flue serves to carry off the uncondensed vapours to the chimney.

The reaction which takes place is as follows:—

$$Al_2O_3 + 2NaCl + 3C + 6Cl = 2AlCl_3NaCl + 3CO.$$

The chlorine is passed in for about seventy-two hours in varying quantity, the boxes at the back being opened from time to time by the workmen to ascertain the progress of the distillation. At the end of the time mentioned the chlorine valves are closed and the boxes at the back of the furnace are all thrown open. The crude double chloride, as distilled from the retorts, condenses in the connecting pipe and trickles down into the boxes, where it solidifies in large irregular masses. The yield from a bench of five retorts will average from 1600 to 1800 lbs., which is not far from the theoretical quantity. After the removal of the crude chloride from the condenser boxes the retorts are opened at their charging end, and the residue, which consists of a small quantity of alumina, charcoal and salt, is raked out and remixed in certain proportions with fresh material, to be used over again. The furnace is immediately re-charged and the same operations repeated, so that from each furnace upwards of 3500 lbs. of chloride are obtained weekly. With ten or twelve furnaces always at work the plant is easily capable of producing 30,000 lbs. of chloride per week, or 1,500,000 lbs. per annum.

Owing to the presence of iron, both in the materials used (viz., charcoal, alumina, etc.) and in the fireclay composing the retorts, the distilled chloride always contains a varying proportion of this metal in the form of ferrous and ferric chlorides. When it is remembered that it requires 10 lbs. of this chloride to produce 1 lb. of aluminium by reduction, it will be quite apparent how materially a very small percentage of iron in the chloride will influence the quality of the resulting metal. I may say that, exercising the utmost care as to the purity of the alumina and the charcoal used, and after having the retorts made of special fireclay containing only a very small percentage of iron, it was found almost impossible to produce upon a large scale a chloride containing less than 0·3 per cent. of iron.

This crude double chloride, as it is now called at the works, is highly deliquescent, and varies in colour from a light yellow to a dark red. The variation in colour is not so much due to the varying percentage of iron contained as to the relative proportion of ferric or ferrous chlorides present, and although a sample may be either very dark or quite light, it may still contain only a small percentage of iron if it be present as ferric salt, or a very large percentage if it is in the ferrous condition. Even when exercising all possible precautions, the average analysis of the crude double chloride shows about 0·4 per cent. of iron. The metal subsequently made from this chloride therefore never contained much less than about 5 per cent. of iron, and, as this quantity greatly injures the capacity of aluminium for drawing into wire, rolling, etc., the metal thus obtained required to be refined. This was successfully accomplished by Mr. Castner and his able assistant, Mr. Cullen, and for some time all the metal made was refined, the iron being lowered to about 2 per cent.

The process, however, was difficult to carry out, and required careful manipulation, but as it then seemed the only remedy for effectively removing the iron, it was adopted and carried on for some time quite successfully, until another invention of Mr. Castner rendered it totally unnecessary. This consisted in purifying the double chloride before reduction. I cannot now explain this process, but I am able to show some of the product. This purified chloride, or pure double chloride, is, as you see, quite white, and is far less deliquescent than the crude, so that it is quite reasonable to infer that this most undesirable property is greatly due to the former presence of iron chlorides. I have seen large quantities, containing upwards of 1½ per cent. of iron, or 150 lbs. to 10,000 of the chloride, completely purified from iron in a few minutes, so that, whilst the substance before treatment was wholly unfit for the preparation of aluminium, owing to the presence of iron, the result was, like the sample exhibited, a mass containing only 1 lb. of iron in 10,000, or 0·01 per cent. The process is extremely simple, and adds little or no appreciable cost to the final product. After treatment, this pure chloride is melted in large iron pots and run into drums similar to those used for storing caustic soda. As far as I am aware, it was generally believed to be an impossibility to remove the iron from anhydrous double chloride of aluminium and sodium, and few, if any, chemists have ever seen a pure white double chloride.

(To be concluded.)

Provincial Transactions.

INVERNESS CHEMISTS' AND DRUGGISTS' ASSOCIATION.

At the July meeting of the Chemists and Druggists' Association the following resolution was unanimously agreed to:—"That the Chemists and Druggists' Association resolve to enter in their minutes an expression of their deep regret at the death of Mr. George Ross Galloway, also of the high estimation in which he was held by his brother chemists, and further, that they desire to express their deep sympathy with his family in their bereavement, and request the Secretary to send them a copy of this resolution."

Obituary.

Notice has been received of the death of the following:—

On the 4th of July, Mr. Richard Forrest, Pharmaceutical Chemist, at the age of 58 years. Mr. Forrest was formerly with Messrs. J. Bell and Co., Oxford Street, but afterwards entered the wholesale trade and represented the house of Barron, Squire and Co., Bush Lane, for many years. He became an Associate of the Pharmaceutical Society in 1852 and a Member in 1857 and remained connected with the Society until his death.

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE PHARMACY ACT.

At the Ipswich County Court, on Wednesday, the 10th inst., before his Honour the Judge (Sir Francis Roxburgh, Q.C.), an action came on for hearing, in which the plaintiffs were the Pharmaceutical Society of Great Britain, and the defendant, Mr. Thomas Eastaway, of 16, Westgate Street, Ipswich. The particulars of the claims were as follows:—

For amount of penalty incurred by the defendant on April 13, 1889, in selling, or keeping open shop for the retailing, dispensing or compounding of poison, to wit, "tincture of opium," contrary to the provisions of the Pharmacy Act, 1868, 31 and 32 Vict., cap. 121, £5.

And for amount of penalty incurred by the defendant on April 13, 1889, in taking, using, or exhibiting the name or title of "chemist," contrary to the provisions of the said statute, £5.

Mr. Granger, barrister (instructed by Messrs. Flux, Son and Co., London), appeared for the plaintiffs; Mr. Laxton for the defendant.

In his opening Mr. Granger said the section of the Act under which the plaintiffs proceeded was to the effect that, from and after December 31, 1868, it should be unlawful for any person to sell, or keep an open shop for retailing, dispensing, or compounding poisons, or to assume or use the title "chemist and druggist," or chemist or druggist, unless such person should be a chemist and druggist within the meaning of the Act—that was to say, a duly qualified person, and it was further provided that offenders were liable to a penalty of £5. His contention was that in this instance an attempt had been made to evade the purpose of the Act. The facts were briefly as follows:—A business was some time ago started at 16, Westgate Street, by a man named Thornton, who was a registered chemist, but the labels issued from the establishment were signed in this way, "Edward Thornton, manager; Thomas Eastaway, secretary." What the plaintiffs alleged was that the two men were in reality partners, and that Eastaway kept the shop himself, having actually a share in the business. If that could be established to his Honour's satisfaction, there was no doubt that an offence had been committed. But it would be proved, furthermore, that Thornton died on February 14 of the present year—that before his death he lived at Leavington, and not at Ipswich—that Eastaway had all along carried on the business—as he was still doing—that he paid the rates, although his name was not on the rate-book, and gave notice of appeal upon a question of rating. Moreover he took an assignment of the lease jointly with Thornton, which clearly showed that he was a partner in the concern, and some agreement was subsequently made between the two men, with the terms of which the learned counsel was not acquainted. When the plaintiffs communicated with defendant stating that he had incurred a penalty, they received a letter from the late Mr. Thornton's widow, who asserted that the business was entirely her own, and was carried on by her as executrix under the will of her husband. The widow of a chemist was entitled to this privilege by the 16th section of the Act, if the business were *bonâ fide* conducted by a duly qualified assistant. In this case, however, the defendant was not qualified, and the plaintiffs asserted that he was carrying on a business that he was not entitled to.

Mr. T. W. Stroud, managing clerk to Messrs. Flux, Son and Co., deposed that he went to the shop on April 13 and handed in a prescription to be made up. It was made up accordingly, and he afterwards handed it to Mr. Eastes, assistant analyst to Professor Attfield, who found that it contained a preparation of opium, which is one of the scheduled poisons.

Mr. H. Kerridge, rate-collector for the parish of St. Matthew's, deposed that the Provincial Co-Operative Drug Company were entered as the occupiers of 16, Westgate Street, but that Mr. T. S. Eastaway resided there, and had appealed against the valuation.

Mr. W. Collins, clerk to Mr. Moore, solicitor, London, produced a copy of the assignment of the lease of the premises from the British Tea and Trading Association to Thomas Eastaway and Edward Thornton, "both of Ipswich, in the county of Suffolk, druggists, hereinafter described as the purchasers."

Mr. Laxton, for the defendant, urged that the plaintiffs had given no evidence that the defendant sold the poison in question, the prescription not having been handed to him, nor that he was keeping an open shop for the sale of poison, the offence alleged having taken place twelve months after the date of the assignment put in, and when an entirely different state of things had arisen.

His Honour held that there was sufficient *primâ facie* evidence of both offences. Before Mr. Laxton proceeded with his statement of facts he drew attention to the words in the assignment of the lease, where the property was referred to as "part of the partnership property" of Eastaway and Thornton, described as "druggists."

Mr. Laxton then proceeded with his version of the facts. Mr. Thornton, he said, was a duly qualified chemist; the defendant, on the other hand, had been long connected with the druggist profession, but was not qualified. Some years ago, the two men became intimately acquainted. In 1887 Thornton came back from Australia in bad health; he established this shop in Ipswich, and employed Eastaway as his servant. Under a statute known as Bovill's Act, it was provided that a contract of this kind did not render the agent or servant responsible as a partner, and after the assignment referred to had been prepared, an agreement was actually signed between the two parties in which, *inter alia*, Eastaway entered into an agreement not to sell or dispense any poisons until duly qualified. This clause of the agreement, counsel contended at length, had been strictly adhered to. From the very first a duly qualified practitioner had been employed in the shop; it was he made up the prescription presented by the witness for the plaintiff, and not only had the law been strictly observed in the lifetime of Mr. Thornton, but his widow was at this moment conducting it in the manner specially allowed by the Act—that was to say she was carrying on the business as the executrix of her late husband, and it was conducted by a duly qualified assistant. These were the main lines of a defence argued with much patience and ingenuity, the learned counsel suggesting that the law might have been put in operation by rival chemists.

The defendant and Mr. F. C. Stacey, the qualified assistant who made up the prescription, were then called in support of Mr. Laxton's statement.

His Honour said he did not want to hear Mr. Granger in reply before giving judgment. He held that there was a partnership between Eastaway and Thornton, the arrangement between them being the not uncommon one, that the former should find the brains and the latter the money; that, as a matter of fact, Eastaway was the leading spirit in the business, neither the deceased Mr. Thornton, nor his widow having "carried it on" in the proper meaning of the phrase; and that both offences—the selling of poison, and keeping open shop for the sale of poison—had been committed. Under these circumstances he gave judgment for the plaintiffs for both amounts, allowing costs on the higher scale.

Mr. Laxton asked for leave to appeal.

His Honour, after argument, said he would give leave to appeal if the sum of £50 were paid to meet costs within a week. That would give the defendants' advisers time to consider the matter.—*Local Paper.*

PROSECUTION UNDER THE PHARMACY ACT.

At the Liverpool County Court, on the 10th inst., before his Honour, Judge Shand, a case was heard in which the Council of the Pharmaceutical Society of Great Britain sued David Robert Macdonald for penalties alleged to be incurred on the 31st May, 1889, by defendant selling, or keeping open shop 158, Park-lane, for the retailing, dispensing, or compounding poisons, contrary to the provisions of the Pharmacy Act, 1868; and also on the same date by defendant exhibiting the name or title of "druggist," contrary to the provisions of the same Act. Mr. Hull appeared for the plaintiffs, and the defendant was represented by Mr. Neale.

Mr. Hull explained that for each of the above offences (if proved) defendant was liable to a penalty of £5.

It was alleged on behalf of the plaintiffs that the defendant, whom they contended was the tenant of the premises in question, on May 31, sold a pennyworth of tincture of opium, and that on that date in the shop there was a handbill at the bottom of which was printed, Macdonald and Co., wholesale druggists."

Mr. Neale admitted that the poison had been sold, but not by the defendant, and that the handbill was in existence.

The plaintiffs called a witness to show that the tenancy agreement was in the name of the defendant, but in cross-examination witness admitted that defendant had told him he was only managing the business for Dr. R. H. D. Johnson, of Canning Street, Liverpool. If witness had not been able to get his rent from defendant he should certainly have looked to Dr. Johnson for it. Since the end of May the tenancy agreement had been altered, and it was now made out as between Dr. Johnson, trading as "Macdonald and Co., in Park Lane," and the owners of the property. They only looked on defendant as a nominal tenant.

Mr. Hull put in the Register of Chemists and Druggists, which did not include the name of defendant.

This also was admitted by Mr. Neale, who submitted that there was no case against the defendant.

Mr. Hull reminded the court that they were suing for penalties for keeping open a shop for selling, and for using the name or title "druggist."

David Robert Macdonald, on being called, stated that he managed the business for Dr. Johnson, who paid a salary, ordered all the goods, attended the surgery, and paid for everything. Witness supposed that the doctor traded as Macdonald and Co. because he did not want his name connected with the business. The only way in which the title "druggist" had been used at the place was on the handbill, which was supplied by a firm of pillmakers. Witness when cross-examined, admitted that he had signed "Macdonald and Co." Re-examined, he said he only signed that name by the instruction of Dr. Johnson.

In the course of his evidence, Dr. Johnson stated that the business in Park-lane was his, and he used the title Macdonald and Co. because as a practising physician in Liverpool he did not wish his name associated with a trade.

The Judge: Is it a usual thing for a surgeon to carry on a business?—I think surgeons carry on a great many businesses?

That is not the question—is it a usual thing?—It is not very usual, but it has been done, and is being done.

Is it within the Act?—Yes.

The Judge: Did you think it a right thing to carry on this business under this title?—Decidedly so.

Mr. Neale said that whatever fault Dr. Johnson might have been guilty of it would not apply to the defendant.

The Judge said that he took the Act to mean that any person selling a poison must be a qualified chemist. A person should not have an assistant selling a dangerous thing—perhaps a lad of 15 selling a poison which might kill a dozen people.

Mr. Neale: I do not think that was ever intended.

The Judge: I do; I think that is the reading of the section, and if that is so this man must be liable, for it is admitted that he is not a chemist.

At the conclusion of the case, his Honour said that he would find against defendant on every possible point he could. It was an evasion of the Act. Defendant must pay the penalties claimed—£5 in each of the two cases—as he (the Judge) found that he had sold poison without being a registered druggist, and that he had exhibited the title "druggist" in the place. Costs were granted on the higher scale.

Mr. Neale gave notice of appeal.—*Local Paper.*

Review.

A HANDBOOK OF CRYPTOGAMIC BOTANY. By ALFRED W. BENNETT and GEO. MURRAY.*

This book is an endeavour by the authors to supply what has long been greatly in demand by the English student, a fairly concise and yet complete account of the most recent results of the labours of the various workers in the department of cryptogamic botany. The works that have hitherto been at his disposal have been either translations of well-known German handbooks, or not very recent books on the classification of these lower forms. The former have been written too exclusively on the lines of morphology and anatomy, while the others, ignoring this side of the science, have tended to be somewhat dry catalogues of genera and species. In the book before us the authors have endeavoured to avoid the exclusiveness which characterises each of these methods of treatment, and have presented us with a cryptogamic flora which, while giving us fairly complete accounts of the genera, and the lines of classification on which these are arranged, yet deals with the general problems of their life history and does not neglect their anatomical and histological peculiarities. Thus it is evidently the wish of the authors to introduce the student to both departments of botany, the biological and the systematic, while they are careful to state at the outset that they do not wish to supersede any of the special monographs which have appeared of special families or groups. In this desire they have succeeded, giving sufficient information on the different heads to lead the student easily to the more advanced and more detailed text-books, while helping the more general reader to understand the structure and life history of numerous forms.

Naturally in such a work as this the greater space is occupied with the description of the lower forms, these showing so much more variety of structure and appearance than the higher ones, the Vascular Cryptogams, in which there are but few genera and species. The amount of detail given in dealing with the algæ and the fungi is unavoidable, on account not only of the immense number of the forms known, but also of the much less complete character of our knowledge of them and of their life histories.

The lines of classification which the authors have followed will perhaps invite some discussion. In the higher forms they adopt as their primary division the occurrence of two kinds of spore in the plant, or of one only, grouping the Rhizocarps, the Selaginellas and Isoetes as their first division, and putting the club mosses, ferns and horsetails as a second section. There is much to be said in favour of this course, as the lines of development lead up through such a series to the higher forms, the gymnosperms and the flowering plants. It seems on the other hand to do violence to undoubted affinities, removing Lycopodium to some distance from Selaginella, and treating similarly the Rhizocarps and the Ferns, which have so much in common.

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* London: Longmans, Green and Co., 1889. 8vo. Pp. 1-473. 16s.

In the classification of the Thallophytes the authors with much reason decline to follow the order proposed some years ago by Sachs, and followed in his textbooks; a classification starting with the idea of two parallel series of forms, one with chlorophyll, the other without it, and proceeding in each series entirely on the lines of the reproductive organs. This system, which has held its own for some years, does considerable violence to vegetative affinities, and demands for its vindication the acceptance of the idea of the derivation of fungal from algal forms all along the line. A much better line is taken in the present work, not, indeed, for the first time, a line which recognizes the importance of using vegetative rather than reproductive characters as giving the most consistent foundation for classification. The reasons for this mode of treatment of the subject are set forth with some vigour in the work. The line adopted is to start with the very lowest forms and to make of these a primary class,—the *Protophyta*,—comprising about the same forms as the class called by Sachs by the same name. Above these forms the first separation is into the Algæ and the Fungi, each of these again being subdivided on lines which place their reproductive systems in a position subordinate to their general structure and habits of life.

Departing somewhat from the mode of treatment of the subject by most authors they place the Characeæ outside the limits of the Thallophytes, giving them the position of a group intermediate between these and the moss-like plants.

In commencing the discussion of the life history of the various forms the authors call attention to what is a real stumbling block in the path of many students when they commence the study of these organisms, the confusing terminology in vogue, particularly the loose way in which the term *spore* is employed, and they suggest certain limitations of the term which seem to be highly desirable. They wish to use the word only when reference is made to a reproductive cell asexually produced. If this could be universally adopted it would do much towards clearing away a good deal of obscurity which comes over the mind of the learner on first becoming acquainted with these bodies. He finds that in very lowly organisms a form of reproductive cell occurs, which having the power of movement and showing outward signs of life, is called a *zoospore*. He finds in a higher form a reproductive body which has none of these outward peculiarities, and yet is known as an *oospore*. Again, he finds a third structure, differing from both these, and called simply a *spore*. It is not to be wondered at, therefore, that he concludes all these forms to be morphologically equivalent to one another, and hence confusion reigns in his mind. The habit of using the term *spore* as equivalent to *reproductive cell*, and limiting its exact meaning by a prefix, has grown to such a point that it is well that its inconvenience should be pointed out. The authors prefer the term *oosperm* to *oospore* for the body produced sexually, reserving the word spore, both alone and in combination, for reproductive cells produced asexually.

Their efforts to amend the nomenclature of the science are not, however, so uniformly successful as in this instance. While decrying the tendency to introduce new terminology so freely indulged in by many writers, they are themselves responsible for an effort to amend terms now in constant use and well understood, by anglicising the Latin forms under which they are known; an effort which serves no practical purpose, and which only makes the terminology clumsy and etymologically bad by tacking an English plural form on to a modified Latin or Greek singular. Thus *antheridium* becomes *antherid*, and its plural *antheridia* appears as *antherids*. So also *paraphysis* becomes *paraphyse*, *columella*, *columel*, *calyptra*, *calypter*. These changes seem hardly likely to be adopted permanently, conveying no better meaning than the recognized forms, and being unjustifiable on etymological grounds. The word *archesporium*, anglicized in this way, becomes *archespore*, and in this form transgresses the limits of application of the term *spore* already alluded to.

In treating of the questions of morphology the authors are in the main successful, though they display in one particular a caution which leads them up to if not over the verge of inaccuracy. The homologies of the reproductive organs are fairly stated throughout the groups of the vascular cryptogams, but they are not followed up into the higher forms of the gymnosperms and angiosperms, so far as the oophore generation is concerned. The authors in particular shrink from the task of stating decisively what in the latter forms are the homologues of the prothallium. Thus, on p. 12, we find, "The contents of the pollen grain of the angiosperms . . . . . are homologous with the antherid of the cryptogams," while on p. 15 it is stated, "In angiosperms the antherids have completely disappeared." Rather than argue the homologies out on first principles, we find them taking refuge in such statements as "the suppression of the sexual generation or prothallium with its antherids and archigones" (p. 15) and "alternation of generations disappears," the latter assertion being made equally of the Characeæ and of the phanerogams. A curious instance of this caution and its results is seen also in the description of the reproduction of the Rhizocarps, where we are told (p. 23) "the microspores do not give birth to a male prothallium," while on p. 27 the prothallium, though said to be reduced to a rudiment, is yet described. A similarly contradictory statement is made about the roots of Salvinia (cf. p. 17 and p. 28).

The work, apart from certain peculiarities of this kind, is calculated to supply a felt want, and will, doubtless, hold its own in the literature of the subject. An especially good feature about it is the summary of the literature of the separate sections which is found at the end of the several chapters. It is curious, however, that the literature quoted of the Characeæ takes no account of Vines's papers on the morphology of these forms, published in the *Journal of Botany*.

The work is well illustrated, figures of the chief forms being collected from various sources and happily inserted with the text.

ANSWERS TO CORRESPONDENTS.

A Formula Wanted.—W. Lawson asks for "Crevat's formula for calculating the food of animals from the body weight." Can any reader supply it?

J. W. D. Hume.—Your seven questions as to the reactions between various salts do not allow of answers within the proper limits of this column; but the information can be found in any fairly good manual of qualitative analysis.

A. E. Beard.—(1) *Triticum pungens.* (2) *Pimpinella saxifraga.* (3) *Chenopodium album.* (4) *Scirpus maritimus.* (5) *Vicia sativa*, var. (6) *Lepidium Draba.* (8) *Chærophyllum temulentum.* (9) *Heracleum Sphondylium.* (11) *Holcus lanatus.* (12) *Astragalus glycophyllos.* (13) *Thalictrum minus*, probably; no flowers sent. (14) *Alchemilla vulgaris.* Please confine yourself to six specimens in future.

W. F. Cowpe.—We are of opinion that you would be eligible; but write and state the case to the Secretary.

W. H. Bulley.—Correct answers to the questions in arithmetic in the Preliminary examination are not supplied officially, and we know of no way of obtaining the answers other than by working out the sums.

M. D. C.—The examination is supposed to cover only an elementary knowledge of such points as would be comprised in any good manuals on the subject. See the questions in last week's Journal.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Maiden, Clague, Umney, Johnston, Brighouse, Thompson, T. W. W., J. R.

"THE MONTH."

Methacetin.

A few months since reference was made in these columns (April 27, p. 861) to a compound that had been reported upon favourably as an antipyretic and antineuralgic, and which from its analogy to phenacetin had been named "methacetin." The relation of these compounds to each other is easily apparent on comparison of the formula by which they are represented, from which it appears that methacetin differs from phenacetin in containing a methyl group in the place of an ethyl group—

$$\underset{\text{Phenacetin.}}{C_6H_4\begin{cases}O\cdot C_2H_5 & (1)\\ NH\cdot C_2H_3O & (4)\end{cases}} \qquad \underset{\text{Methacetin.}}{C_6H_4\begin{cases}O\cdot CH_3 & (1)\\ NH\cdot C_2H_3O & (4)\end{cases}}$$

If the comparison be extended to antifebrin, it may be stated that antifebrin is acetanilid, phenacetin is oxyethylacetanilid, and methacetin is oxymethylacetanilid. Methacetin is now stated (*Pharm. Zeit.*, July 10, p. 419) to crystallize in shining white odourless and almost tasteless scales, melting at 127 C., and boiling undecomposed above that temperature. It is soluble in 526 parts of water at 15° and 12 parts at 100°, whilst phenacetin requires 2500 parts of water at 15° and 86 parts at 100°; it follows therefore that the solubility of methacetin in water is five times as great as that of phenacetin. In alcohol and acetone methacetin dissolves very freely, and also in chloroform, especially when warmed. It is less soluble in benzol and only difficultly soluble in carbon bisulphide, petroleum, benzine and ether. Upon cooling or evaporation of a solution the methacetin separates unaltered in handsome crystals. It is also freely soluble in glycerine and fixed oils, especially when heated, and with more difficulty in turpentine and other essential oils. An aqueous solution is neutral in reaction and should not be affected by barium chloride, silver solution or ammonium sulphide. Heated on platinum foil it should burn without leaving any residue. In most of its known chemical reactions it resembles phenacetin, from which it is best distinguished by its physical properties. For instance, if methacetin be heated with insufficient water for its solution it melts and solidifies again upon cooling, but phenacetin heated with the same quantity of water does not melt. In respect to the therapeutic value of methacetin Dr. Weller corroborates what has been previously stated, and says that in its action it corresponds in every respect with phenacetin.

Hydracetin in Psoriasis.

It will be remembered that in a recent notice of hydracetin, the purified representative of "pyrodin," it was mentioned that Dr. Guttmann had reported that he had used a 10 per cent. ointment of it successfully in the treatment of psoriasis. (*Pharm. Journ.*, June 29, p. 1049). More recently Dr. Oestreicher also reports that he has used a 20 per cent. lanolin ointment of hydracetin with the best results (*Apot.-Zeit.*, July 20, p. 763); but he qualifies this statement by the important observation that in every case after using the ointment from seven to ten times severe symptoms of poisoning were set up. The patients complained of constantly increasing exhaustion and weakness in the limbs, accompanied by the impression that a serious illness was impending. The urine was of a mahogany colour, with a greenish tinge, but no biliary colouring matter could be detected in it. Dr. Oestreicher is therefore of opinion that a substance that is capable of producing such symptoms requires to be subjected to more prolonged clinical observation as to the necessary limits of doses before it should be recommended for general medicinal use.

Antipyrin Incompatibles.

A short time since M. Carles called attention to a precipitate which is formed upon mixing solutions of antipyrin and extract of cinchona. M. Ollivier, who has been making further experiments, says (*Bull. Comm.*, June, p. 278) that all the active principles are precipitated together, and that there remain in the liquid hardly any perceptible traces of alkaloids or antipyrin. According to M. Carles, however, the precipitate is readily soluble in weak acids, so that it might dissolve in the gastric juice, and the mixture, though unsightly, might not be inert. Another apparent incompatibility has been recorded by M. Blainville (*l.c.*), who having occasion to mix 4 grams of antipyrin and 5 grams of chloral hydrate in 15 grams of water, observed that the mixture assumed a milky appearance, and upon clearing deposited an oleaginous liquid. After decantation this liquid soon crystallized, and then no longer possessed the taste of antipyrin or of chloral, but a flavour rather resembling that of coriander seeds. Attention is called to the inconvenience that may result from the prescribing of complex substances of which so little is known together with other chemical substances that may change their physiological action altogether, and it is recommended that as far as possible, when ordering them, simple formulæ in which only distilled water and a simple flavouring agent enter should be adopted.

Orange-Flower Water Coloration.

Some correspondence has appeared recently in a French contemporary journal as to the cause of a red coloration observed when a mixture containing "antimoine diaphorétique" (acid antimoniate of potassium), glycerine and orange-flower water was heated in a water-bath, in compliance with instructions, before being taken by the patient. One correspondent affirmed it was due to a defect in the orange-flower water, on the ground that the colour was not observed upon repeating the experiment with a genuine distilled water (*Bull. Com.*, June, p. 280). Another recalled the known action of nitric acid upon orange-flower water, and stated that commercial "antimoine diaphorétique" always contains a small quantity of potassium nitrate, which under the influence of heat might react with the acid antimoniate, with the formation of neutral antimoniate of potassium and liberation of nitric acid. It was ascertained that a similar reaction takes place when acid sulphates and acid tartrates are added to solutions of nitrates in orange-flower water, without the intervention of the glycerine. Further it was suggested that the diaphoretic antimony might contain a little basic nitrate of antimony, which would be decomposed by the action of water. Finally a more systematic series of experiments seemed to demonstrate that each of the three ingredients is concerned in the reaction. It was found that when distilled water holding in suspension acid potassium antimoniate is boiled it remains perfectly neutral, but that when neutral glycerine is used instead of water the liquid becomes slightly acid. Neutral orange-flower water also becomes slightly acid under the same conditions, without becoming coloured; but upon glycerine being added it sinks to the bottom and a rose coloration is produced at the point of contact of the two liquids, whilst the reaction of the mixture becomes more distinctly acid. When orange-flower water is heated with a trace of nitric acid it acquires a faint rose colour, which is not changed by the addition of glycerine, but on adding the antimony salt the colour becomes much more intense. The rose colour so produced is changed to a dirty yellow by a few drops of soda solution and restored by nitric acid. It will be remembered that the coloration of a mixture containing nitrohydrochloric acid and orange-flower water was brought under the notice of the Pharmaceutical Conference by Messrs. Reynolds and Bothamley in 1878 (*Pharm. Journ.*, [3], ix., 248).

Rubidium-Ammonium Bromide.

It having been noticed by Professor Laufenauer that the activity of the bromides ordinarily used in medicine is proportional to their atomic weight,—potassium bromide, for instance, being much more energetic than lithium bromide,—he was induced by this observation to experiment with a bromine compound of much higher atomic weight, rubidium-ammonium bromide being selected for the purpose. He reports (*Mün. med. Woch.*, July 9, p. 495) that he has administered it to twenty-two patients, seventeen of whom were epileptic. Generally speaking, the action corresponded with that of potassium bromide; but in six cases the results obtained were undoubtedly more favourable than when using any other bromine preparation. The quantity given amounted on the average to 6 grams daily. The compound was also administered with good results as a sedative and hypnotic in evening doses of 4 to 5 grams. Rubidium-ammonium bromide is, however, rather an expensive remedy.

Camphor Compounds.

The compounds formed by camphor with chloral, phenol, betol, salol, resorcin and other substances have attracted some attention in recent years in consequence of the introduction of some of them into medicine. Most of them present the peculiarity of being liquid products of the combination of two solids, and even when this is not the case, as in the compounds of camphor with hydroquinone, salicylic acid, tannin and gallic acid, the temperature of the melting point of the joint product is much below that of either of its constituents (*Répertoire*, July 10, p. 289). M. Cazeneuve points out that these camphor compounds are probably more numerous than is generally supposed (*Journ. Pharm. Chim.*, July 15, p. 49). Even resin and gum resins are said to soften in contact with camphor, and gutta percha has been reported to behave similarly. Although in many of these cases true compounds are probably formed, in which the individual properties of the constituents are modified, the exact nature of the combination has not yet been explained and it is evident that it is comparatively feeble. It is known, for instance, that upon submitting to distillation the liquid formed by the combination of camphor with chloral hydrate, it s split up into its constituents. The same result obtained by simply shaking it with water; but it remains unaltered when agitated with an aqueous solution of chloral hydrate. In discussing the question, M. Cazeneuve expresses the opinion that he formation of these compounds is not due to the non-saturation of the camphor molecule, which allows of the fixation of two atoms of hydrogen, to form borneol, because the compound so produced is a stable one. He prefers to consider camphor-chloral and its congeners as a class of "molecular compounds," in which the combination between the two constituents is comparable to that which exists between water of crystallization and a salt.

Naphtol-Camphor and Salol-Camphor.

The valuable properties of the compounds of camphor with carbolic acid and with salol form the subject of a communication by M. Désesquelle (*Répertoire*, May 10, p. 200). In hospital use they have been found to possess considerable antiseptic properties, and the application of the naphtol-camphor is not followed by pain, in consequence of the anæsthetic action of the camphor. In preparing them M. Désesquelle finds the most convenient proportions to be 200 parts of camphor to 100 parts of β-naphtol or 300 parts of salol. The two ingredients are reduced together to a fine powder, and then gently warmed until liquefaction is complete; the liquid is then filtered and preserved in a well-closed bottle. The liquids obtained are denser than water, in which they are insoluble, and miscible with fixed and volatile oils, ether, and alcohol. They also possess considerable solvent powers, 10 parts of iodine, for instance, being soluble in the cold in 90 parts of naphtol-camphor. Cocaine hydrochlorate and the cinchona alkaloids also dissolve in them in considerable proportions. Lastly, the liquids are said to constitute an excellent medium for keeping surgical instruments, as they attack neither the metal nor the wood.

Iodoform and Silver Nitrate.

The consequences of an accident by which two contiguous bottles, one containing iodoform and the other silver nitrate, were broken in a box during transit and the contents mixed, are the subject of an editorial caution to packers (*Amer. Drug.*, June, p. 119). The occurrence of the breakage first became manifest by the escape of suffocating red fumes through the chinks and cracks of the box, when those in charge, fearing the box would take fire, drenched it with water. Of course everything in the box was spoilt and the corrosive liquor draining from it did considerable mischief. It is pointed out that the reaction between these two substances in the dry state differs widely from that which takes place in the presence of water. If iodoform be triturated gradually with solution of silver nitrate there is no violent reaction, and the whole of the constituent not in excess is decomposed according to the equation:—

$$CHI_3 + 3AgNO_3 + H_2O = 3AgI + 3HNO_3 + CO.$$

But when iodoform and silver nitrate come into contact in the dry condition, or perhaps with only a trace of moisture, a reaction is set up which rapidly intensifies and passes off almost like an explosion. The decomposition in this case is represented by the equation:—

$$CHI_3 + 3AgNO_3 = 3AgI + HNO_3 + N_2O_4 + CO_2.$$

Petroleum Soap.

The manufacture of the petroleum soaps of commerce appears to be based upon the observation that when petroleum in certain proportion is dissolved with the aid of heat in melissic alcohol a solution is obtained which when added to an aqueous solution of soap forms a stable homogeneous liquid. In practice carnauba wax, which contains melissic alcohol, is used. Working upon these lines, M. Emery has prepared a soap for medicinal purposes containing about one-fourth of its weight of petroleum and using ordinary white wax instead of carnauba wax (*Répertoire*, May 10, p. 205). The method adopted is to heat together 50 parts of petroleum, 40 parts of white wax and 50 parts of 90 per cent. alcohol until solution is complete, then add 100 parts of Marseilles soap, and when this is dissolved agitate until the mixture assumes a creamy consistence, when it is run into moulds. The soap so obtained is described as being homogeneous and firm, emulsifying well, especially with hot water, and as being an excellent medium for applying the insecticidal properties of petroleum to the skin.

Altered Essential Oils.

According to the *Pharmaceutical Post* (June 16, p. 407) an old resinified and malodorous essential oil is best freed from impurities by shaking it for a quarter of an hour with a thin paste made of powdered borax, bone black and water and then filtering, when the oil passes through quickly and bright. To decolorize an oil it should be distilled with an equal weight of poppy oil and saturated solution of common salt, when it is said the oil passes over colourless to the last drop, whilst all the colouring matter remains combined with the fixed oil.

Vaselin and Water.

According to M. Klebs, of Brussels (*Journ. de Pharmacol.*, June, p. 243), the inconvenience sometimes experienced in dispensing through the immiscibility of vaselin and water may be overcome by the aid of castor oil. The addition of this oil in the proportion of two drops to a gram of liquid he has found to be sufficient to produce a perfectly homogeneous mixture. By this means potassium iodide may be introduced into an unguent without danger of the decomposition that takes place after a time when fat is used.

Menthol and Safrol.

Menthol is well known to act as an anæsthetic when applied externally, but its internal use as an anæsthetic and antiseptic does not appear to be so generally recognized. Dana states that in doses of five to twenty grains it gives a pleasant feeling of warmth, stimulates the cardiac action without increasing its rapidity, and raises the arterial blood pressure. He also recommends it in preference to antipyrin for weakly and anæmic individuals, to whom the administration of antipyrin is not without danger, owing to its tendency to cause collapse. It is in the headaches of neurasthenic and anæmic individuals that menthol has been found especially valuable, as well as in migraine and supra-orbital neuralgia. To its virtues as an antiseptic the writer can bear witness, five to twenty grains proving generally sufficient to stop the diarrhœa of abdominal catarrh when the bile duct is obstructed and the bile does not enter the intestine. Safrol is stated to possess similar anodyne effects in doses of twenty drops, given for headache and sciatica (*Brit. Med. Journ.*, p. 1419).

Peptones and Nutrition.

Peptone being presumed to be the end-product of gastric digestion, it has usually been considered to represent the form in which the proteids are absorbed, and with this idea numerous commercial "peptones" have been recommended for patients suffering from weak digestion. But the idea that proteids are absorbed as peptone to any great extent has been disputed and the relation of the peptones to nutrition is discussed in an interesting paper in the *British Medical Journal* (July 20, p. 136). The conclusion arrived at is that the weight of accurate evidence is in favour of peptones having a great nutritive value, and of their representing, in fact, the modifications in which proteid food is absorbed in the stomach and intestine. But a question then arises as to what becomes of the peptones, since there is a concurrence of opinion that they are not present as such in the blood and lymphatic vessels in sufficient quantity to account for the proteids taken in as food. Hofmeister appears to have lighted upon a possible explanation in the observation that peptones probably undergo a change in traversing the wall of the living intestine. During digestion peptones are found in quantity in the mucous membrane itself, but not deeper down in the intestinal wall, and when a piece of intestine taken from an animal killed while in full digestion was kept at a body temperature the peptones disappeared. Presumably the conversion that takes place is into serum albumen, and this theory finds support in the results of some experiments conducted by two ladies in the laboratory at Berne. It is known that a frog's heart may be separated from the body and kept pulsating for many hours if a proper nutrient liquid be supplied to it, one of the best being a 0·6 per cent. salt solution, to which a certain proportion of serum has been added. If salt solution alone be used, the pulsation quickly stops, and nearly the same result follows when peptone is added to the salt solution instead of serum. But Miss Popoff found that if a solution of pepsin-peptone be placed in the stomach of a living dog for twenty minutes and then removed, it undergoes a change, and becomes capable of sustaining the pulsation of a frog's heart, the change being more marked when the solution is placed in the small intestine. Pancreas-peptone, however, similarly treated, behaves differently, and does not act as a nutrient liquid for the heart after exposure to the action of the intestinal canal. The effect on the pepsin-peptone seems to be produced by epithelial cells lining the stomach and intestines, and Miss Brinck found that a solution passed a few times through the heart becomes capable of sustaining cardiac action. It was also found that pepsin-peptone solution in incipient decomposition is a powerful sustainer of the heart's action, but after the decomposition has progressed it becomes a cardiac poison. Miss Brinck suggests that the first effect is due to an organism, which she describes as *Micrococcus restituens*, forming serum albumen from the peptone, and that subsequently another organism that secretes a poison is developed in the liquid.

Milk.

In a recent communication to the Paris Chemical Society, M. Béchamp gave an interesting account of his researches into the constitution of cow's, ass's and woman's milk (*Chem. Zeit.*, June 29, p. 853). In a former paper (*Pharm. Journ.*, [3], xix., 427) the author had given reasons for holding that butter is not present in milk as a simple emulsion, but that the fat globules are actually contained in closed cells, surrounded by a membrane of an albumenoid nature, insoluble in dilute alkalies. The fact that butter can be removed from milk by shaking it with ether, which has been considered evidence of the emulsification theory, he explains by saying that under the conditions the delicate enclosing membrane is ruptured and a true churning takes place. But if the milk be mixed with an equal volume of ether in such a way that no froth results and the mixture be allowed to stand until a separation of the liquids takes place, the fat globules, which occur in the milk underlying the ether, are seen to have considerably increased in size and altered in appearance. For several days it is found that the volume of the milk layer goes on increasing and that of the ether layer decreasing, which is just the reverse of what might be expected to occur if the fat were dissolved in the ether. Simultaneously the milk separates into two layers, a cream layer, containing ether, which has lost the appearance of milk, and in which swollen globules are perceptible for some time, and a lower layer. The thickness of the upper of these two layers stands in certain relations to the richness of the milk in butter, being least in ass's milk, which is the poorest in fat. The consistency also varies, being greatest in ass's milk and least in woman's milk. The lower layer also, in the cases of cow's, goat's and ass's milk, shows varying degrees of opacity and milkiness, but woman's milk gives an almost transparent lower layer, and can be distinguished from the other three milks mentioned by this character.

Milk Souring.

Notwithstanding all the attention that has been paid to the common phenomenon of the souring of milk, considerable uncertainty seems still to exist as to the causes leading to it, whether it is due to the action of one specific organism or of more, or even to other agents. Some recent experiments by Herr Fokker have led him to the conclusion that the milk-souring germ is a modification of an ordinary saprophyte, but that the *rôle* played by the germ is a very subsidiary one (*Med. Chron.*, July, p. 291). This appeared to be shown by the fact that the acidity developed two days after the addition of one drop of a pure culture of the milk germ to 50 c.c. of sterilized milk was almost equal to that observed when 50 drops were added. But when casein was substituted for the germ culture, the acidity increased with the quantity of casein added. Nevertheless, the acidification was not in strict proportion with the augmentation of the casein, and this is attributed to the increased concentration of the liquid. It is interesting to note that Liebig attributed the acidification of milk to the agency of casein, but Pasteur demonstrated that the presence of a living organism was necessary, and looked upon casein as its food. The manner of action of casein is not clear, for this seems to be intensified after the casein has been subjected to a steam heat under pressure, and the acidifying property is also shared by coagulated albumen. The idea of the action being mechanical, and dependent like that of platinum sponge upon porosity, is excluded by experience with other substances. Herr Fokker appears to think it dependent upon a "power of furthering the production of acid" peculiar to animal substances, and to look upon the work of the germ as the "spark that kindles the firework."

"Artificial" Cloves.

Dr. Hanausek calls attention to the occurrence in commerce of "artificial cloves" made of moulded paste (*Apot.-Zeit.*, June 29, p. 691). The resemblance of the spurious article to cloves is said to be sufficiently close to allow of their being overlooked in the mass; the colour approaches closely to that of the real article, but when examined more closely ridges from the mould are perceptible and there is an adherent dust that is yellow, consequently much lighter than the clove. In the mouth the spurious "cloves" soften to a gritty paste, colouring the saliva brown, and tasting slightly of cloves, with a remarkable "bark" flavour. When pulverized and the powder examined microscopically a very minute proportion of clove tissue was found. But the conclusion arrived at was that the spurious "cloves" are made from a paste consisting mainly of wheaten flower and ground oak bark, with a small proportion of genuine cloves powder, pressed into metal moulds and roasted.

Olive Stones in Pepper.

The property possessed by aniline in acid solution of colouring the sclerous elements of vegetable tissues yellow, without affecting other tissues, is utilized by M. Chevreau as a means of detecting an adulteration of pepper with ground olive stones (*Répertoire*, May 10, p. 203). For this purpose he uses a solution of one part of aniline in two or three parts of ordinary acetic acid. If a sample of genuine pepper powder be moistened with this solution it undergoes no change perceptible to the naked eye, and with the aid of a microscope only a few scattered yellow cells can be seen. But if the sample contains ground olive stones it assumes a characteristic yellow aspect, and the stone cells, coloured a pure gamboge yellow, can be easily seen. The shade of colour varies with the extent of the admixture and may be used as an indication of the quantity of adulterant present.

Lithia in Granite.

The *Midland Naturalist* (p. 154) contains an account of a granite found in Devonshire, at Meldon Quarry, near Oakhampton, which contains 0·7 per cent. of lithia. It contains, besides, 3 per cent. of potash, 4·6 per cent. of soda, 16 per cent. alumina, 1 per cent. ferric oxide, 0·2 per cent. of magnesia and manganese oxide, 0·9 per cent. lime and 72·4 per cent. of silica. The lithia was separated in the form of chloride by Gooch's method of using boiling amyl alcohol. The granite is almost pure white, somewhat resembling statuary marble in appearance, and is composed of quartz, felspar (largely plagioclase), white mica, topaz, and green tourmaline; black mica is absent. The lithia appears to occur in the white mica. Lepidolite had previously been noted among the constituents of Cornish granite, and lithia is widely diffused among granitic micas from all parts of the kingdom, but except one Scotch muscovite granite this appears to be the only British sample that contains sufficient lithia to colour a flame so as to be visible without a spectroscope. Lithium chloride has, however, been found to the extent of 26 grains to the gallon in a spring in Clifford United Mines, Cornwall.

Exostemma floribundum.

A new type of calcareous cystolith has been detected by Mr. E. Heckel in the stem of *Exostemma floribundum*, which may serve as a means of distinguishing it from *E. caribbæum*, in which these bodies are quite absent. In the bast layers of the cortical parenchyma two concentric cycles of cystolithic cells are found. The cystoliths are in the form of papillæ, terminating in a point, and are five or six in number; the apices are all turned towards the interior of the cortex and their bases towards the exterior. When dissolved by weak acid a small pedicel of cellulose remains on the wall to which the cystoliths have been attached, thus differing from those of *Urticaceæ*.

Structure of Plant Hairs.

The structure of the hairs of various species of *Urticaceæ*, *Moraceæ*, *Boraginaceæ* and *Cucurbitaceæ*, remarkable for their rigid character, has been investigated by Dr. F. G. Kohl. He finds that they exhibit a marked thickening at the apex followed by a partial calcification or silicification. This thickening is due to the deposit of caps of cellulose placed one within the other, masses of protoplasm lying between each. This structure is easily seen in the hairs of *Symphytum officinale*, after the calcium carbonate has been removed by dilute hydrochloric acid. It is to the deposits of lime or silica that the brittleness of such hairs is due, and that they so readily, as in the case of the nettle, enter the skin, and being brittle break off and allow the poison to enter (*Journ. Roy. Micr. Soc.*, p. 403).

Primula obconica.

The favourite greenhouse plant, *Primula obconica*, appears to possess either irritant or poisonous properties which render it as unsafe to handle as the poison oak (*Rhus Toxicodendron*). Attention was called to this property of the plant by a writer in the *Garden and Forest* some months since, and the statement has been confirmed by others in the *Garden* (April 20, p. 368, and July 13, p. 35). It would appear, however, that it is only certain individuals with an abnormally sensitive skin who are thus affected, shown by the fact that one of the persons also experienced irritation from contact with the fruits of *Acer macrophyllum* and *Ostrya virginica*, which are covered with minute hairs. In some cases troublesome inflammation of the face and hands resulted from the handling of the *Primula obconica*. It does not appear to have been ascertained as yet whether the irritation is due to hairs, or to a volatile acrid principle, as in the Anacardiaceæ. The unbranched jointed hairs themselves are apparently not adapted for causing mechanical irritation, having somewhat obtuse apices. They appear to secrete, however, a viscid yellowish substance, which is found coating their apices. The leaf, when chewed, leaves a tingling or acrid sensation on the tongue.

Blue Colour of Flowers.

The blue colour of most flowers is well known to fade rapidly, and this is due, according to Herr H. Molisch, to the fact that anthocyan (or the mixture of pigments known under that name) in purple leaves or petals is readily turned blue by a little alkali, green by a larger quantity, and then yellow, finally losing its colour altogether. In the state of nature this change is brought about by the contents of the cells containing anthocyan becoming mixed with the protoplasm of other cells from which they were previously separated.

Tannin in Plants.

According to Herr Klercker, tannin in mature roots occurs partly dissolved in the sap and partly in special cavities, or tannin vacuoles, occasionally in the cell wall, but never in the protoplasm. He believes that the vacuoles are probably separated from the protoplasm by a precipitated membrane of iron tannate. He regards the tannin of the vacuoles in the root bark as an excretion, although in the epiderm a resorption of the vacuoles frequently takes place in the formation of root hairs. The tannin was recognized in the experiments made by staining with methyl blue and an alcoholic solution of cupric acetate, which stains the tannin and fixes the entire cell contents.

Structure of the Petiole of Dicotyledons.

Mr. L. Petit has investigated the anatomy of nearly five hundred species of Dicotyledons, belonging to forty-eight families and three hundred genera, and has obtained results which will probably be of great value for purposes of identification of leaves under the microscope. He divides the petioles into two primary divisions. In the first, including *Umbelliferæ*, *Araliaceæ*, *Malvaceæ*, *Tiliaceæ*, *Sterculiaceæ* and *Compositæ* the terminal section in the petiole encloses secretory canals. In *Umbelliferæ* and *Araliaceæ* the canal lies behind each peripheral bundle, while the others have them arranged irregularly. In the second division, the terminal section of the petiole does not enclose secretory canals. This section includes *Apocynaceæ*, *Asclepiadaceæ*, *Convolvulaceæ*, *Solanaceæ*, *Myrtaceæ* and *Cucurbitaceæ*, with bicollateral bundles, and various *Rosaceæ*, *Malvaceæ*, *Geraniaceæ*, *Oxalideæ*, *Cupuliferæ*, *Amaranthaceæ*, *Chenopodiaceæ* and *Leguminosæ*, without any collateral bundles. In *Scrophulariaceæ*, *Oleaceæ* and *Boraginaceæ* the lower bundle preponderates and there is no sclerenchyma. *Papaveraceæ*, like *Compositæ*, has secretory tissue, but unlike the latter has no sclerenchymatous fibres. *Cruciferæ* have thick fibres like *Compositæ*, but no secretory tissue. In *Ranunculaceæ* the transverse section of the fibrovascular bundles has the form of an ellipse (*Journ. Roy. Micr. Soc.*, 1889, p. 409).

Sideroxylon dulcificum.

At a recent meeting of the Linnean Society, a specimen of the fruit of *Sideroxylon dulcificum*, the so-called "miraculous berry" of West Africa, was exhibited by Mr. D. Morris, the Assistant-Director of Kew Gardens. He stated that the sweet pulp of the fruit, which is about the size of an olive, imparts to the palate a sensation which renders it possible to partake of sour substances, such as tartaric acid, lime juice and vinegar, and gives them a flavour of absolute sweetness. The fruit of another plant (*Thaumatococcus* (*Phrynium*) *Danielli*) possessing similar properties, was also shown, living plants of both having been recently received at Kew from Lagos from Governor Moloney. These two vegetable curiosities are, however, by no means new, the former having been described and figured in the *Pharmaceutical Journal*, [1], vol xi., p. 447, and the second in vol. xiv., p. 159, of the same publication. The former also is mentioned by Dalzell in his history of Dahomey, where it is stated to be used by the natives to render palatable a gruel made from bread after it has become too stale for any other purpose. Unfortunately the peculiar sweetening principle is soon dissipated if the fruit remains ripe for any length of time. Preservation in spirit, acetic acid or syrup, does not appear to favour the retention of the dulcifying principle, according to Dr. Daniell, since he found that specimens of the fruit brought to England became insipid and lost their properties. In the case of *Thaumatococcus Danielli*, however, the properties of the mucilage surrounding the seeds appears to be retained much longer when the fruits are preserved in syrup. It would be interesting to ascertain the nature of the sweet substance contained in the fruits, and it may be hoped that the Kew authorities will not let so interesting a question fall to the ground without some attempts being made in various ways, such as obtaining the dried unripe fruits, to extract the dulcifying principle of these fruits.

LAC FERMENTATUM.*

A. *Kumyss* (National Formulary, U.S.P.).

BY AD. TSCHEPPE, PH.D.

Kumyss is generally designated as fermented milk. As this term implies the meaning of alcoholic fermentation, the definition is incorrect, since lactic fermentation has as much share in shaping the final result, by acting on both the proteid substances and the sugar, as vinous fermentation does. It is not even the sugar contained in milk which is attacked by the ferment which induces alcoholic fermentation, for the product of its fermentation is furnished by sugar foreign to milk, purposely added to it. Kumyss may, therefore, more properly be defined as being obtained by alcoholic fermentation of sugar, not *of* milk, but *in* milk.

The various phases of the process which take place in the formation of kumyss, and the changes which the constituents of milk must undergo, may be thus briefly stated:

Some sugar is added to milk, then brewer's or cake yeast (grocer's yeast), and the mixture is left to itself. In the course of time, varying in length according to temperature, the effects of alcoholic and of lactic fermentation make themselves apparent, the first, by evolution of gas, through the splitting up of some of the sugar into alcohol and carbonic acid, of which the latter is the most conspicuous; the lactic fermentation, by the appearance of lactic acid, generated through a re-arrangement of the atoms in the sugar molecule, and in the influence of lactic ferment, which transformation manifests itself by throwing the casein out of solution.

While albumen may be considerably acidulated without losing its solubility, casein, as an alkali-proteid, is soluble only in slightly alkaline solutions, and is extremely sensible, in this respect, towards acids. If lactic fermentation is so far progressed that neutrality is passed, the casein is thrown out as a coherent jelly, which, when undisturbed, becomes more compact by contraction and expulsion of serum, and finally conglomerates into separate fibrous lumps, which cannot be divided any more. But if this gelatinous precipitate is agitated ever so slightly in the incipient stages of its formation, it is readily broken up into an impalpable cream, which may be kept finely suspended in the liquid for a length of time, if the necessary conditions of temperature are observed.

If the generation of carbonic acid gas has been lively enough before the lactic fermentation produces its effects, or if it is aided by occasional shaking of the bottles, all the butter fat is enveloped in the precipitate of the casein without affecting its divisibility. Hence the function of the carbonic acid is this, that by the expansion and mobility due to its gaseous nature, it reduces the casein to the finest possible condition—much finer than other mechanical means can do. When the precipitation and division of the casein are effected, and enough carbonic acid gas is found to cause lively effervescence, the kumyss is ready for use. The time in which this is accomplished depends on conditions of temperature at which the fermentation takes place, and on the proportions of the additions. Upon the observance of the most favourable conditions depends also the quality of the product, and it is here where the formula and the directions given in the National Formulary need a correction, in order to obtain an irreproachable preparation of kumyss.

a Addition of Sugar.—Milk-sugar is not readily attacked by yeast. Contrary to statements in books that vinous fermentation will set in after the milk turns sour, and that thereby the milk-sugar becomes changed into glucose, I find that milk more easily enters fermentation under addition of an alkali, by which the souring is prevented. The same is the case with cane-sugar; and as it is desirable to have the alcoholic fermentation started before the lactic fermentation acts on the casein, the addition of fermentable sugar, in the shape of grape sugar or honey, is indicated. Its quantity must be regulated according to requirements only. Nothing is more annoying to the unwary consumer than the opening of an overcharged bottle of kumyss, which generally results in the spattering of its contents promiscuously about the room. The quantity prescribed in the N. F. for two pints of milk is amply sufficient for two gallons, and may only be increased for kumyss dispensed in patent bottles, or if drawn from ordinary bottles by means of a tap.

b Temperature.—The temperature prescribed in the formula may turn out to be disastrous in the manufacture of kumyss.

Milk is a peculiarly complex preparation. It is not an emulsion, as sometimes stated in books, but contains the fat inclosed in separate cells, which rises to the surface as layer of cream if milk is left in undisturbed repose or subjected to centrifugal force. Boiling does not burst these cells or separate the fat; but if milk is left for hours at a temperature above the melting point of butter fat, 65° F., or if subjected to violent commotion, such as churning at the same temperature for a short time, practically all the fat is separated. Again, if casein is precipitated from fresh milk by means of acids, at any temperature, it encloses all the fat in its meshes, and also the jelliform casein separated from milk by rennet includes the butter firmly. But if milk is allowed to turn sour, the fat separates from the casein readily by keeping it a short time at temperatures above the melting-point of the butter-fat. At the same time the finely divided casein conglomerates into more compact lumps, and the kumyss is spoiled.

Although milk, as long as it is sweet, may be kept at 90° F. with impunity, this same temperature is deleterious to the product after souring sets in. The casein turns lumpy, and the fat may be seen floating in the neck of the bottle as a yellow mass. This temperature is unnecessary for the manufacture of kumyss. Vinous fermentation takes place at much lower temperatures, and the higher degrees only favour the lactic fermentation by which the kumyss gets too acid to be drunk by the bottleful.

The sugar is not all consumed by either kind of fermentation. If milk is allowed to turn sour, only one-tenth to one-eighth part of its sugar is changed to lactic acid, and also the vinous fermentation stops before all the sugar is used up. But the lactic fermentation goes on slowly, acting on the sugar which is left, and the kumyss turns gradually more and more acid the longer it is kept. Pretty old samples of kumyss still react on Fehling's solutions.

In place of preparing kumyss with sweet milk, and waiting until it turns sour, the casein may be precipitated at once, by the addition of one-third of ready kumyss to fresh milk. Yeast is not necessary, but sugar must be added to produce enough carbonic acid gas to cause effervescence.

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[*] From the *American Druggist*, April.

Kumyss may also be made from sour milk, freed of its crust of cream, by breaking up the gelatinous mass by vigorous concussion, and causing alcoholic fermentation by addition of sugar and yeast. This preparation would be nearly devoid of cream, but a proportion may be brought in by addition of sweet milk.

The time in which kumyss becomes ready for use depends as much on the quantity and activity of the ferment as on the temperature. With plenty of yeast and a prevailing temperature nearer to 90° than 60° F., the course of fermentation may be said to be even stormy, and the process is completed in as many hours as days may be consumed when the temperature is kept lower. But it is safer to operate at a lower temperature, by which a much finer product is obtained. Besides, by a slow after-fermentation, the kumyss becomes ripened, and in the course of one to two weeks a cheesy or butyraceous flavour is acquired which is generally regarded as a necessary characteristic of good kumyss.

Commercial preparations of kumyss never correspond to fully undiluted milk. Kumyss made from undiluted milk is too rich and requires too great care to be practicably handled by the large manufacturer. But the pharmacist who disposes of his own production directly to the customer may easily take the necessary precautions against disastrous influences, and may give his customers the benefit of an undiluted preparation, which kumyss is supposed to be.

Samples of commercial preparations of kumyss I found either to be more or less deficient in cream, or to be made from watered milk, or both. Dr. Brush's kumyss, for instance, commanding the largest sale in New York, gave, on analysis, only two-thirds of the casein and fat in the proportions in which they exist in milk, indicating a corresponding watering of the milk.

B. *Kephir*.

This is a fermented milk beverage identical with kumyss in its finished state. It differs from the latter by being produced by aid of a different ferment. The kephir ferment was originally brought from the Caucasus, but may be procured in this market from home culture. It comes in the shape of grains of various forms and sizes, very much resembling bits of the inflorescence of cauliflower, constituting a compound fungus growth resulting from the cohabitation of a fleshy fungus with a certain species of *Saccharomyces*, which latter alone plays the active rôle of enacting vinous fermentation of the saccharine constituent of milk. This peculiar *Saccharomyces* differs from the brewer's yeast by starting vinous fermentation without addition of a fermentable sugar, and fermentation progresses to a certain advanced degree while the milk is yet sweet, or before lactic fermentation produces its effect. It is therefore possible to obtain an effervescing kumyss by its aid with a much less degree of acidity than that obtained by the *Saccharomyces cerevisiæ*, and it may be concluded that kephir yeast is better adapted for the fermentation of milk than beer yeast is. By after fermentation the same degree of acidity is reached as in kumyss obtained through the action of ordinary yeast. This peculiarity has led to a distinction in the use of the different stages of the fermentation of kephir, as it has been observed that young kephir which is yet sweet acts as a slight purgative, while an older, or more acid, or "stronger" kephir exerts a constipating effect on the bowels, and is less easily borne by delicate stomachs.

Kephyr kumyss is prepared by adding active kephir grains to milk, preferably kept at a temperature between 70° and 80° F., until the effect of fermentation becomes apparent by the rising of the grains to the surface, being carried upward by bubbles of carbonic acid gas attached to them. The grains may then be strained off, and the milk, which now contains enough yeast cells to insure the continuance of the fermentation, left to itself in well-corked bottles.

As the yeast cells propagate themselves, more fresh milk may be added previous to bottling.

The directions accompanying the kephir grains direct that the grains should be left in the milk until the casein separates from the serum, and that this strained product shall be used as the ferment of about four times its bulk of fresh milk. (Several prominent houses who sell kephir grains accompany them by printed directions which fail to start their activity altogether.)

If kephir is once obtained by this means, the further production may be simplified in the same manner as in the case of kumyss, by adding a quantity of ready kephir to a multiple of fresh milk, and this may be continued through many generations without having further recourse to the original kephir grains.

The printed directions recommend the employment of milk previously boiled. The advantage of this proceeding is supposed to be this, that the lactic fermentation is retarded, to which end a washing of the kephir grains with a two per cent. solution of carbonate of sodium is prescribed for the removal of the rest of lactic acid tenaciously retained by the grains.

Commercial kephir grains may be found to be quite inert by the buyer uninitiated in the art of developing them properly. The fact is, that their activity must be first started, and directions to do so are given with the samples, but in spite of following them closely, they may fail to give satisfactory results. The secret of success seems to me to be to keep the grains in fresh milk at a temperature of 70° to 80° F., and to change the milk once or twice daily, or as often as the milk threatens to become sour. The time may have to be extended to a week, until their action becomes manifest by the generation of gas.

Kephir grains are also apt to decay, and those inert grains have to be removed. Those which retain their vitality may be recognized by their turgor or toughness to the touch, while the decayed ones crumble between the fingers like soft cheese.

The usefulness of kumyss as a dietetic hinges upon the fine division of its casein. Indeed, if a well-prepared kumyss is subjected to digestive influences, the finely divided and diffused precipitate of casein dissolves at once, while the floccular casein, otherwise obtained, resists the peptic action remarkably long.

C. *Matzoon*.

Matzoon is a peculiar milk preparation, also stated on the label to be fermented milk, although there is no evidence of its having undergone alcoholic fermentation. It is devoid of gas, and appears as a viscid liquid, showing a rather coarsely granular mass of precipitated casein, well suspended in a serum which corresponds to that obtained from sour milk. Although betraying great richness from its appearance, the analysis gives amounts of casein as corresponding to undiluted milk and two-thirds of its cream.

1 fl. oz. of cow's milk contains grains (average).		Kumyss from milk:	Dr. Brush's kumyss.	Matzoon.
Sugar	22	—	—	20
Casein	14	14	10	14
Fat	15	15	9	7
Lactic acid.	—	1·5	3	·1

Glucose. Lactic acid.

$$C_6H_{12}O_6 = 2HC_3H_5O_3$$

Glucose. Alcohol.

$$C_6H_{12}O_6 = 2C_2H_6O + 2CO_2$$

Glucose yields by fermentation :—

Alcohol	48·5 per cent.
Carbonic acid	46·5 „
Glycerin	3·6 „
Other products	1·4 „

The Pharmaceutical Journal.

SATURDAY, JULY 27, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ALKALI WORKS INSPECTION.

THE report of the Chief Inspector of works devoted to the manufacture of alkali and to similar chemical operations has just been issued, and as usual it contains much information of a useful as well as interesting nature. This is the twenty-fifth annual report that has been issued since the Alkali Works Regulation Act of 1881 came into operation, and it is satisfactory to find that any feeling of apprehension there may at first have been as to the work of the Government inspectors causing interference or inconvenience to manufacturers has given place to a very general recognition of the fact that it is really beneficial to them as well as to the public. Although it is the business of the inspectors to detect the escape of injurious gases and to take means for preventing the continuance of nuisance of that kind, it is not their object to do so by seeking for and collecting materials on which to base a prosecution, but rather by assisting manufacturers in keeping within the requirements of the Act. It has been found that one of the best ways of giving help in this direction is by inducing manufacturers to maintain a constant system of testing the effluent gases discharged from the operations they carry on, and also to employ for the supervision of their works the best-skilled assistance they can obtain. The value of such assistance is being recognized, and Mr. CHANCE, in speaking on this subject, has given expression to the prevailing opinion that Government inspection of chemical works has led to material improvement in their general management and been of such distinct benefit to the owners of them that the inspectors ought to be regarded in the light of friends. Altogether the alkali manufacture offers a striking illustration of the proverb that necessity is the mother of invention, and of the advantage of a little pressure as promoting progress. The origin of the process that has hitherto been relied upon as a source of soda was due to the necessity of finding a substitute for the kelp soda that was formerly the raw material employed. LEBLANC's method of decomposing common salt and soda sulphate supplied that want so well that it soon became the only source of soda salt. At a later date the stoppage of the supply of sulphur from Sicily necessitated the provision of a substitute for the manufacture of sulphuric acid, and the use of pyrites as a source of sulphur was thus introduced with much advantage. Then the necessity of preventing the escape of hydrochloric acid as a waste product of the decomposition of salt, though at first thought to be irksome, became the means by which alone it was possible to obtain a profit from the manufacture of alkali by the LEBLANC process. And lastly the growing necessity of doing away with the nuisances arising from the "waste" produced in that process, gives promise of the development of new methods for its utilization and of alternative processes for the manufacture of soda without any production of the "waste" that has been so much trouble as refuse.

The magnitude of the alkali industry may best be shown by reference to the quantity of the chief raw materials employed in connection with it, and the collection of statistics of this nature has been incidentally carried out by the inspectors while making their visits. In the year 1888 the quantity of salt consumed for this purpose by the LEBLANC process in the United Kingdom was 655,902 tons, or an excess over that used in 1887, amounting to 6,035 tons. In addition some 212,181 tons were used for producing soda by the ammonia process. The latter process, which has at length come to be such a serious competitor with the LEBLANC process, that it may eventually supersede it altogether, has been developed only within the last few years. Its rapid progress may be judged of from the fact that while in 1886 the quantity of salt used for it was only one-sixth of the whole quantity used for making soda, in 1888 it amounted to nearly one-fourth of it. During the past year the quantity of native sulphur burnt for the manufacture of sulphuric acid was 17,975 tons, but the quantity of pyrites burnt for the same purpose was about 600,000 tons, and the quantity of salt manufactured was 2,039,867 tons. The chief basis on which the working of the LEBLANC process is now continued is the production of hydrochloric acid, which was at one time regarded only as a bye-product, and was got rid of entirely by discharging it into the atmosphere. As yet the ammonia process has not succeeded in producing hydrochloric acid or chlorine so as to add the making of bleaching powder to the work done by it, and it is only while this condition remains unchanged that the LEBLANC process can hold its ground. Hence for a long time past it has been the object of chemists to utilize the sulphur locked up in the "waste" resulting from that process. That material contains from 11 to 15 per cent. of sulphur, and as the total quantity of "waste" annually produced is about 750,000 tons, representing about 100,000 tons of sulphur, success in that direction would be highly profitable. The problem is either to recover the sulphur or to avoid the formation of "waste." The process devised by Mr. Chance for the former purpose is one of the most promising, and it has already been adopted by many alkali manufacturers. The sulphur it yields is of very high quality, and the amount recovered is at present about 90 per cent. of that in the waste operated upon. The realization of this object is also being attempted by a new process of soda manufacture, proposed by Messrs. Parnell and Simpson, which admits of the recovery of the whole of the sulphur in alkali "waste." But a still more radical attack of the difficulty is the process suggested by Mr. Gossage, of decomposing soda sulphate into sodium sulphide by the action of carbon at a high temperature. The formation of "waste" would thus be avoided, and by the action of carbonic acid on the sodium sulphide dissolved in water sulphuretted hydrogen would be evolved and bicarbonate of soda produced. All three of these processes promise support for the Leblanc process and important results in the removal of its most objectionable feature.

Another very interesting subject referred to in the report of the alkali works inspector is the prevention of black coal smoke. A strong feeling is entertained by the public that the evils arising from this source should be diminished. That they are very serious there can be no doubt; but very erroneous ideas prevail on this subject, for the correction of which we may well look to the intervention of the inspectors under the Alkali Act. Already a step in that direction has been taken. In the newspaper correspondence that has been carried on lately it has been contended that the suppression of black smoke should not be insisted upon because the black smoke is a guarantee that the poisonous gas carbonic oxide is absent and because the presence of that gas in chimney smoke would be still more prejudicial. Chemists would naturally perceive the fallacy of this assertion, but with those who cannot form a judgment from that point of view, the argument in favour of black smoke has been accepted. It is therefore very useful that in the report now referred to the results of a number of analyses of chimney gases are given which show that the above-mentioned statement as to the absence of carbonic oxide being indicated by the blackness of the smoke is entirely incorrect. In reality carbonic oxide is but rarely present in chimney gases, and in all instances where it occurs it is accompanied by black smoke, showing that the presence of the one as well as the other is due to imperfect combustion. This is precisely the evil to be dealt with for the suppression of black smoke and for preventing waste of fuel. The mode of burning coal now in use is defective chiefly by reason of its want of regularity, and the mechanical stokers which have hitherto been offered in its place have not been sufficiently successful to supersede it. Much more is to be expected from the system of converting coal into gas before it is burnt. The late Dr. Siemens' labours in that direction were very useful in various industries, and a further development of the system by Mr. Mond seems likely to be of great value to the chemical manufacturer, since it not only affords gas which is incapable of causing black smoke when burnt, but also admits of the nitrogen of the coal being recovered as ammonia. The use of gaseous fuel, indeed, appears to be the most hopeful means of preventing black smoke, and as it is attended with other advantages for the fuel consumer of a nature to compensate for increased cost, it appears to be time that out of regard for the public health and convenience its application by manufacturers should be promoted by some external pressure at least in towns and densely populated districts.

INTERNATIONAL CONGRESS IN PARIS.

A complete programme has now been issued in connection with the International Congress of therapeutics and materia medica to be held in Paris next month. The place of meeting is to be the Hotel des Societés savantes, 28, Rue Serpente. The sittings will commence on the 1st of August, and continue until the 4th. The first business will be to elect officers and arrange for the reading of papers in the several sections, which will meet each day in the morning and general meetings will be held in the afternoon. Up to the 1st inst. the number of members amounted to 450, and the organising committee had received notice of several deputations that would attend to represent foreign Governments or learned Societies. The list of papers to be read in the section of materia medica and pharmacology has been published, but it does not present any feature of striking interest, and it is probable that the reports which we mentioned in a previous note will chiefly occupy the attention of the Congress. In reference to the subjects of four of those reports communications have been sent in to the Secretary of the Congress. The subject of an international pharmacopœia does not offer opportunity for being dealt with in the same manner, but several pharmacists have announced their intention of taking part in the discussion that may be expected to follow the reading of Professor Schaer's report. On the 3rd August there is to be a dinner for the members of the Congress. It will take place on the first platform of the Eiffel Tower at 7.30 p.m. The ticket, costing 20 francs, will give admission to the Tower.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July 9, 10, 11, 12, 17, 18 *and* 19, 1889.

Present on the 9th.—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner and Taylor.

Present on the 10th, 11th, 12th, 17th, 18th and 19th.—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner, Taylor and Thresh.

Dr. Stevenson was present on the 9th, 12th and 17th, on behalf of the Privy Council.

MAJOR EXAMINATION.

9th.—Eight candidates were examined. *Three* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Church, Edward Harry	Cambridge.
Cox, Herbert Victor	Southampton.
Grice, Joseph Ed. Brindley	Brighton.
Harper, Edmund William	Ossett.
Jones, John	Llandovery.

10th.—Seven candidates were examined. *Four* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Livesley, Thomas Henry	New Mills.
Routley, Edwin Walter	Bath.
Smith, Frederick	London.

17th.—Eight candidates were examined. *Two* failed. The undermentioned *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Davison, Daniel	Cromer.
Fuge, Harry Dixon	Matlock Bath.
Fuller, George Sydney	Thornton Heath.
Hobbs, Alfred Ernest	Tunbridge Wells.
Latchmore, Alfred	Plymouth.
Norman, Richard Henry	Cottenham.

18th.—Seven candidates were examined. *Two* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Smith, Albert	Royston.
Sturton, John Gilbert	Peterborough.
Thornley, John Brooks	London.
Wain, Clement John	Hanley.
Young, Edward Francis	Portishead.

MINOR EXAMINATION.

9th.—Twenty candidates were examined. *Thirteen* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Agar, John George	Mansfield.
Arrandale, James William	Denton.
Bate, Arthur Macaulay	Northampton.
Boor, Harry Herbert	Spalding.
Bowron, Henry Edward	Liverpool.
Broadbent, Harry Ralph	Manchester.
Burnett, Augustus Frederick	Highbridge.

10th. — Twenty-five candidates were examined. *Fourteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ashton, Thomas Richard	Manchester.
Brown, Herbert	Carrington.
Chappelow, Thomas Henry	Southampton.
Chown, Harry Clement	Lympstone.
Clegg, Alfred Joseph	Wantage.
Cross, Frederick George	Birmingham.
Crozier, George Dixon	Carlisle.
Davies, Daniel Evan	Carmarthen.
Donellan, Arthur W. Ernest	Crewe.
Ellwood, William Mark	Leominster.
Elmitt, William	Lincoln.

11th.—Thirty candidates were examined. *Twenty* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Fletcher, William George	London.
Gelston, Percival John Neill	Derby.
Gibson, William Thomas	Collingham.
Godding, William Charles	Tunstall.
Greening, George F. Gregory	Dorchester.
Harries, Howell	St. Clears.
Hewitt, Joseph Frederick	York.
Hillman, Charles Edward	Westbury.
Hook, Richard Graves	Bridgwater.
Hurd, William	Nottingham.

12th.—Twenty-eight candidates were examined. *Nineteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jacks, Frederick	Longton.
Jago, Charles Albert	Plymouth.
Jones, John Rees	Tredegar.
Judd, Walter Rossell	Liverpool.
Leech, Charles Richard	Cambridge.
Lines, Charles Montague	Bedford.
London, Walter Augustus	Redditch.
Lowe, Osmond Henry	Maidenhead.
Weighill, William Lancelot	West Hartlepool.

17th.—Twenty-five candidates were examined. *Fourteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Morgan, Ebenezer	Carmarthen.
Morton, Lawrence Knyvett	Kennington.
Page, Percy Dodson	Boston.
Parsons, Henry Imber	Barnstaple.
Perks, Alfred	Birmingham.
Postlethwaite, Thomas	Kirkby-in-Furness.
Price, Walter William	Worcester.
Priestley, Lawrence	Nottingham.
Rodgers, Ivo Frederick Joseph	Stafford.
Roe, George	London.
Rose, Joseph Gandy	Buxton.

18th.—Twenty-five candidates were examined. *Twelve* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Batty, Charles	Glossop.
Hughes, Thomas Edward	Newtown.
Jacques, Sidney Paul	London.
Jeffcoat, Joseph George	London.
Lawrenson, John	Radcliffe.
Marsden, Prosper Henry	Manchester.
Norman, Edwin	Ripley.
Page, William Irwin	London.
Rhodes, Alfred Barrett	Manchester.
Roper, Frederick Alfred	Plymouth.
Scott, Claude W. Lascelles	Ulverston.
Talintyre, William John	Stockton-on-Tees.
Taubman, Frank Mowbray	London.

19th.—Twenty-eight candidates were examined. *Sixteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dryden, Thomas	Landore.
Smales, Alfred John	Darlington.
Turver, Charles Henry	Newark.
Venning, William	Pyworthy.
Vincent, William	Truro.
Waterhouse, Albert	East Bierley.

Watkinson, William Harrison...Farnworth.
Watt, John Charles ....Darlington.
Westlake, George Frederick...London.
Wilson, James Beetham ......Nottingham.
Wyatt, Alvan Lovell ....Stourbridge.
Wynne, William Arthur.........Mold.

PRELIMINARY EXAMINATION.

19th.—Certificates by an approved examining body were received from the undermentioned in lieu of the Society's examination:—

Le Cudennec, Louis Edouard...Mauritius.
Tuffin, Alfred Henry ....Sherborne.

The Report of the College of Preceptors on the examination held on July 9 was received.

Three hundred and fifty-seven candidates had presented themselves for examination, of whom *one hundred and ninety-nine* had failed. The following *one hundred and fifty-eight* passed, and the Registrar was authorized to place their names on the Register of Apprentices or Students:—

Adan, James Watt ....Aberdeen.
Armitage, Nathaniel Newborn.Armley.
Atkinson, Thomas Cawood ...Driffield.
Ball, William Titus...............Swansea.
Barclay, Robert Wilson.........Banff.
Barker, John Faulkner ....Milnthorpe.
Bidie, Francis William.........Banbury.
Black, John.. ....Aberdeen.
Bloomfield, Edwin James......Leamington.
Bond, John Henry Price ......Coleford.
Bowden, William ....London.
Bray, George Thomas ....Lincoln.
Brooks, John William ....Bolton.
Buckingham, Harry ....Coventry.
Burch, Libbis Napier......... ..Wigan.
Burnett, Thomas....... ....Lytham.
Bygott, Henry Walter ....Brigg.
Chester, Charles Henry... .... Kettering.
Clark, Henry Goldspink ......Lowestoft.
Cole, Beatrice ....London.
Collier, Frederick Tames ...... Birmingham.
Corfe, John Martin...............Maidstone.
Cousins, George Herbert ......Ambleside.
Curry, Ralph Shield ....Sunderland.
Cuthbertson, Thos. Maitland...Lostwithiel.
Darby, Herbert Christopher...London.
Denton, George Clark ....Hull.
Dickins, Frederick...............Bridlington Quay.
Dickson, Thomas George ......Montrose.
Dixon, John William............Milnthorpe.
Dixon, Rowland ....Sheffield.
Dumper, Lewis.....................Newbury.
Duncan, James ....Leeds.
Duncan, James Alexander ...Dundee.
Edwards, Henry Vercoe.........Redruth.
Evans, Evan Lewis................Llandyssul.
Eyre, Sidney........... ....Sheffield.
Fairlee, Alfred James............Carlisle.
Flood, Fanny ....London.
Forrest, Thomas Wotherspoon.Leith.
Forrester, Joseph .... Stoke-on-Trent.
Fortune, William ....Aberdeen.
Freeman, Alfred Percy ....Manchester.
Frost, John Ernest...............Worthing.
Gee, Alfred Charles...............Redruth.
Glendinning, Charles Crerar...Langholm.
Gooden, William Henry.........Duddingston.
Grant, George Brown............Fochabers.
Gregory, Herbert William......Lincoln.
Hamilton, Andrew ....Forres.
Hampton, William Henry......Cheltenham.
Hardman, James Chevalier ...Leeds.
Hardy, Samuel............... . ...Liverpool.
Haywood, Herbert ....Coventry.
Heden, Joseph Henry............Kineton.
Hemming, John Wilson.........Wolverhampton.
Henderson, Andrew Webster...Aberdeen.
Hill, Richard Barker ....Howden.
Hole, John Beeston...............Mansfield.
Holt, William ....Dukinfield.
Homan, Charles Edward ......Maindee.
Hughes, David............ ....Bath.
Ibbotson, Oswald..................Wakefield.
Imlay, Charles Wilson ....Banff.
Jewson, William Thomas N....Long Eaton.
Johnson, Herbert..................Normanton.
Johnson, James ....Wigan.
Johnson, William Arthur ......London.
Jones, David Thomas............Llanidloes.
Jones, John Edmund ....Kilnhurst.
Jones, John Philip ....Holywell.
Jones, Robert ....Sarn.
Jones, William Miall ....Aberystwith.
King, Charles Edward ....Berkhamsted.
Kirkpatrick, John Donaldson...Teignmouth.
Knight, George Thomas.........Halesowen.
Laidlaw, Daniel ....Hawick.
Last, Ernest Charles ....Ipswich.
Latham, William..................Nantwich.
Latham, William Henry ......Wigan.
Leighton, Alexander ....Aberdeen.
Logan, James ....Peterhead.
Long, Herbert Samuel A. ......Lowestoft.
Longley, John William Percy...Leeds.
Male, Elliott William Graves...Soham.
Mallinson, Fred. ....Liversedge.
Mannox, Lizzie Greener.........Birmingham.
Martin, Hugh Gray ....Peterhead.
Massingham, Arthur Edward...Lowestoft.
Mather, Mary Sophia............Clifton.
Matthews, Robert John.........Penzance.
Maxwell, Arthur Thomas ......Gateshead.
Mays, Sydney Walter............Nottingham.
Moore, Arthur ....Rotherham.
Morris, George Hy. Actæon ..Bridgnorth.
Mundell, Stephen ....Leeds.
O'Brien, John Thomas ....Wigan.
Osborne, Arthur Ralph ....Stony Stratford.
Parry, John ....Llandyssul.
Paterson, Andrew John Kidd...Dundee.
Pattison, Herbert George ......Shrewsbury.
Petrie, John M. ....Arbroath.
Pickworth, George Boyer ......Congleton.
Preston, James Bateson.........Oxenhope.
Reed, William Herbert . ...Bristol.
Reekie, Balfour ....Glasgow.
Reekie, Thomas ....Woolwich.
Rees, John Samuel...............Carmarthen.
Richmond, Edmund ....Sittingbourne.
Robertson, Sidney ....Norwich.
Robertson-Macdonald, Margaretta...London.
Robson, John Thomas ....London.
Ross, Alexander ....Kirriemuir.
Samuels, Herbert Geo. Lewis...Bath.
Sanderson, Joseph ....Glasgow.
Sandlin, Henry.....................Maidstone.
Sargeant, Fred. Pilkington ...Chorley.
Sawyer, Robert Bowlby.........Hull.
Scott, George L. ....Hawick.
Seymour, William Herbert ...London.
Shackleton, George Harry......Abergavenny.
Shearn, Ernest Henry............Thetford.
Sime, Lewis .... Rothes.
Simpson, Herbert ....West Hartlepool.
Simpson, John Fenwick ....Newcastle-on-Tyne.
Smith, Charles Henry............London.
Smith, George William ....Oakham.
Smith, Thomas..... ....Hull.
Smith, Thomas Mathie ....Musselburgh.
Smith, William Edgar ....Hyde.
Snelling, Edith Harriet.........London.

Spencer, Robert Shenstone	London.
Sproat, Samuel Cowan	Castle Douglas.
Spurrier, William Edward	Colchester.
Staddon, Henry James	Gillingham.
Stewart, Mary Ariel	Cheltenham.
Stuttard, Thomas	Burnley.
Taylor, Frederick Haydn	London.
Taylor, John Henry	Newcastle-on-Tyne.
Taylor, John Ratcliffe	Workington.
Taylor, William	Accrington.
Troup, Alexander Stephen	Fyvie.
Turner, Alfred William	Westbury-on-Severn.
Tutt, George Francis	Ashford.
Waddington, Joseph Edwd. G.	Manchester.
Wade, John	Seaham Harbour.
Walker, Helen Charlotte	Malvern Link.
Wass, Charles	Wellingborough.
Watts, Herbert	Darnall.
Watts, William Clarke	Foulsham.
Whitton, Andrew Crichton	Dundee.
Williams, Richard John	Carmarthen.
Willson, Robert Wherry	Peterborough.
Wilson, Robert Hanbury	Stourbridge.
Winston, William Ripley	Ulverston.
Woolfenden, Thomas	Rochdale.
Woollen, John James	Taunton.
Wynn, Herbert Alfred	Melton Mowbray.

The questions set at this examination were published in the *Pharmaceutical Journal* for July 13, p. 29.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	20	11	9	Lancaster	7	4	3
Birmingham	19	8	11	Leeds	21	9	12
Brighton	2	1	1	Lincoln	2	2	0
Bristol	9	4	5	Liverpool	11	3	8
Cambridge	6	1	5	London	45	15	30
Canterbury	7	3	4	Manchester	28	15	13
Cardiff	6	2	4	Newcastle-on-T.	14	5	9
Carlisle	13	4	9	Northampton	6	3	3
Carmarthen	10	6	4	Norwich	8	7	1
Carnarvon	6	1	5	Nottingham	9	4	5
Cheltenham	6	4	2	Oxford	2	1	1
Darlington	1	1	0	Peterborough	3	1	2
Douglas	1	0	1	Sheffield	12	5	7
Dundee	13	6	7	Shrewsbury	5	4	1
Edinburgh	19	5	14	Southampton	7	3	4
Exeter	6	2	4	Truro	8	4	4
Glasgow	5	2	3	Worcester	4	3	1
Hull	11	7	4	York	2	0	2
Inverness	3	2	1				

COUNCIL PRIZES EXAMINATION, 1889.

I. PEREIRA MEDAL (SILVER); and Books of the value of £5 presented by Mr. T. H. Hills.

II. PHARMACEUTICAL SOCIETY'S MEDAL (SILVER); and Books of the value of £3, presented by Mr. T. H. Hills.

III. PHARMACEUTICAL SOCIETY'S MEDAL (BRONZE); and Books of the value of £2, presented by Mr. T. H. Hills.

The following are the questions that were set at the Council Prizes Examination held on Thursday, July 25:

BOTANY AND MATERIA MEDICA.

Time—10 a.m. to 1 p.m.

Botany.

1. Define a cystolith, globoid and crystalloid and indicate how the presence of the two latter may be demonstrated in the same cell.

2. State in what way a Diatom differs from a Desmid.

3. State two views as to the constitution of Lichens.

4. How would you proceed with a species of the Umbelliferæ with a view to refer it to its place in the order?

5. Write a short article on Cross fertilization and its effect on Species.

Materia Medica.

1. A vegetable substance under examination has been treated successively with the following solvents:—Petroleum Ether, Pure Ether, Absolute Alcohol, Water, Dilute Solution of Soda, Dilute Hydrochloric Acid. State what proximate principles may be removed by each solvent.

2. Name some of the products of the genus Citrus; and give two methods for procuring Oil of Lemons, stating which method yields the more valuable product.

3. Write a short description of Strophanthus and give percentage of active principle.

4. Give the method of preparing Euonymin and state principal adulterations.

Chemistry.

Time: 2 to 5 p.m.

1. Describe in detail the process by which the composition of water by weight has been determined.

2. Zinc and magnesium are regarded as belonging to the same chemical group, but are placed in different ones for the purposes of qualitative analysis; give reasons for their position in each case.

3. What impurities should you expect to find in commercial phosphate of lime? How should you determine the proportion of real tricalcic phosphate?

4. Give a short account of the periodic law, and discuss its bearing on future chemical research.

5. What is the result of passing chlorine through (1) excess of ammonia, (2) aldehyde, (3) acetic acid.

6. What is naphthalin? Give its graphic formula. How is benzoic acid prepared from it?

7. One gram of a substance gives on combustion 1·466 grams carbon dioxide 0·599 gram water—find its percentage composition and empirical formula. What methods would you adopt in order to determine the rational formula of a compound of which the empirical formula was known?

EXAMINATIONS IN EDINBURGH.

July 17, 18, 23 and 24.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Nesbit, Maben and Stephenson.

Professor Sir Douglas Maclagan was present on the 24th, on behalf of the Privy Council.

MAJOR EXAMINATION.

17*th.*—*Three* candidates were examined. *One* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Brown, James Joseph	Perth.
Robertson, William George	Jedburgh.

MINOR EXAMINATION.

17*th.*—*Eleven* candidates were examined. *Four* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Anderson, James Grant	Aberdeen.
Archibald, David	Kelso.
Bell, Peter	Edinburgh.
Bethune, Andrew Wright	Lochgelly.
Brown, John	Edinburgh.
Buckley, Herbert	Stalybridge.
Buckley, John William	Stalybridge.

18*th.*—*Thirteen* candidates were examined. *Five* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cumming, John	Aberdeen.
Dods, John Henry	Market Deeping.
Ellis, Jeremiah	Batley.
Farthing, George Thompson	Spennymoor.
Findlay, James	Edinburgh.
Forster, James	Musselburgh.
Hadden, Alexander	Aberdeen.
Hughes, Edmund W. Crawford	Holywell.

23rd.—*Thirteen* candidates were examined. *Ten* failed. The undermentioned *three* passed, and were declared qualified to be registered as Chemists and Druggists:—

Harbottle, Bernard	Alnwick.
Montgomery, John Stuart	Southampton.
Robbie, Charles Thain	Aberdeen.

24th.—*Twelve* candidates were examined. *Seven* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Heywood, William	Heywood.
Speedie, Robert	Edinburgh.
Taylor, William	Macclesfield.
Thomas, David	Brynaman.
White, William Stokoe	Skipton.

Proceedings of Societies in London.

ROYAL COLLEGE OF PHYSICIANS.

[CROONIAN LECTURE.]

RELATION BETWEEN CHEMICAL STRUCTURE AND PHYSIOLOGICAL ACTION.

BY T. LAUDER BRUNTON, M.D., F.R.S.

(*Continued from page* 55).

Acids as Hypnotics.—The presence of any substance which will tend to increase the formation of acid in the nerve cells ought therefore to have a hypnotic or even an anæsthetic action. Now, according to Binz, this actually occurs, and chlorine, bromine, iodine, ozone and nitrites have all a more or less hypnotic action. The fumes of chlorine, bromine or iodine, inhaled by a frog causes paralysis of the nerve centres, without any previous convulsions, and this paralysis is due to their action on the protoplasm of the nerve centres, according to Binz. On account of the local irritant effect upon the respiratory passages and the alteration they occasion in the blood they cannot be brought in contact with the nerve centres of mammals in the same way as with those of the frog, and therefore they cannot be employed as anæsthetics; but, nevertheless, they tend to exert a similar action in mammals, and when combined with alkyls they tend greatly to increase their anæsthetic action.

Action of Halogens on Muscle.—But I have already mentioned that the same process of contraction or partial coagulation which leads to anæsthesia occurs also, though to a much smaller extent, in the muscles, and the presence of halogens, chlorine, bromine and iodine appears to increase the effects of an alkyl upon the muscles more than it does on the nerve centres.

Thus, the haloid combination of the alkyls, although they are more rapid anæsthetics, tend also to affect muscles, and more especially the heart, in a greater degree than those compounds from which they are absent. A similar tendency to paralyse muscular fibre, both in the limbs and the heart, was noticed by Cash and myself to be produced by combination of the halogens, and particularly iodine and bromine, with ammonia or compound ammonias.

Halogen Compounds as Anæsthetics.—The introduction of the halogens into anæsthetics, therefore, tends to increase the risk attending their use, but at the same time increases their anæsthetic power, and renders them more convenient. A knowledge of the chemical structure of an anæsthetic will thus give us a clue to its advantages and disadvantages, but only actual experiment can decide its practical value.

Limitation in Choice of Anæsthetics.—But the application of any substance as an anæsthetic must not only be possible, it must be convenient and it must be safe. Thus our choice of substances practically useful as anæsthetics from amongst the innumerable substances of the alcoholic group is limited.

Convenience.—In order to be convenient, they must fulfil a good many requirements. They must be easily carried about, and must be readily applied without apparatus; they must not cause much struggling on the part of the patient; they should not take too long to produce anæsthesia, nor should the anæsthetic state last either too short or too long a time; they should not give rise to prolonged discomfort after their anæsthetic action has ceased.

Safety.—In order to be safe they should not have any marked tendency to paralyse the heart. All anæsthetics tend to paralyse the nervous system, beginning within the highest or most volitional centres in the cerebrum, and ending with the lowest or most automatic centres in the medulla oblongata. Hence, if they are pushed far enough, they will all paralyse the respiratory centre and stop the respiratory movements; but these can readily be imitated artificially, and the blood can thus be kept aërated and the tissues supplied with oxygen until the anæsthetic has been either destroyed or sufficiently eliminated from the respiratory centre to allow it to regain its activity. The case is quite different when the heart stops; for then the supply of oxygen in the tissues entirely ceases. The anæsthetic is not eliminated nor destroyed, and the processes of life are arrested. Mechanical stimulation may help the heart to make a few feeble beats, and if artificial respiration be kept up actively so that blood charged with oxygen reaches the left ventricle, it may resume its activity. Nevertheless, stoppage of the heart is much more dangerous than stoppage of the respiration, and those anæsthetics which tend to enfeeble the heart are more dangerous than those which do not.

Inflammability.—In order to be safe in operations where a light is required, or where the actual cautery is to be used, the anæsthetic must not be too inflammable. This objection does not apply if there is no chance of the anæsthetic taking fire, but it may preclude the use, under certain circumstances, of an anæsthetic like ether, which might otherwise be suitable.

Bulk.—The gaseous form used to be very unsuitable for anæsthetics on account of the cumbrous apparatus required. Since the plan has been adopted of compressing the gas into steel or iron bottles, the difficulty is much lessened, although not entirely got rid of, and nitrous oxide is constantly administered now, although it cannot be carried about so conveniently as ether or chloroform. Their gaseous nature was formerly a serious objection to the lower hydrocarbons of the alcohol series, methane, ethane, and propane, all of which are permanent gases, and to butane, which boils at 1°, and is thus a gas at ordinary temperatures. This objection would be obviated by using them in a compressed form like nitrous oxide.

Their inflammability, like that of ether, may preclude their use under certain circumstances, and possibly the cold generated by their expansion may also prove an obstacle to their employment, yet it is possible that they might be usefully employed instead of nitrous oxide, along with ether, chloroform, or other anæsthetics higher in the series.

In 1849 Nunnely, of Leeds, in a letter to the *Lancet*, suggested the use of ordinary coal gas as a safe and convenient anæsthetic, notwithstanding its disagreeable smell. It has never come into general use, but it has quite recently been recommended as a sedative in whooping-cough.

Relation between Chemical Structure and Physio-

logical Action of Anæsthetics.—The physiological action of carbon compounds was investigated by B. W. Richardson, in a most valuable and important research, in which he compared the action of higher and lower members in the alcoholic series, and examined the alteration produced in their action by the introduction of different radicals, such as chlorine, bromine and iodine.

As the results of his investigations he objects to gases on account of the difficulty of administering them, the short duration of their action, and the asphyxia they would produce if administered for a length of time; solids are impracticable, and the anæsthetic must therefore be fluid. The fluid should be homogeneous, as mixtures are unreliable; it should be stable, and not easily decomposed by heat or light; it should have a pleasant smell and cause no irritation when applied to the skin. The boiling point should not be too low, because those boiling under the temperature of the body must be used like gases to the exclusion of air, and those whose boiling point is too high remain long in the body, causing nausea and depression. These conclusions, although they seem *a priori* to be sound, have not quite been borne out by practical experience, for, according to them, chloroform is objectionable, as it irritates the skin, causes vomiting, and is too slowly eliminated. Ether also is objectionable, as having too low a boiling point, and requiring to be used like a gas to the exclusion of air. Nevertheless these two substances are practically the best anæsthetics we have got yet.

HYPNOTICS.

Physiology of Sleep.—In healthy sleep the person becomes unconscious of the external world, voluntary action ceases, and even the automatic centres for the respiration and circulation act less energetically, so that the breathing becomes slow, the pulse quiet, and the vessels tend to dilate. This dilatation of the vessels may be so well marked that it causes the feet to swell, and renders a pair of well-fitting boots too tight. At the same time it makes one more liable to be chilled by exposure to external cold while asleep than while awake. This condition of the vessels has been regarded by some as the cause of sleep rather than its consequence, for the two principal theories to explain sleep are, first, that it depends upon anæmia of the brain; and secondly, that it is due to an exhausted or inactive condition of the brain-cells.

Condition of the Nerve Cells.—In all probability, the truth is that it depends upon the condition of the brain cells, but this is so much influenced by the circulation that frequently the condition of sleeping or waking will depend entirely upon the cerebral circulation. We shall understand this more easily by referring again to Ehrlich's experiments upon oxidation and reduction in the tissues. You will remember that the grey substance of the brain is possessed of a great power of reduction, as shown by the readiness with which it reduces aniline colours after death, but during life the necessity for oxygen is so great that it retains within it a sufficient quantity of stored up oxygen to prevent such reduction taking place under ordinary circumstances. But if its functional activity be augmented by stimulation its store of oxygen is used up, and thus it becomes ready at once to reduce. Its very activity, however, gives rise to the formation of acid products which lessen its reducing power, so that the mere supply of fresh oxygen would not be sufficient to restore it to its previous condition unless the acid were neutralised.

Effect of Arterial Blood.—Arterial blood supplies both these requirements, neutralising the acid and giving off oxygen to the brain cells. Thus, in some conditions of the brain simple increase in the supply of arterial blood will restore functional activity and cause wakefulness, while diminished supply will produce sleep.

Effect of Position.—This has been beautifully shown by Friedländer in a research on the hypnotic properties of isopropyl alcohol. Here the condition of sleeping or waking was simply determined by the position of the animal. If it were held up by the legs so as to increase the supply of blood to the head, it at once awoke, but when held up by the ears it immediately fell asleep. By alternating the positions sleeping and waking could be induced at will. We see the same effect of the circulation in man, more especially in debilitated subjects; some people with feeble tension tend to fall asleep even while standing up, and do so at once on sitting down, and yet are very wakeful in the horizontal position.

Effect of Food.—We very frequently find that people tend to fall asleep after a hearty meal. It is possible that this may be partly due to the absorption of certain digestive products, which may act as soporifics, but it is probable that the dilatation of the gastric and intestinal vessels has much to do with the production of sleep, by drawing away blood from the brain.

Effect of Cold.—We know, too, that cold, unless very intense, tends to prevent sleep, and we see that it also causes contraction of the superficial vessels. It seems probable, therefore, that it prevents sleep in a great measure by driving the blood from the surface of the body to the brain. We cannot see the intestinal vessels, but we know that the abdominal walls are thin in front, and it is almost certain that external cold will act through the adbominal walls on the intestinal vessels, and cause them to contract likewise. Such contraction will also drive the blood to the brain, and tend to prevent sleep, but warmth to the abdomen will tend to relax them and induce sleep. This is probably the reason why dogs, before going to sleep, curl themselves up, so that their abdomen is kept warm by their limbs, and men do the same thing when exposed to cold.

Effect of High Tension.—In cases where the blood tension is high, as in chronic Bright's disease, we often find troublesome insomnia, whereas in cases of debility with low tension, we often find troublesome drowsiness. The condition of the circulation is, therefore, a most important factor in the production of sleep, but it will by itself no more explain completely the insensibility of sleep than it will that of anæsthesia.

Action of the Products of Tissue Waste on the Brain.—We must now turn to the condition of the brain cells themselves. As Ehrlich has shown, the acid products of their functional activity tend to lessen their reducing power, or, in other words, their power of absorbing oxygen. But it is highly probable that other products of tissue change, either in the brain itself or in the rest of the body, have a similar power to that of acids upon the brain cells.

Products of Tissue Waste by Day and by Night.—At all events, Bouchard has found that the toxic substances excreted in the urine during the day have a soporific action, while those excreted during the night have a stimulating action.

Self-Regulating Mechanism of Sleeping and Waking.—It would thus appear that there is a sort of self-regulating mechanism in the body by which sleeping and waking are made to alternate. During the waking hours soporific products are formed, and these, gradually accumulating, will by-and-by induce sleep, while during sleep stimulating products are formed which, after a certain number of hours, will stimulate the brain to wakefulness.

Voit's Observations.—Now Voit found that during the waking hours more carbonic acid is given off, while during sleep the reverse is the case, and more oxygen is absorbed than carbonic acid eliminated. It is therefore evident that during waking, the organism as a whole is an oxidising agent, while during sleep it is acting as a reducing agent.

Nature of Leucomaines formed during Sleep and

Waking.—We might therefore expect the products of the waking hours, those products which have a soporific action, to be more highly oxidized, while those of sleep, which have a stimulating action, would be rather products of reduction. The chemical constitution of these products still requires investigation, but we know that amongst the substances resulting from tissue waste there is a group of bodies closely allied to urea and uric acid. Amongst these is xanthine, the chemical constitution of which will appear from the graphic formula.

Relationship of Tea, Coffee and Cocoa to Products of Tissue Waste.—Xanthine is closely allied to theobromine, the active principle of cocoa, and caffeine of tea and coffee, for the former is dimethyl, and the latter is trimethyl xanthine. The stimulating effect upon the brain of cocoa, and to a still greater degree of tea and coffee, is universally known. This stimulating action would lead us to regard them as belonging to the class of products formed during sleep. During the waking hours we might reasonably expect that the substances formed, at least in the early part of the day, would have no narcotic action, even although they should be products of oxidation, but as the day went on the products of waste might gradually assume a more and more soporific character, until in the evening they again produced sleep. If this were so, we might naturally expect that by oxidation of some of the stimulant substances I have mentioned we might get products having no very marked physiological action, and others having a narcotic action.

Production of Narcotics from Stimulants.—This is the case, at least with caffeine, for while hydroxy-caffeine has still a stimulating action it is less powerful than caffeine, caffeine-methylhydroxide seems to have neither stimulating nor soporific action, but ethoxy-caffeine acts as a soporific instead of a cerebral stimulant like caffeine itself.

Sub-divisions of Hypnotics.—It will be noticed that in the last-mentioned substance, ethoxy-caffeine, we have a compound of a radical, belonging to the alcoholic series, with one in which ammonia plays a prominent part. These two constituents are examples of two classes of soporifics, and a convenient sub-division of the class is into (1) substances belonging to the alcoholic group; (2) substances allied to urea or uric acid.

CHANGES IN THE BRAIN CELLS DURING SLEEP.

Let us now turn from the products of tissue waste which may act upon the brain, to consider what changes the brain cells undergo during sleep. I have already entered so fully into the subject, when speaking of anæsthetics, that all I need do now is simply to remind you that hypnotics may probably lessen the functional activity of the cerebral cells (1) by causing their protoplasm to contract, and thus interposing a barrier of paraplasm between it and the oxygen brought by the blood, and (2) by lessening the affinity of the cells for oxygen by diminishing their alkalinity, or by entering into actual combination with them for a time, and thus altering their chemical relationships. The products of tissue waste in the brain cells appear to be of acid nature and therefore lessen oxidation, but, as Preyer has suggested, lactic acid is a product of muscular waste, and if much of it be formed in consequence of violent or prolonged exertion, it will pass into the circulation and tend to lessen the alkalinity of the brain as well as other tissues, and sleep might therefore be induced by a long walk, where acid is formed in the limbs, as well as by prolonged mental work, where the acid is a product of the brain.

Carbonic Acid and Deficient Oxygen.—One of the final products of tissue waste is carbonic acid, and this likewise has a soporific and anæsthetic action. One is usually accustomed to associate carbonic acid poisoning with convulsions; but from careful researches on this point, it would appear that these are not due to the presence of carbonic acid but to the absence of oxygen. It would thus seem that deficient oxidation in cases of suffocation produces in a few minutes intense stimulation of the nerve centres, while the lessened oxidation occurring in sleep has a similar but much slighter effect in the course of several hours. It is probable that in both cases the stimulation which gives rise in the one case to waking and in the other to convulsions is immediately caused by products of tissue waste.

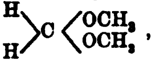
Close Rooms: Sleeping in Church.—The drowsiness which comes on in a confined atmosphere is probably of complex origin, and, while external warmth may assist it and carbonic acid also be an important factor in its production, it is not unlikely that volatile poisons excreted from the lungs and skin may help to cause it. Carbonic acid in the cells of the cerebral cortex may, like other acids, lessen their affinity for oxygen, and thus in itself diminish their functional activity. But it may have a still more powerful action indirectly if certain substances are present in the blood, and more especially organic compounds containing chlorine, bromine, or iodine; for it may decompose these compounds and liberate hydrochloric, hydrobromic, or hydriodic acids within the nerve tissue itself. These will exert a much more powerful action than the carbonic acid. It is probable that some decomposition occurs when the sodium salts of an organic acid are introduced into the circulation, and thus sodium lactate may have a soporific action as well as lactic acid itself. Sodium, propionate, butyrate, and valerianate have also a narcotic action, increasing in strength with the rising number of carbon atoms contained in each.

BODIES OF THE ALCOHOLIC SERIES AS HYPNOTICS.

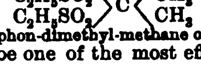
Alcohols.—The action of alcohol as a soporific is widely known, and the practice of taking a glass of hot water and spirits as a "night cap," is far from uncommon. The success of this plan would naturally lead one to look amongst the alcohols in the higher series for some substance which would be still more powerful, and might be given in smaller doses. The narcotic power of the alcohols increases as we ascend in the series, and the sopor induced by them is also of longer continuance. There is only one methylic and ethylic alcohol, but there are two propylic, four butylic, and eight amylic. The number of possible isomeric alcohols having the same chemical composition, though differing in constitution, increases rapidly as we ascend in the series. There are three divisions of alcohols, namely: (1) Primary, (2) secondary, and (3) tertiary, according as the carbon atom to which the hydroxyl is attached is united to one, two, or three radicals.

Amylene Hydrate.—Tertiary amyl alcohol, or, as it is often called, amylene hydrate, was recommended by Schmiedeberg as a hypnotic, and it has lately been introduced into practice by von Mering. It is said to be intermediate between chloral and paraldehyde, safer than either, and not likely to disturb the digestion. When we consider that the next number of the series above amyl, namely, hexyl, may yield thirty-eight alcohols, and that thirteen of those are actually known, we can readily see what a possible field there is for the introduction of new hypnotics.

ETHERS AS HYPNOTICS.

Methylal.—The ethers are as a rule very volatile, and are more used as anæsthetics than hypnotics. One of them, methylene-dimethyl-ether, or methylal or formal,  $\begin{matrix} H \\ H \end{matrix}\!>C<\!\begin{matrix} OCH_3 \\ OCH_3 \end{matrix}$, has recently been recommended as a soporific. Its rapid elimination, however, renders it somewhat unsuitable, and in addition to this, patients appear to become very quickly accustomed to its use, so that the dose has to be constantly increased.

Sulphonal.—The chemical name of this substance is diethyl-sulphon-dimethyl-methane. This long name shows that it consists of methane, or marsh gas, $\begin{smallmatrix}H\\H\end{smallmatrix}\!\!>\!C\!<\!\!\begin{smallmatrix}H\\H\end{smallmatrix}$ or CH_4, in which atoms of hydrogen are replaced by methyl, CH_3, thus: $\begin{smallmatrix}H\\H\end{smallmatrix}\!\!>\!C\!<\!\!\begin{smallmatrix}CH_3\\CH_3\end{smallmatrix}$. But this is not all, for this body only corresponds to the last half of the name, and is dimethyl methane. It resembles methylal to a certain extent, only the two methyl groups are connected directly with the carbon of the original methane instead of the connection being effected by means of oxygen in methylal. In order to complete the structure of sulphonal we must replace the other two atoms of hydrogen by ethyl: but if these were connected directly to the carbon in the same way as the two methyls are, we should get diethyl-dimethyl-methane $\begin{smallmatrix}C_2H_5\\C_2H_5\end{smallmatrix}\!\!>\!C\!<\!\!\begin{smallmatrix}CH_3\\CH_3\end{smallmatrix}$. But in sulphonal the connection of the two ethyls is effected by the SO_2 group, which plays a part like that of O in methylal in connecting alkyls with the carbon. We thus get



$$\begin{smallmatrix}C_2H_5SO_2\\C_2H_5SO_2\end{smallmatrix}\!\!>\!C\!<\!\!\begin{smallmatrix}CH_3\\CH_3\end{smallmatrix}$$

Diethyl-sulphon-dimethyl-methane or sulphonal.

This appears to be one of the most effective of all the newly introduced hypnotics, and although it does not, like morphine, compel sleep, it induces sleep in a pleasant manner, and has few disagreeable after-effects and little or no danger.

ALDEHYDES AS HYPNOTICS.

Paraldehyde.—Aldehydes have a strongly irritant action upon mucous membranes, and this is a great objection to their use as hypnotics. But they have a power of uniting with themselves, or polymerising, as it is termed, and these polymeric forms are less irritant. Ethylic aldehyde unites with itself, and when three molecules of it combine it forms paraldehyde. When several molecules, the number of which is unknown, combine it forms metaldehyde. Paraldehyde forms a useful hypnotic, which does not depress the action of the heart like chloral, and does not give rise to discomfort next day. The chief objection to it is its unpleasant smell, which it imparts to the breath and which hangs about the patient for many hours.

Ketones as Hypnotics: Hypnone.—In aldehyde we have the group CO, attached on the one side to a radical, and on the other to hydrogen; in ketones it is attached on both sides to a radical. When this radical consists on both sides of methyl, we obtain the ketone known as acetone. This substance has received much attention on account of its having been found in the blood of diabetic patients, and it is suspected of causing diabetic coma; it produces intoxication and sleep, but it is less powerful than ether or chloroform. Lately a compound, in which the aldedyde group is attached on the one side to methyl and on the other to phenyl, has been introduced by Dujardin-Beaumetz. Its chemical name is phenyl-methyl-acetone or phenyl-methyl-ketone. It has received the name of hypnone, but as it is quite clear that a very large number of ketones may have a hypnotic action, it is much better to give each its chemical name; for we may connect any radical—ethyl, butyl, propyl, etc.—to one or both sides of the CO group, and therefore the number of possible ketones is almost innumerable. When we consider that in addition to the ketones we have great possibilities amongst the alcohols and ethers, it is evident that a large number of hypnotics may be obtained from members of the alcohol series.

HYPNOTICS RELATED TO UREA.

But there is another class of hypnotics, namely, those in which nitrogen may be said to form the basis, and which are closely allied to urea and uric acid. Urea, or carbamide, consists of two atoms of amidogen, NH_2, united to carboxyl, CO, thus: $O\!=\!C\!<\!\!\begin{smallmatrix}NH_2\\NH_2\end{smallmatrix}$. When one atom of amidogen is replaced by hydroxyl, OH, we get carbamic acid, thus: $O\!=\!C\!<\!\!\begin{smallmatrix}NH_2\\OH\end{smallmatrix}$. This acid is not capable of independent existence, but its ammoniacal salt is familiar to us under the name of carbamate of ammonia. From its composition it seemed to Schmiedeberg likely that if carbonic acid were united to an alkyl, the alkyl would still continue to exert a narcotic action, while the NH_2, if it exerted any action, would tend to stimulate like ammonia. One would thus, he hoped, be able to get a hypnotic which would produce sleep, and in place of depressing the heart like chloral, would tend rather to stimulate it. Such a drug was likely to be useful in cases where, on account of cardiac feebleness, the administration of chloral might be dangerous. He accordingly tested the compound of carbamic acid with methyl and ethyl. The latter substance is called urethane, from its relationship to urea on the one hand and ethyl on the other.

The term "urethanes" has also been given to all the members of the series in which alkyls are combined in a similar fashion with carbamic acid. The anticipations which Schmiedeberg formed have been realised, and urethane is a useful hypnotic, although not so powerful as chloral. One would imagine that urethanes containing alkyls higher in the series than ethyl would be more powerful, but unfortunately they are less soluble, and thus are rendered less active by their slow absorption.

LOCAL ANÆSTHETICS.

In sleep, and to a still greater extent in the stupor produced by anæsthetic agents, impressions made upon the body may remain unfelt, although in the waking condition they might be painful. It frequently happens that we wish to prevent pain during a slight operation, or to relieve pain from some irritation without producing general stupor, and this we can sometimes do by means of local applications.

Cause of Pain.—The feeling of pain is undoubtedly due to some condition in the cerebrum itself, although it may be impossible for us to say where it is localised.

Tactile Centre.—The tactile centre has been located by Ferrier in the hippocampal region, and very probably the sensation of pain is also located here, for in some of his experiments I have seen a monkey in which this region has been destroyed give no evidence whatever of sensation, either tactile or painful, when the skin of the opposite part of the body was touched with a piece of wire sufficiently hot to make the animal jump when applied to the other side.

Peripheral Ends and Trunks.—As a rule the sensation of pain is awakened in the cerebral centre, wherever that may be, by stimuli applied to the peripheral ends of the afferent nerves. From these it is conveyed through the nerve trunks and spinal cord to the brain. There is a marked distinction between the sensibility of the peripheral ends and of the trunks of sensory nerves, the former being much more sensitive. On this account a stimulus applied to the skin may produce well marked sensation, although a similar stimulus applied to the nerve might not.

Removal of Pain.—Pain due to irritation of any part of the sensory tract may be abolished by destroying the irritability of the part to which the irritant is applied, or the conducting power of the path by which it ought to travel to the brain.

Freezing.—One mode of producing local anæsthesia is by freezing. This can be done by ice and salt, but it is much more convenient and effective by using the cold generated during the evaporation of a volatile liquid, or, still better, of a gas which has been liquefied by cold and pressure. The spray of anhydrous ether was for a long time the most convenient form of producing local anæsthesia by the application of cold, but for two or three years back chloride of methyl compressed into iron cylinders has been found still more convenient. Whatever the means used, however, care is necessary to avoid destroying the tissues and causing ulceration, and this method is, therefore, by no means without its disadvantages.

Carbolic Acid.—Another method is to apply to the surface some drug which will destroy the sensation, and this power is possessed in a marked degree by carbolic acid. When applied to the skin it passes through the epidermis, gives rise to a certain amount of burning, but produces such an amount of anæsthesia that boils may be opened without pain. Carbolic acid appears to have the peculiar power of irritating either peripheral ends or nerve centres, when applied to them, and also of completely destroying the power of conduction in sensory nerves, without causing any irritation in them.

Cresols.—A local anæsthetic power is also possessed by several bodies allied to carbolic acid, such as paracresol. These substances destroy the sense of pain but they do not destroy tactile sensibility. But carbolic acid coagulates albumen, and tends, like cold, to destroy the part to which it is applied, and causes ulceration. A similar objection applies to a cresol. But there are other substances also allied to carbolic acid, which are free from this objection. The most important of these is certainly cocaine.

Cocaine.—When this substance is boiled with water it splits up, yielding methylic alcohol, benzoic acid, and another substance, ecgonine. From ecgonine cocaine can again be built up by the addition to it of the radicals benzoyl, C_6H_5 CO, and methyl, CH_3. Ecgonine has no local anæsthetic action whatever, and in this it resembles tropine, which is a product of the decomposition of atropine.

Atropine.—Atropine splits up into tropic acid, and tropine, which has no local anæsthetic action, although atropine possesses it to a certain extent; but when tropine is combined with benzoic acid instead of tropic acid, the resulting benzoyl tropine, or homatropine, has a distinct local anæsthetic action.

Benzoyl Compounds.—This fact led Filehne to suspect that the anæsthetic property in cocaine probably resided in the benzoyl rather than in the ecgonine. Curiously enough, benzoyl ecgonine does not appear to have a distinct local anæsthetic action, although the addition of methyl, which converts it into cocaine, gives it this power in such an eminent degree. Yet Filehne's supposition is, to a great extent, correct, and he has found that the benzoyl derivatives of several substances have a marked local anæsthetic action. Amongst these are the benzoyl derivatives of morphine, hydrocotarnine, quinine, cinchonine, and methyl triacetonal-kanine. The latter has, next to benzoyl-tropine, most resemblance in its action to cocaine. Next comes benzoyl-quinine, and the weakest is benzoyl-morphine. Unfortunately, these substances, with the exception of benzoyl-tropine, have all an irritant action, which precedes their anæsthetic action, and when introduced into the eye they cause so much burning that they cannot be used as local anæsthetics. Benzoyl-tropine, although free from this objection, acts too much like atropine, and therefore is for many purposes inadmissible.

Anæsthetica Dolorosa.—The irritant action which a number of local anæsthetics possess has led Liebreich to divide local anæsthetics into two classes: those which cause local irritation and pain and those which do not. In a letter to the *Lancet*, I suggested that most of the substances belonging to the group of cardiac poisons, like digitalis, might have a local anæsthetic action. At that time I was unaware that they had nearly all been tested and found to have such an action by Professor Hoppe. However, they nearly all cause more or less irritation before producing their anæsthetic action, and are practically not available.

(*To be continued.*)

ROYAL INSTITUTION OF GREAT BRITAIN.

ALUMINIUM.*

BY SIR HENRY ROSCOE, M.P., D.C.L., LL.D., V.P.R.S.

(*Concluded from page 57.*)

Aluminium Manufacture.

I now come to the final stage of the process, viz., the reduction of the pure double chloride by sodium. This is effected, not in a tube of Bohemian glass, as shown in Mr. Barlow's lecture in 1856, but in a large reverberatory furnace, having an inclined hearth about 6 feet square, the inclination being towards the front of the furnace, through which are several openings at different heights. The pure chloride is ground together with cryolite in about the proportions of two to one, and is then carried to a staging erected above the reducing furnace. The sodium, in large slabs or blocks, is run through a machine similar to an ordinary tobacco-cutting machine, where it is cut into small thin slices: it is then also transferred to the staging above the reducing furnace.

Both materials are now thrown into a large revolving drum, when they become thoroughly mixed. The drum being opened and partially turned, the contents drop out into a car on a tramway directly below. The furnace having been raised to the desired temperature, the dampers of the furnace are all closed to prevent the access of air, the heating gas also being shut off. The car is then moved out on the roof of the furnace until it stands directly over the centre of the hearth. The furnace roof is provided with large hoppers, and through these openings the charge is introduced as quickly as possible. The reaction takes place almost immediately, and the whole charge quickly liquefies. At the end of a certain time the heating gas is again introduced and the charge kept at a moderate temperature for about two hours. At the end of this period the furnace is tapped by driving a bar through the lower opening, which has previously been stopped with a fire-clay plug, and the liquid metal run out in a silver stream into moulds placed below the opening. When the metal has all been drawn off, the slag is allowed to run out into small iron wagons and removed. The openings being again plugged up, the furnace is ready for another charge. From each charge, composed of about 1,200 lbs. of pure chloride, 600 lbs. of cryolite, and 350 lbs. of sodium, about 115 to 120 lbs. of aluminium is obtained.

The purity of the metal entirely depends upon the purity of the chloride used, and without exercising more than ordinary care the metal tests usually indicate a purity of metal above 99 per cent. On the table is the metal run from a single charge. Its weight is 116 lbs., and its composition, as shown by analysis, is 99·2 aluminium, 0·3 silicon, and 0·5 iron. This I believe to be the largest and the purest mass of metal ever made in one operation.

The result of eight or nine charges are laid on one side, and then melted down in the furnace to make a uniform quality, the liquid metal, after a good stirring, being drawn off into moulds. These large ingots, weighing about 60 lbs. each, are sent to the casting shop, there to be melted and cast into the ordinary pigs, or other shapes, as may be required for the making of tubes, sheets, or wire, or else used directly for making alloys of either copper or iron.

The following table shows approximately the quantity of each material used in the production of one ton of aluminium:—

Metallic sodium	6,300 lbs.
Double chloride	22,400 „
Cryolite	8,000 „
Coal	8 tons.

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* Read at a Weekly Evening Meeting, Friday, May 3.

To produce 6,300 lbs. of sodium is required:—

Caustic soda	44,000 lbs.
Carbide made from pitch, 12,000 lbs., and iron turnings 1,000 lbs.	7,000 lbs.
Crucible castings	2½ tons.
Coal	74 tons.

For the production of 22,400 lbs. double chloride is required:—

Common salt	8,000 lbs.
Alumina hydrate	11,000 „
Chlorine gas	15,000 „
Coal	180 tons.

For the production of 15,000 lbs. of chlorine gas is required:—

Hydrochloric acid	180,000 lbs.
Limestone dust	45,000 „
Lime	30,000 „
Loss of manganese	1,000 „

It might seem, on looking over the above numbers, as if an extraordinary amount of waste occurred, and as if the production is far below that which ought to be obtained, but a study of the figures will show that this is not the case. I would wish to call attention to one item in particular, viz., fuel, it having been remarked that the consumption of coal must prevent cheap production. I think when it is remembered that coal, such as used at the works, cost only 4s. per ton, while the product is worth £2,240 per ton, the cost of coal is not an item of consequence in the cost of production. The total cost of the coal to produce one ton of metal being £50, the actual cost for fuel is less than sixpence for every pound of aluminium produced. The ratio of cost of fuel to value of product is indeed less than is the case in making either iron or steel. In concluding my remarks as to the method of manufacture and the process in general, I may add that I do not think it is too much to expect, in view of the rapid strides already made, that in the future, further improvements and modifications will enable aluminium to be produced and sold even at a lower price than appears at present possible.

Properties of Aluminium.

In its physical properties aluminium widely differs from all the other metals. Its colour is a beautiful white, with a slight blue tint. The intensity of this colour becomes more apparent when the metal has been worked, or when it contains silicon or iron. The surface may be made to take a very high polish, when the blue tint of the metal becomes manifest, or it may be treated with caustic soda and then nitric acid, which will leave the metal quite white. The extensibility or malleability of aluminium is very high, ranking with gold and silver if the metal be of good quality. It may be beaten out into thin leaf quite as easily as either gold or silver, although it requires more careful annealing.

It is extremely ductile and may be easily drawn, especial care only being required in the annealing.

The excessive sonorousness of aluminium is best shown by example (large suspended bar being struck). Faraday has remarked, after experiments conducted in his laboratory, that the sound produced by an ingot of aluminium is not simple, and one may distinguish the two sounds by turning the vibrating ingot.

After being cast it has about the hardness of pure silver, but may be sensibly hardened by hammering.

Its tensile strength varies between 12 and 14 tons to the inch (test sample which was shown having been broken at 13 tons, or 27,000 lbs.), ordinary cast iron being about 8 tons. Comparing the strength of aluminium in relation to its weight, it is equal to steel of 38 tons tensile strength. The specific gravity of cast aluminium is 2·58, but after rolling or hammering this figure is increased to about 2·68.

The specific gravity of aluminium being 1, copper is 3·6, nickel 3·5, silver 4, lead 4·8, gold 7·7.

The fusibility of aluminium has been variously stated as being between that of zinc and silver, or between 600 to 1000° C.

As no reliable information has ever been made public on this subject, my friend, Professor Carnelley, undertook to determine it. I was aware, from information gained at the works at Oldbury, that a small increase in the percentage of contained iron materially raised its point of fusion, and it has been undoubtedly due to this cause that such wide limits are given for the melting point. Under these circumstances two samples were forwarded for testing, of which No. 1, containing ½ per cent. of iron, had a melting point of 700° C.; whereas No. 2, containing 5 per cent. of iron, does not melt at 700° and only softens somewhat above that temperature, but undergoes incipient fusion at 730°.

According to Faraday, aluminium ranks very high among metallic conductors of heat and electricity, and he found that it conducted heat better than either silver or copper. The specific heat is also very high, which accounts for length of time required for an ingot of the metal to either melt or get cold after being cast.

Chemically, its properties are well worthy of study.

Air, either wet or dry, has absolutely no effect on aluminium at the ordinary temperature, but this property is only possessed by a very pure quantity of metal, and the pure metal in mass undergoes only slight oxidation even at the melting point of platinum.

Thin leaf, however, when heated in a current of oxygen, burns with a brilliant, bluish-white light. If the metal be pure, water has no effect on it whatever, even at a red heat. Sulphur and its compounds also are without action on it, while, under the same circumstances, nearly all metals would be discoloured with great rapidity.

Dilute sulphuric acid and nitric acid, both diluted and concentrated, have no effect on it, although it may be dissolved in either hydrochloric acid or caustic alkali. Heated in an atmosphere of chlorine it burns with a vivid light, producing aluminium chloride. In connection with the subject it may be of interest to state the true melting point of the double chloride of aluminium and sodium, which has always been given at 170° to 180° C., but which Mr. Baker, the chemist to the works, finds lies between 125° and 130° C.

Uses of Aluminium.

Its uses, unalloyed, have heretofore been greatly restricted. This is, I believe, alone owing to its former high price, for no metal possessing the properties of aluminium could help coming into larger use if its cost were moderate. Much has been said as to the impossibility of soldering it being against its popular use, but I believe that this difficulty will now soon be overcome. The following are a few of the purposes to which it is at present put:—Telescope tubes, marine glasses, eyeglasses and sextants, especially on account of its lightness. Fine wire for the making of lace, embroidery, etc. Leaf in the place of silver leaf, sabre sheaths, sword handles, etc., statuettes and works of art, jewellery and delicate physical apparatus, culinary utensils, harness fittings, metallic parts of soldiers' uniforms, dental purposes, surgical instruments, reflectors (it not being tarnished by the products of combustion), photographic apparatus, æronautical and engineering purposes, and especially for the making of alloys.

Alloys of Aluminium.

The most important alloys of aluminium are those made with copper. These alloys were first prepared by Dr. Percy, in England, and now give promise of being largely used. The alloy produced by the addition of 10 per cent. of aluminium to copper, the maximum amount that can be used to produce a satisfactory alloy, is known as aluminium bronze. Bronzes, however, are made which contain smaller amounts of aluminium, possessing in a degree the valuable properties of the 10 per cent. bronze. According to the percentage of aluminium up to 10 per cent., the colour varies from red-gold to pale yellow. The 10 per cent. alloy takes a fine polish, and has the colour of jewellers' gold. The 5 per cent. alloy is not quite so hard, the colour being very similar to that of pure gold.

To arrive at perfection in the making of these alloys, not only is it required that the aluminium used should be of good quality, but also that the copper must be of the very best obtainable. For this purpose only the best brands of Lake Superior copper should be used. Inferior brands of copper or any impurities in the alloy give poor results. The alloys all possess a good colour, polish well, keep their colour far better than all other copper alloys, are extremely malleable and ductile, can be worked either hot or cold, easily engraved, the higher grades have an elasticity exceeding steel, are easily cast into complicated objects, do not lose in remelting, and are possessed of great strength, dependent, of course, on the purity and percentage of contained aluminium. The 10 per cent. alloy, when cast, has a tensile strength of between 70,000 and 80,000 lbs. per square inch, but when hammered or worked, the test exceeds 100,000 lbs. (A sample shown broke at 105,000 lbs.)

An attempt to enumerate either the present uses or the possible future commercial value of these alloys is beyond my present purpose. I may, however, remark that they are not only adapted to take the place of bronze, brass, and steel, but they so far surpass all of those metals, both physically and chemically, as to make their extended use assured.

But even a more important use of aluminium seems to be its employment in the iron industry, of which it promises shortly to become a valuable factor, owing to certain effects which it produces when present, even in the most minute proportions. Experiments are now being carried on at numerous iron and steel works in England, on the Continent, and in America. The results so far attained are greatly at variance, for whilst in the majority of cases the improvements made have encouraged the continuance of the trials, in others the result has not been satisfactory. On this point I would wish to say to those who may contemplate making use of aluminium in this direction, that it would be advisable before trying their experiments to ascertain whether the aluminium alloy they may purchase actually contains any aluminium at all, for some of the so-called aluminium alloys contain little or no aluminium, and this may doubtless account for the negative results obtained. Again, others contain such varying proportions of carbon, silicon, and other impurities, as to render their use highly objectionable.

It seems to be a prevailing idea with some people, that because aluminium is so light compared with iron, that they cannot be directly alloyed, and furthermore, that for the same reason, alloys made by the direct melting together of the two metals would not be equal to an alloy where both metals are reduced together. Now, of course, this is not the case, and the statement has been put forward by those who were only able to make the alloys in one way.

Aluminium added to molten iron and steel lowers their melting points, consequently increases the fluidity of the metal, and causes it to run easily into moulds and set there, without entrapping air and other gases, which serve to form blow-holes and similar imperfections. It is already used by a large number of steel founders, and seems to render the production of sound steel castings more certain and easy than is otherwise possible.

One of the most remarkable applications of this property which aluminium possesses of lowering the melting-point of iron has been made use of by Mr. Nordenfelt in the production of castings of wrought iron.

Aluminium forms alloys with most other metals, and although each possess peculiar properties which in the future may be utilised, at present they are but little used.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, June 20. Dr. W. J. Russell, F.R.S., President, in the chair, when the following papers were read:—

Observations on the Melting Point of some Salicylic and Anisic Compounds. By W. H. Perkin, Ph.D., F.R.S. —The author, after referring to his paper published in the Journal of the Society in 1867, in which methylated and ethylated salicyl aldehydes are described as nearly colourless fluids which do not solidify when cooled in a freezing mixture, and to the apparently contradictory results of Voswinckel (*Ber.*, 1882, 2024) —who states that methylated salicyl aldehyde is a solid melting at 35°—points out the curious fact that, although this latter aldehyde does not easily crystallize in a freezing mixture, it can be made to do so; the crystals, however, melt at about 2·7—3°. On evaporating an ethereal solution of the aldehyde, he obtained prismatic crystals, having the melting point given by Voswinckel, and it was found that if the oily aldehyde be touched with one of these it immediately becomes a solid mass having a melting point of 35°. On re-melting this solid and then cooling in a freezing mixture, crystals melting at 2·7—3° can again be obtained. It is therefore established that methylated salicyl aldehyde forms crystals of two kinds, having melting points differing by about 32°. Ethylated salicyl aldehyde can also be made to crystallize; the crystals melt at about 6° or 7°. Anisic aldehyde also crystallizes when cooled; although a para-compound, it melts at a lower temperature than either modification of methyl salicyl aldehyde, viz., at 0·02°. Ethylic anisate easily crystallizes (m. p. = 7°), but ethylic methylsalicylate has not as yet been obtained in a crystalline condition.

The Action of Propionyl and Butyryl Chloride on Phenol. By W. H. Perkin, Ph.D., F.R.S.

The Nature of Solutions as Elucidated by a Study of their Freezing Temperatures. By S. U. Pickering.—A series of determinations of the freezing temperatures of mixtures of sulphuric acid and water was undertaken in order to obtain further confirmation of the existence in solution of the various hydrates which had been indicated by the densities, heat of dissolution, heat capacity and electric conductivity of these solutions, as well as to throw some light on Raoult's method of determining molecular weights. The determinations with solutions containing over 4 per cent. H_2SO_4 were attended with considerable difficulty, as the solution does not freeze, but one of its constituents crystallizes out, the change being identical in nature with the crystallization of a salt from a saturated solution; what has to be determined, therefore, is the temperature at which the given solution becomes saturated. This was done by cooling the liquid down till a good crop of crystals was obtained; it was then put in a vessel of water, and the rise of temperature noted at every half minute; the temperature at which the last crystals had disappeared was signalized by a sudden alteration in the rate of this rise. The author has, so far, plotted the results against percentage composition. The general results are represented by three independent curves, in which water, $H_2SO_4{\cdot}H_2O$, and H_2SO_4, itself are the substances which crystallize out. The first of these curves is represented by an approximately straight line as far as 8 or 9 per cent. H_2SO_4, falling at the rate of about 0·5° for every 1 per cent.; it then curves rapidly downwards, the crystallizing temperature of a 30 per cent. solution being 36°; a little beyond this point it appears to become almost vertical. From 30 to 77 per cent. no freezing points have been attained. At this latter strength the crystallization of the monohydrate begins. This crystallization is represented by a curve with two branches, having its highest point at 84·5 per cent. (the composition of $H_2SO_4{\cdot}H_2O$) and 8·5°, and falling away from this point on either side, at first gradually, and then abruptly. At about 94 per cent. this curve meets that representing the crystallization of H_2SO_4, the temperature being—31°; the H_2SO_4 curve rises from this point in an approximately straight line up to 100 per cent. and 10·35°, when it turns abruptly down again in a curvilinear direction, the determinations having been extended as far as 101 per cent. A closer inspection of these several curves shows that none of them are continuous, but that they are made up of separate curves or straight lines, which seem to be quite independent of each other, and show breaks of a most marked character, often corresponding to differences five or ten times greater than the experimental error. These breaks occur in every case at the same points as those observed by the author in the densities and other properties, and are of a very much more certain character than in any of the other cases. Of the 17 hydrates of sulphuric acid which he previously indicated, 12 are very satisfactorily confirmed by the present observations; the other five (H_2SO_4 with 2, 4, 5, 9 and 13 H_2O) would be shown only in that portion of the diagram where no freezing points have yet been reached. In addition to this, there appears to be three other breaks, which the previous work would have been insufficient to show, at 98·7, 86, and 82·5 per cent., corresponding to $12\,H_2SO_4{\cdot}H_2O$, $7(H_2SO_4{\cdot}H_2O){\cdot}H_2SO_4$, and

$$7(H_2SO_4{\cdot}H_2O){\cdot}H_2O,$$

as well as a break at 100·7 per cent., representing $27\,H_2SO_4{\cdot}SO_3$, and at 100 per cent., or H_2SO_4 itself. It is especially noteworthy that the breaks at the extreme end of the curve corresponding to H_2SO_4 with 500, 1400 and 5000 H_2O have been fully confirmed. The marked character of these breaks (which are apparent without any differentiation) leads to the hope that the method may be applicable in the case of solutions of organic liquids where other methods would fail. Each of the three main curves which represent the general results tend downwards at an increasing rate as we pass from the highest points in them, and this tendency would also be exhibited if the results were plotted against molecular instead of percentage composition. This, the author shows, is what their character should be if hydrates were formed in solution, whereas on the physical theory of solution, they should tend downwards at a diminishing rate; so that the general form of the curves, independent of there being breaks in them, is conclusive in favour of the hydrate theory. Passing on to the bearing of these results on Raoult's method, the author repeats his assertion that, at the best, this method could only give us the molecular weights of substances in the gaseous condition at the temperature of the determination; for in dilute solutions the molecules of the dissolved substance are as far removed from each other as they are when vaporized. There are, however, no theoretical considerations which justify our regarding the molecular weight thus obtained in the same light as that obtained from vapour-densities. The vapour-density is a constant within experimental error throughout a very long range of conditions, whereas the lowering of the freezing point could only be a constant on the supposition that dissolution is entirely physical and that the dissolved molecules act independently of the solvent. The present results show that it is not a constant, and that we have no grounds for supposing it to be such even with extremely dilute solutions. The irregularities and breaks which characterize the whole results have been traced back as far as a 0·1 per cent. solution, and a further extension of the determinations, if possible, would simply reveal a continuation of these irregularities. On the other hand, it must be admitted, as, indeed, the practical results prove, that these irregularities would often lead to no great error in the molecular weight found, provided the solutions used are not too strong. The author shows that such would be the case with the sulphuric acid curves, when the crystallization of water is used to determine the molecular weight of H_2SO_4, or that of sulphuric acid to determine the molecular weight of H_2O. But the case is otherwise when we use the crystallization of the monohydrate to determine the molecular weight of H_2SO_4 on the one hand and H_2O on the other. Within 5 per cent. of $H_2SO_4{\cdot}H_2O$ we should get results such as 18 for H_2SO_4 and 6 for H_2O. This shows that, although Raoult's method may give approximately correct results in many cases, we can never rely on it without performing an extensive series of experiments. There are no theoretical considerations which would lead us to suppose that it is reliable, and this investigation proves that each case has peculiarities of its own, which may lead to an entirely erroneous molecular weight.

(To be concluded.)

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

COUMARIN IN THE VEGETABLE KINGDOM.

Sir,—As one whose work chiefly lies in the investigation of economic vegetable products, I am grateful to you for your publication of Messrs. Schimmel and Co.'s valuable notes. I observe in the *Pharmaceutical Journal* of April 20 they quote H. Lojander on the distribution of coumarin in the vegetable kingdom. Scores of Australian indigenous plants smell strongly of coumarin, while the bark of a large tree, *Ceratopetalum apetalum*, D. Don., belonging to the Saxifrageæ, reeks with it. I see you have an *Alyxia* in your list; allow me to add *A. buxifolia*, P. Br., common enough in Tasmania, Victoria and New South Wales, whose wood smells so sweetly of coumarin as to bear the local name of "Tonga-bean wood."

Technological Museum, Sydney. J. H. MAIDEN.

J. Morcombe.—(1) *Agrimonia eupatoria.* (2) *Nepeta Cataria.* (3) *Stellaria media.* (4) *Chærophyllum temulum.* (5) *Epilobium montanum.* (6) *Campanula Trachelium.*

A. A.—(1) Not sent. (2) *Calluna vulgaris.* (3) *Erica cinerea.* (4) *Erica tetralia.*

Ornis.—We have been unable to trace the work in the catalogues to which we have access.

Revilo.—*Vanessa urticæ* and *Pterophorus platadactylus.*

"*Safe.*"—The name to which you refer has now been included in the British Pharmacopœia as an official synonym. The application of it, therefore, to any other preparation might lead to some inconvenience.

W. J. Shepperd.—*Pyrus fennica.*

J. W. Morrison.—We have been unable to find such a formula.

Inquirer.—The difficulty in dispensing the prescriptions is due to the formation of hydriodate of quinine. The object of the prescriber would have been better attained by the use of hydriodate of quinine.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Slinn, Clague, Bennett, Morrison, Inquirer.

ASHBY DE LA ZOUCH AS A HEALTH RESORT.

The pleasant little midland town of Ashby de la Zouch is well-known to readers of Ivanhoe as having been the scene of those brilliant tournaments of the Middle Ages which are so well described in that work. The fame of Ashby on that account is a thing of the past, but at the present day the town has the advantage of possessing an abundant supply of "healing waters," the efficacy of which in the alleviation of certain forms of disease has of late years acquired considerable repute. In this respect Ashby de la Zouch has come to be of importance as a health resort for those who are troubled with gout or rheumatism, scrofulous affections or chronic skin diseases and general debility. The water to which it owes this distinction is derived from the carboniferous strata at Moira, and was discovered so recently as the year 1805 issuing from a depth of some 700 feet below the surface, and its healing qualities were soon found to be so great that an hotel and bath establishment were erected at that place for the convenience of patients. Shortly afterwards it was considered desirable to provide better and more extensive facilities for the use of this water, and the matter having been taken in hand by the Marquis of Hastings and his agent Mr. Mammatt, the result was the building in 1826 of a bathing establishment at Ashby, to which place the mineral water was conveyed from the spring at Moira. This building has recently undergone considerable alterations and additions: it is now fitted up on the most improved principle with all the modern appliances for proper and varied administration, and about a year ago its re-opening was formally celebrated.

The water with which the baths are supplied is highly impregnated with alkaline salts, approximating in character to some brine springs. According to an analysis recently made by Dr. B. H. Paul it contains nearly 1800 grains of saline contents in the gallon; the composition of which is stated in his report to be as follows:—

	Grains per gallon.
Sodium chloride	1312·23
Potassium chloride	8·22
Calcium sulphate	175·69
Aluminum sulphate	1·59
Calcium chloride	156·22
Magnesium chloride	116·99
Magnesium bromide	3·89
Calcium carbonate	4·62
Iron carbonate	6·09
Manganese carbonate	2·52
Silica	0·56
Total saline contents	1788·62

On evaporating the water the separation of the saline contents soon commences, and by exposure to the atmosphere a ferruginous deposit is formed in consequence of the peroxidation of the ferrous carbonate present in solution. The water is not quite so highly charged with saline ingredients as some kinds of natural brine; but it contains a larger amount of them than most of the mineral waters which are celebrated for their medicinal qualities. The amount of sodium chloride, the predominating ingredient, is nearly equal to that contained in sea water, and the amount of magnesium bromide is also considerable. In addition to other calcareous and magnesium salts, the water contains calcium carbonate and the carbonates of iron and manganese, which are held in solution by carbonic acid gas, of which the gallon contains more than 19 cubic inches. The large amount of magnesium salts associated with alkaline chlorides in this water is an important factor of its value as a medicinal agent, and it points to the efficacy of the water being analogous to that of the Pullna and Kreutznach waters. Judging of it by comparison of its composition with that of other kinds of mineral water which possess high repute for their remedial efficacy in the treatment of gout and rheumatic or scrofulous affections, it seems that the water of Ashby-de-la-Zouch must be eminently suitable for such purposes and at least as efficacious as many of the mineral waters that have long been regarded by medical authorities as valuable curative agents.

The bath establishment is a handsome building in the Grecian style, with a front colonnade 150 feet long. The centre of the building is entered by a broad flight of steps leading through a fine portico to a hall, which is used as a ball room. Two similar entrances at each end of the building lead to the two wings containing the bath rooms. Each wing has six baths, with separate dressing rooms and every convenience for shower needle and douche application. There is also an excellent swimming bath 50 feet long, and it is proposed to add a Turkish bath. The whole building is heated by steam pipes, so that an equable and comfortable temperature can always be maintained at all seasons of the year, and there are arrangements of steam pipes for heating the water used in the baths as may be required. The grounds attached to the bathing establishment are tastefully laid out with walks and ornamental trees so as to form a pleasant garden, besides which there are several tennis courts, an archery ground, and a bowling green. For those who require to devote their attention to the serious business of bodily recuperation, these attractions, with the quiet repose of the place, will suffice to compensate for the lack of the more stirring amusements of larger towns. The country round Ashby is also very attractive, not only on account of its natural beauty, but also from the number of country mansions it contains, and by offering to the geologist and antiquarian abundant opportunity for pursuing the studies in which they delight.

About six miles to the east of Ashby lies the beautiful range of hills called Charnwood Forest, the drive to which is most enjoyable. There are many other interesting places in the neighbourhood which claim the attention of the visitor, such as Gracedieu, with its ancient monastical ruins; the monastery of Mount St. Bernard in full monastic life, and Bardon Hill, a conspicuous elevation with beautiful wooded slopes, from the summit of which is obtained a view of some of the finest landscape scenery in Leicestershire and the adjoining counties. Lastly it must be mentioned that there is attached to the grounds of the bathing establishment an excellently equipped hotel belonging to the Baths Company, where every convenience is provided for residence in immediate proximity to the baths, to which access is obtained by a private entrance.

The town of Ashby is situated on the line of railway connecting Leicester with Burton-on-Trent. It is three hours' journey from London, 21 miles from Leicester, 14 from Derby, and 9 miles from Burton. The town stands at an elevation of 400 feet above the sea level, and is for the most part built on the slope of two hills, so that its position as regards efficient drainage is very favourable. For several years past the local Board of Health has been careful to perfect the sanitary conditions by introducing the most recent improvements in drainage and water supply. The report of the medical officer of health for the year 1887 shows that the small rate of mortality affords strong evidence of the salubrity of the town. Of the 81 deaths registered during the year, 15 occurred in the Union workhouse. The remaining number of 66 in the rest of the urban district with a population of nearly 5000 shows a favourable percentage. A large proportion of the deaths were due to old age, while there was not a single death from zymotic disease. The general healthy condition of a watering place is one of the conditions most necessary to be taken into account by all intending visitors, and more particularly by those who resort to such places for the improvement of their health or to undergo special medical treatment. In this respect some of the places on the Continent which are famous for their mineral water are highly defective. The sanitary arrangements of the houses and of the towns are often of a primitive character and the partial introduction of improvements of them are not always advantageous. So much is this the case that many medical men are of opinion that considerable risk is thus incurred by weakly persons of contracting diseases more serious than those for which they seek relief at foreign watering places. One of the chief objects of attraction at Ashby is the ruin of the ancient castle, which was finally destroyed in 1648, after having been surrendered to the Parliamentary forces three years previously. The portions still remaining suffice, however, to give an idea of its original stateliness and extent. Another place of interest is the tournament field, situated at some little distance from the town near the old-fashioned village of Smisby.

One of the most important conditions in the use of baths for remedial purposes is the experienced guidance of a medical adviser, and the proprietors of the baths have for that reason appointed as consulting physician to the Baths Company Dr. C. R. Williams, a local practitioner who has given considerable attention to the use of the Ashby water for various complaints. In this respect the system obtaining at bathing places on the Continent has been wisely imitated, and patients who have recourse to the "healing waters" of Ashby de la Zouch can therefore rely upon having not only the full benefit of the baths but also skilled advice as to the proper mode of using them to suit their particular requirements. It may therefore be expected that the use of these baths will be greatly extended for the general good, and as the facilities for reaching Ashby from various parts of the country are likely to be still more ample than they are even now, it is not unreasonable to expect that before many years have passed the Ashby mineral water will be widely celebrated for the cure of disease, and that the bath establishment of Ashby will take high rank as a health resort.

THE PARIS UNIVERSAL EXHIBITION.

(*Continued from page* 45.)

If there be one case in the present Paris Exhibition containing material that threatens to affect more than any other the future of British chemical industry, it is that of Pechiney and Co., of Salindres and other places. It has been well understood for some years past that as an economical method of producing soda the "ammonia" process presents great advantages over that of Leblanc, and that notwithstanding all the improvements that have been made in the latter, which have left it at the present time an almost theoretically perfect process, if it were not for its value as a source of the once useless bye-product, chlorine, it would have to be discarded. As is known, in the ammonia process the chlorine remains locked up in a waste calcium compound, which hitherto has baffled all attempts to utilize it economically. In the meantime chemists have been looking in other directions for cheap chlorine, and among other compounds magnesium chloride has been the subject of many experiments. Of this material an abundance is available in the mother liquors from the *salines* as well as those from the Stassfurt salt industry. The latter, indeed, are practically cold saturated solutions of magnesium chloride, and the quantity left as residue yearly is estimated to contain about 200,000 tons of $MgCl_2$. This would represent, if all were available, 150,000 tons of chlorine, or more than is contained in all the chlorinated compounds produced in a year in this country and on the continent combined. Moreover the economical utilization of this compound as a source of chlorine would probably be quickly followed by a modification of the ammonia process by which magnesium chloride would be obtained as a bye-product instead of calcium chloride. It has long been known that an aqueous solution of magnesium chloride can, without alteration, be concentrated by heating to the point at which the relation stands at one molecule of the chloride to six molecules of water, and that if the concentration be carried further decomposition takes place, with formation of hydrochloric acid in proportion varying with the conditions of the experiment. Attempts to obtain hydrochloric acid industrially in this way were made, but had to be abandoned on account of the damage done to the furnaces by the concentrated solutions operated upon. In 1881 the late Mr. Weldon conceived the idea of adding to the concentrated solution of magnesium chloride sufficient magnesia to form an oxychloride and then treating by heat and air solid masses of the resulting product. The results were sufficiently promising to attract the attention of Pechiney and Co., who get enormous quantities of magnesium chloride liquor left as a bye-product in the manufacture of salt from sea-water, and in experimenting on a large scale it was found that proceeding on these lines under certain conditions as much as one-half of the chlorine contained in the magnesium chloride could be obtained, if desired, in the free state. The construction of the apparatus for carrying out the operation on a manufacturing scale has been a serious problem for the engineer as well as the chemist, but it is claimed that it has now been solved, and a beautifully-made model of the furnace used in the decomposition of the oxychloride may be seen in the out-of-the-way place in a gallery in the machinery hall where chemical and pharmaceutical manufacturing apparatus is located. In fact this appears to be the only part of the apparatus yet in practical use, since the Weldon-Pechiney process is at present limited to the production of chlorine from hydrochloric acid. For this purpose magnesium oxide is dissolved in hydrochloric acid to form the oxychloride, which is dried and roasted at a high temperature. It is claimed that this process is considerably more economical than the old Weldon process, one reason being that a much larger proportion of the chlorine is obtained free. At any rate it is stated that already the manufacture of chlorine by this process at Salindres amounts to one ton daily, with a prospect that before the year is out the output will reach six tons daily. This looks unpromising enough for the North country alkali makers, but should the obstacles, consisting chiefly in the expensiveness of the plant, now standing in the way of working with magnesium chloride be removed, it would probably give the *coup de grâce* to the Leblanc soda industry. In the opinion of a German contemporary the result would be to make the chlorine manufacture at once a monopoly of the Stassfurt district; but here the wish is evidently father to the thought, for it is not probable that Pechiney and Co., and others similarly circumstanced, would miss the opportunity, if there were one, of utilizing the residues from the *saline* industry. From this rather long prelude it will be seen how much of interest and importance may lie in an exhibit that presents no specially attractive feature to the casual observer beyond the ordinary items of a chemical manufacturer's exhibit. These are made up of pyrites, salt from sea-water and products of the mother liquors, various potassium, sodium, and magnesium salts, and samples of magnesium oxychloride, the starting-point of the new industry. In addition there is a display of aluminium in ingots and sheets, accompanied by a number of aluminium compounds, in the production of which bauxite has been the material used.

Similarly, in Solvay and Co.'s case in the French court there are various products of the evaporation of sea-water from the Varangéville saline, mineral phosphates, soda salts produced by the ammonia process, and caustic soda derived from them, together with hydrochloric acid recovered from the residual calcium chloride. In the light of what has just been said it will be seen that the last-mentioned item may have great significance, but no information is vouchsafed as to the relation the cost of recovering the acid from this waste material bears to its market value. In another special "pavilion" are additional exhibits from this firm and different establishments working the Solvay patents. Several other alkali manufacturers, some of them deriving their supplies of salt from *salines* on the coast, show specimens of their products in the French court; Brunner, Mond and Co., of Nantwich, also exhibit products by the ammonia process in the British Court, together with sulphate of ammonia, presumably obtained by the process recently described by Mr. Mond (see before, p. 34), and there are a few exhibits in the Belgian Court. But nothing else very special was noticed, and it is not worth while to simply catalogue names. In some cases nitric acid and sulphuric acid and sulphates are also shown, and there is a good display of pyrites from different sources. The Rio-Tinto Company fully illustrates the products obtained from pyrites, showing, besides sulphuric acid and sulphates, ingots of copper and silver, and zinc salts. Crude and refined sulphur are shown in the case of L. Chambon, of Marseilles, including a greenish-yellow powder, labelled "sublimé sulfaté." But the most interesting sulphur exhibits are those of Chance Brothers, of Birmingham, and the Saint-Gobain Company, since they illustrate the products recoverable from the alkali "waste" by the latest process of Chance and Claus, together with sulphuric acid free from arsenic manufactured from the regenerated sulphur. This process, it will be remembered, consists of two stages. In the first, the alkali waste is submitted to the action of kiln gas, by which it is decomposed, the products being sulphuretted hydrogen and calcium carbonate. In the second stage, the sulphuretted hydrogen is mixed with a regulated quantity of air and made to pass through a layer of anhydrous oxide of iron. When the quantity of air is just sufficient to combine with the hydrogen of the sulphuretted hydrogen, the products of the reaction that takes place are vapour of water and free sulphur; the latter being volatilized by the heat generated passes on and is obtained in the fused or the sublimed form according to the temperature of the kiln and depositing chambers. The St. Gobain Company also exhibits selenium obtained from pyrites. The alum industry appears to be represented only by French manufacturers. Fine crystals of potash alum are shown by Pommier and Co., of Gennevilliers, together with a soluble double sulphate of aluminium and calcium, and aluminium sulphate, nitrate, acetate, oxalate and hydrochlorate, the last-mentioned being used in the purification of wool. Potash and ammonia alum and sulphate of iron are exhibited by Marguerite-Delacharlonny, of Aisne, and in the case of Noel and Co., of Noyon, in addition to alum and other aluminium compounds, there is a substance, having the appearance of a yellow fat, labelled "trisulphide of carbon." Sulphates of copper and zinc are shown by Labarre and Co., of Montreuil-sous-Bois, but the most interesting feature in this case is a series of sulphites, bisulphites and hydrosulphites; especially attention will be attracted to a very fine crystallization of bisulphite of calcium. Before leaving this part of the subject reference should be made also to the exhibits of potassium salts derived from animal and vegetable materials. Potassium carbonate and caustic potash derived from "suint" are shown in the case of Holden and Son, of Croix, together with samples of wool fats operated upon. Potassium salts recovered from the residues of the beet industry are exhibited by E. Porion, of Wardrecques, and Dècle and Co., of Rocourt. The kelp industry also contributes its quota of potassium salts, as well as a fine show of iodine, iodides and bromides, in the collective exhibit of Levasseur and Co. and associated firms resident in the Finisterre department. Antimony and antimonial compounds, prepared from minerals derived from the Cassagnas and Martinet mines in the Auvergne department, are to be seen in the case of E. Beau, of Alais; the metal is shown in large masses, well illustrating by the crystalline texture of the surface the form known as "regulus antimonii stellatus." In the case of Tassy de Montluc, of Bar-le-Duc, the slow formation of carbonate of lead is demonstrated by means of specimens of metal that have been subjected to the action of the acid for one, three, and five days respectively, at the end of which time a thin sheet of lead is nearly eaten through, but the process requires about thirty days for its completion. Cobalt and nickel compounds prepared from New Caledonia minerals are shown by the Société anyonyme de produits chimiques, of Paris, including cobalt, oxide, phosphate, sulphate and nitrate, double nitrite of cobalt and potassium, or "cobalt yellow," and nickel sulphate. Tin salts are also shown by the same firm, and in one or two other cases. G. Meier, of Madrid, exhibits a mineral from the Carthagena mines, which is said to yield 53 per cent. of manganese. In the Russian court there is an exhibit by Auerbach and Co. of cinnabar mineral from a mine in the Bakmouth district in Central Russia. The yield of mercury from this mineral is given as 70 kilograms per ton, and although the deposit was only discovered in 1879, and worked for the first time in 1887, the production of mercury last year is said to have amounted to 160,000 kilograms, with a possibility of that quantity being doubled in 1889. For chromium compounds the visitor must go to the British court, where will be found the really beautiful exhibits of the Eglington Chemical Company and Stevenson, Carlile and Co., both of Glasgow. In these cases may be seen the metal chromium, chromite, and a magnificent series of bichromates, chromates and allied compounds. A good show of the prussiates and cyanides will be found in a case containing products from the Mines de Bouxviller, especially a very fine crystallization of the red prussiate. But some gems of this class may also be seen in the collective exhibit of French pharmacists, in the amber crystals of lithium ferrocyanide, the dark garnet crystals of lithium ferricyanide, and the red-brown nitroprussiate of the same metal.

It would be tedious in the extreme to attempt to give a detailed description of the multitudinous pigments placed at the disposal of the dyer and printer. There are several capital displays of lakes and extracts. Marquet de Vasselot, of Paris, makes a very creditable display of cadmium yellows, ranging from orange red to lemon colour, and these are associated with metallic cobalt, smalt, cobalt pinks, the arsenate, borate, phosphate and silicate, as well as indigo sulphate, carmine of indigo (the purified colouring matter) and orcine. A. E. Dubosc, of Havre, shows a number of tinctorial and tanning extracts, including some quercitron extract of good appearance and quebracho extract in large resinous-looking masses. Of course it goes without saying that the so-called coal-tar colours are well represented, though, probably in consequence of the abstention of German manufacturers, the displays of these compounds are not so numerous in this as they have been in some less important exhibitions. One of the best of the exhibits is that of the Paris Aniline Colour Company, which is understood to be a development of the Paris Gas Company. Curiously enough about the most conspicuous feature of this case consists in some fine crystallizations, as well as packets, of antipyrine; but as these articles are distinctly labelled "antipyrin, Knorr," it is left somewhat in doubt whether the Parisian company is manufacturing the article under a licence to use the name of the inventor, or whether it is exhibiting an article of German manufacture. In the case of Durand, Huguenin and Co., of Gentilly, there is some fine indophenol resembling lumps of "washing blue" and dyeing like indigo. The exhibit of Guinon, Picard and Jary, of St.-Fons, may be said to combine the old and the new pigments, for it contains many of the tar colours, including fine masses of red and brown coralline, as well as indigo, orchil, and other vegetable derivatives. Lastly, a good collection of the products of the distillation of tar will be found in the exhibit of F. Dehaynin, of Paris, which includes anthracene and naphthaline, crude and purified, carbolic acid, pyridine and chinoline, and in that of Brigonnet and Naville, which includes aniline, toluene, and phenylamine and naphthaline compounds, essence of mirbane, chloride of benzyl, benzoic acid and benzaldehyd.

(*To be continued.*)

RECENT IMPROVEMENTS IN THE METHODS FOR THE MANUFACTURE OF CHLOROFORM.*

BY SAMUEL P. SADTLER, PH. D.

It is of course within the knowledge of the drug and chemical trade that along in the fall of 1885, a notable reduction in the price of chloroform took place, and that this reduction has been practically maintained since. Such a change indicates that either there has been a notable cheapening of the raw material of manufacture, a decided improvement in existing methods, or the introduction of an entirely new method for the manufacture of the staple so cheapened. In the case of chloroform it has been the latter.

The old process of manufacture by the action of bleaching powder upon alcohol has given way to what is now termed the "acetone" process. This is not, however, a new discovery. Liebig, in 1832, in following up his first account of the properties of the newly discovered "chloride of carbon" (chloroform), mentions that it can be gotten in very large quantities by the action of bleaching powder upon "pyroacetic spirit" (acetone), as well as from alcohol. That alcohol has all this time been preferred to acetone as a material from which to prepare chloroform, is due mainly to the fact that only in recent years has acetone been prepared pure in quantity, but also to the erroneous statement of Siemerling quoted in the works of reference like Watts' 'Dictionary of Chemistry,' that only 33 per cent. of chloroform could be gotten from acetone by the action of bleaching powder. Now that acetone is made on a large scale, and of extreme purity, and it has been shown that it is the richest chloroform-yielding substance known (206 per cent. by theory and 200 per cent. in practice at times), the case assumes a different aspect. Indeed, as was testified by one of the witnesses in the recent patent litigation on this subject (Michaelis *vs.* Roessler), this process "is one of great importance to the manufacturers of chloroform, and of great value to the public for the reason that it enables the production of chloroform at a price which is nearly one-half its cost by any other method practised by manufacturing chemists or known by me."

The writer, having had opportunity to thoroughly study the new process in practice, desires to give an outline sketch of this recent revolution in the manufacture of so important a chemical as chloroform.

The manufacture of a purer grade of acetone than that then in use for solvent purposes having been begun in Germany in 1881 on the part of the "Verein für Chemische Industrie," Liebig's old suggestion for the manufacture of chloroform from acetone was taken up by the "Verein Chemischer Fabriken," Mannheim, Germany, in the beginning of 1882, and a year later by the first-mentioned company, which made the acetone for both. In June, 1884, Mr. F. Roessler, of the present Roessler and Hasslacher Chemical Company, of New York, visited Germany and studied the process, which his company are now carrying out under the patents of Gustav Rumpf, to be described later. In the meantime Prof. G. Michaelis, of Albany, obtained in July, 1885 (application filed Nov. 18, 1884) a patent for distilling crude acetate of lime (preferably, as the patent says, crude "brown acetate of lime") and using the liquid products of their distillation in connection with a hypochlorite for the manufacture of chloroform. Under this patent suit was brought against Roessler and Hasslacher for infringement. After protracted litigation, Judge Butler, of the United States Circuit Court, has just decided that in using pure acetate alone the defendants were using an old and well-known process and were not guilty of infringement. As both the production of pure acetone and the method of manufacture of chloroform are covered by patents issued in this country, the processes can be given in outline as there published.

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* From the *American Journal of Pharmacy*, July.

The raw material with which the beginning is made is the "grey acetate of lime." While this is distinctly purer than "brown acetate" it still contains both moisture and tarry matter. To free it from these and to raise the percentage of actual acetate of lime, it is carefully roasted before being submitted to dry distillation. This roasting forms the subject of patent No. 393,079, issued to Gustav Rumpf, of Frankfort, Germany, and assigned to Roessler and Hasslacher, of New York. As shown in Fig. 1, it is done in a series of three slightly-inclined cylindrical retorts, in which the material is continually pushed forward by revolving blades. The crude gray acetate is dropped in at *a* and passes along the length of the upper retort until it drops upon the blades which revolve in the second retort, and passing along this is dropped into the third or lowest retort, from which it issues at *g*, and is collected in suitable vessels. As seen in the illustration, the inclination of these three retorts is different, so that the material passes along most rapidly as it descends into the hottest retort below. At *e* and *f* are connections with the flue, through which the moisture and tarry vapours can pass off. By this continuous roasting process, the crude material can be purified without notable decomposition of the true acetate. The second patent, No. 385,777, issued to the same and assigned to the same, refers to the method of distilling the roasted gray acetate. Here, to secure the maximum yield of acetone, the points to be attained are uniformity of temperature throughout the whole mass and slow heating to not over 300° C. The patentee claims that "in the process of subjecting acetates in a closed vessel to heat applied externally to the vessel for distilling acetone from the acetates, the desired slowness and uniformity of temperature may be secured by stirring the acetates so that all portions of the mass will be subjected to the heat resulting from direct contact with the bottom of the vessel and by admitting free steam from time to time into direct contact with the acetates in case of any undesirable rise in temperature within the vessel."

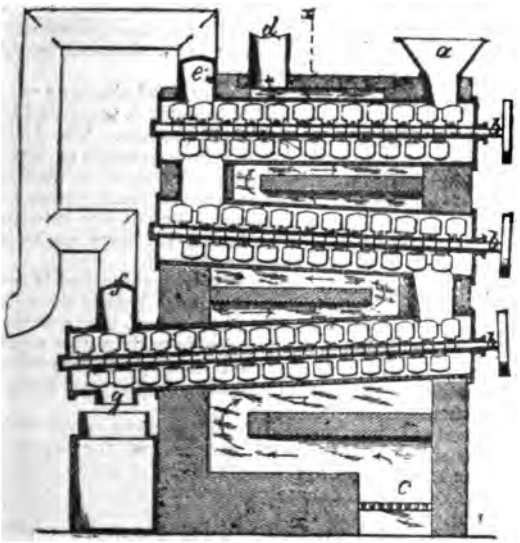

Fig. 1.

Fig. 2 shows the form of retort in which this is effected. It will be seen mechanical agitation is provided for by the paddles which rotate around the vertical central axis. Steam is admitted by one of the openings above, while the products of distillation pass off by another opening in the top of the retort. The crude acetone distillate so obtained while richer than before in real acetone still contains oily distillation products and much water from condensed steam. In this dilute state it is treated with milk of lime to remove the higher ketones and other compounds. It is then distilled from a large plain still and the fractions rich in acetones passed to a column-still, where it is rectified until it becomes almost if not quite anhydrous. In practice, two column-still rectifications are carried out, one after the other, so that the pure acetone shows 99° or 100° by the alcoholometer. It is now fitted for use in the direct manufacture of chloroform. The process and form of apparatus for most successfully carrying out this chloroform manufacture constitute the subject of United States patent, No. 383,992, also issued to G. Rumpf, and assigned to Roessler and Hasslacher. The patentee first states that in order to get the full yield of chloroform it is necessary to take a much larger proportion of bleaching powder than that given in Watts's 'Dictionary of Chemistry,' vol. I., page 918, and states that for 58 pounds of acetone at least 600 pounds of chloride of lime of thirty-five per cent. available chlorine are necessary. The yield will then

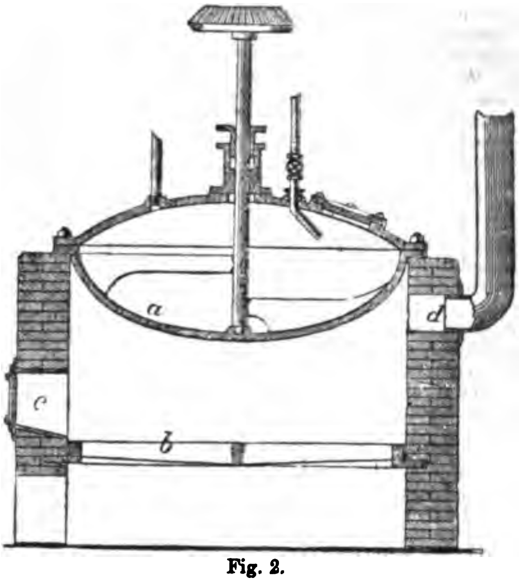

Fig. 2.

be from 150 to 180 per cent. of the weight of the acetone employed instead of about 33 per cent.

The construction of the still and connections are shown in Fig. 3. The still having been filled to a proper height with water, as shown in the cut, the charge of bleaching powder is introduced and the manhole *c* closed with cement. The agitators having been started by means of the revolving shaft *b*, the acetone, previously diluted, is pumped in gradually at *i*. As it enters, it rises and reacts with the bleaching powder solution, and the chloroform produced distils spontaneously from the delivery tube *d*, passes through the condenser *e* and is collected under water at *f*. The introduction of the diluted acetone is to be effected at intervals only, otherwise some acetone will distil over unchanged, or the reaction will become too violent and much frothing ensue. When the delivery of chloroform begins to slacken, steam is gradually introduced to heat up the mixture and drive over the last portions of the chloroform which remain. The contents of the still are then discharged through the outlet *k* into the drain. They consist of very dilute calcium acetate solution mixed with calcium hydrate and calcium chloride.

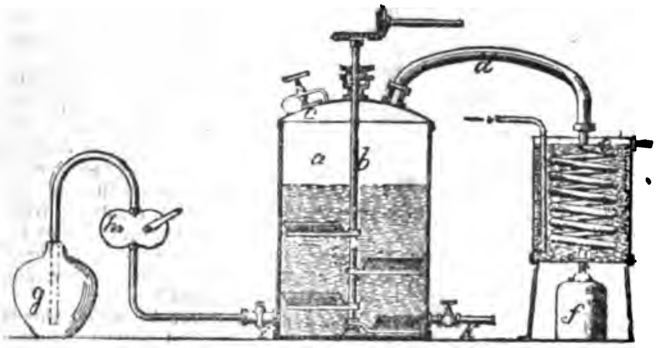

Fig. 3.

The reaction for this production of chloroform from acetone seems to be simply:

$$2C_3H_6O + 6CaOCl_2 =$$
$$3CCl_3H + Ca(C_2H_3O_2)_2 + 2Ca(OH)_2 + 3CaCl_2.$$

This would demand one equivalent of chloroform for one of acetone used, or 206 parts of chloroform by weight reckoned on the weight of the acetone. In practice 180 parts are usually obtained, although 200 parts have actually been obtained at times.

The chloroform obtained is quite free from the chlorinated side products which often accompany the chloroform made from alcohol. It is, nevertheless, thoroughly purified by treatment with sulphuric acid and careful washing, and it is then brought exactly to the United States Pharmacopœia standard.

NOTE UPON THE CANDYING OF FRUIT INDUSTRY AT LEGHORN.*

It would be a mistake to suppose that Leghorn is a great centre for this industry in all its branches. The candying of fruits, whole or cut, is carried on at many other places to a larger extent. At Genoa and westward along the French Riviera, at such places as Grasse, this industry is carried on, and we know that in Spain and Portugal fruits are also candied, Madeira being especially noted amongst the possessions of the latter for this manufacture. Moreover, upon inquiry I find that in this city of over 100,000 inhabitants only seven establishments are occupied in the manufacture, and that these seven, when in full working, only employ about 200 hands. Leghorn can hardly, therefore, be considered a great centre of the fruit-candying industry.

It does, however, I believe, occupy the first place in Italy, and perhaps throughout the Mediterranean for the preparation of the candied citron and orange peel so largely used in all branches of confectionery. For the citron is brought to us for this purpose from Corsica, from Sicily, from Calabria and other southern provinces of Italy, from Tunis and Tripoli, and even from Morocco; and the candied-peel of the fruit is exported hence to North America, to the United Kingdom, and to Hamburg, for distribution throughout Germany. Sugar also is imported for the purpose of the manufacture from Egypt. The wood of the boxes in which the candied peel is packed reaches us from Trieste, and the immense earthenware vessels necessary for the saturation of the fruit in sugar syrup are made in the neighbourhood of Florence.

On all sides I hear that Corsica produces the citron of the finest quality; those of Sicily and Calabria are regarded as slightly inferior; whilst that which comes from the African coast is held in still lower repute, and, indeed, appears to be of a different variety, being larger, and having a smooth instead of the rough granulated surface generally characteristic of the citron. The African citron is probably somewhat deficient in the essential oil which forms the medical property and gives the flavour to the rind. The oranges imported into Leghorn, whether for consumption or for candying, are nearly all brought from the islands of Sicily, Sardinia and Corsica.

I shall perhaps convey the clearest impression of the treatment of the fruit, and the processes through which it passes if I follow it through the various stages of its preparation, from its arrival at this port to the moment of its departure hence in cases filled with boxes neatly packed with the cut candied-peel.

In all the countries I have mentioned above as contributing the raw fruit for this industry it is treated in the same manner for the over-sea passage. The fruit is simply halved and placed in hogsheads or large casks filled with a fairly strong solution of brine, the fruit being halved merely to ensure thorough preservation of the rind by an equal saturation of the interior as well as the exterior surface. In these casks it arrives at the doors of the manufactory.

The first process to which it is then subjected is the separation of the fruit from the rind. This is done by women who, seated round a large vessel, take out the fruit, skilfully gouge out the inside with a few rapid motions of the forefinger and thumb, and, throwing this aside, place the rind unbroken in a vessel alongside them.

The rind is next carried to large casks filled with fresh cold water, in which it is immersed for between two and three days to rid it of the salt it has absorbed. When taken out of these casks, the rinds are boiled, with the double object of making them tender, and of completely driving out any trace of salt that may still be left in them. For this purpose they are boiled in a large copper cauldron, for a time varying from one to two hours, according to the quality of the fruit, and the number of days it has been immersed in brine. When removed from this cauldron, the peel should be quite free from any flavour of salt, and at the same time be sufficiently soft to absorb the sugar readily from the syrup, in which it is now ready to be immersed.

The next process to which the rind is subjected is that of a slow absorption of sugar, and this occupies no less than eight days. Needless to say that the absorption of sugar by fresh fruit in order to be thorough must be slow, and not only slow, but must also be gradual. That is to say, the fruit should be at first treated with a weak solution of sugar, which may then be gradually strengthened, for the power of absorption is one that grows by feeding. The fruit (and this holds good more especially with the rind) would absorb with difficulty, and more slowly and unequally, if plunged at once into a thick syrup, than if gradually treated with weak solutions easier of absorption, and by which it has been thoroughly permeated first. It is a knowledge of this fact that governs the process I now describe.

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* From an official report by Mr. Consul O'Neill.

The fruit has now passed into what I may call the saturating room, where on every side are to be seen long rows of immense earthenware vessels, about 4 ft. high and 2½ ft. in extreme diameter, in outline roughly resembling the famed Etruscan jar, but with a girth altogether out of proportion to their height, and with very short necks and large open mouths. All the vessels are filled to their brims with citron and orange peel in every stage of absorption, *i.e.*, steeped in sugar syrup of, roughly speaking, eight different degrees of strength. I said before that this is a process that occupies almost always eight days, and as the syrup in each jar is changed every day, we may divide the mass of vessels before us into groups of eight. Take one group of this number, and we are able to follow the fruit completely through this stage of its treatment. With vessels of such great size and weight, holding at least half a ton of fruit and syrup, it is clearly easier to deal with the syrup than with the fruit. To take the fruit out of one solution and to place it into the next stronger, and so on throughout the series, would be a toilsome process, and one moreover injurious to the fruit. In each of these jars, therefore, is fixed a wooden well into which a simple hand suction pump being introduced, the syrup is pumped from each jar daily into the adjoining one.

"How is the relative strength of the syrup in each jar regulated?" is the next question. "The fruit itself does that," is the foreman's reply; and this becomes clear from the following explanation. Number your group of jars from one to eight respectively, and assume No. 1 to be that which has just been filled with peel brought straight from the boiler in which it has been ridded of the last trace of salt, and No. 8 to contain that which, having passed through every stage of absorption but the last, is now steeped in the freshly prepared and therefore the strongest solution of syrup used in this stage.

"We prepare daily a syrup of the strength of 30 degrees, measured by the 'provino,'"* continued the foreman; "and that is poured upon the fruit in jar No. 8. To-morrow the syrup from this jar, weakened by the absorption from it, by the fruit, of a certain proportion of sugar, will be pumped into jar No. 7, and so on daily through the series. Thus, No. 1 containing the fruit will be treated with the weakest solution of syrup, and the fruit itself regulates the strength of the syrup as I said." "But if the syrup has lost all its strength before the seventh day, or arrival at jar No. 1?" we ask. "Care must be taken to prevent that, by constant testing with the 'provino,'" is the reply; "and if that is found to be the case, a little stronger syrup must be added to the jar."

A slight fermentation next takes place in most of the jars, but this, so far from being harmful, is regarded as necessary, but of course must not be allowed to go too far.

There is yet another stage, and that, perhaps, the most important, through which the peel has to pass before it can be pronounced sufficiently saturated with sugar. It is now boiled in a still stronger syrup of a density of 40 degrees by the testing-tube, and this is done in large copper vessels over a slow coke fire, care being taken to prevent the peel adhering to the side of the vessel by gentle stirring with a long paddle-shaped ladle. This second boiling will occupy about an hour.

Taken off the fire, the vessels are carried to a large wooden trough, over which is spread a coarse, open wire netting. The contents are poured over this, and the peel distributed over the surface of the netting, so that the syrup—now thickened to the consistency of treacle—may drain off the surface of the peel into the trough below. The peel has now taken up as much sugar as is necessary.

Now comes the final process, the true candying, or the covering of the surface of the peel with the layer of sugar crystals which is seen upon all candied fruits. To effect this a quantity of crystallised sugar—at Leghorn the same quality of sugar is used as employed in the preparation of the syrup—is just dissolved in a little water, and in this the now dried peel taken off the wire netting is immersed. The same copper vessels are used, and the mixture is again boiled over a slow fire. A short boiling will suffice for this, the last process, for the little water will quickly be driven off, and the sugar upon cooling will form its natural crystals over the surface of the fruit. Poured off from these vessels it is again dried upon the surface of the wire netting, as before described. The candying is now complete, and the candied-peel is ready for the packing-room, to which it is carried off in shallow baskets.

In the packing-room may be seen hundreds of boxes of oval shape, or, if I may so speak, of rectangular shape, with rounded corners and of different sizes, for each country prefers its own boxes to be of a particular weight, Hamburg taking the largest, of 15 and 30 kilos., the United States of America preferring smaller of 10 and 12 kilos., whilst England takes the smallest of 5 kilos., and one containing about 7 English pounds. The wood of which the tops and bottoms of these boxes are made comes to us in thin planks from Trieste, and a skilful workman, paid 3 francs a day, will complete 70 boxes per diem. The packing is generally done by women, and the boxes are lined with white paper. They are then packed in cases of 100 kilos., 10 of the smaller American boxes filling a case. The candied-peel is now ready for export.

I think I have now spoken of all that need be noticed in the actual manufacture of candied, citron and orange peel at Leghorn. There are, however, a few reflections upon the very existence of this industry here which seem to me suggestive and instructive ones. In my inquiries into the course of the industry I find that the fruit itself, and every ingredient and article necessary to the preparation of the candied-peel comes to us from abroad. The fruit of the best quality is from Corsica; Egypt furnishes the sugar; England provides the fuel, distant provinces of Italy contribute a portion of the raw product and the wood for the boxes in which the peel is exported. The province of Leghorn provides nothing but the labour necessary to the manufacture. Nor is this industry one that has fallen into Livornese hands from any specially acquired local handicraft or skill. How then does this industry exist here in these days of keen international competition? No doubt it is mainly supported by the large drawback granted by the Italian Government upon the duty paid on the chief and dearest ingredient in the manufacture—sugar. The Customs tariff in force imposes a duty of 76·75 lire upon 100 kilos. of the sugar used (classed in the tariff as of second class), but grants a drawback of 60·50 lire upon 100 kilos. of the exported article. Without this large measure of support there can be no doubt this industry would immediately and wholly collapse. With it even it finds it difficult to hold its ground. Exporters tell me that the United Kingdom is beginning to call for the fruit to be sent to it direct from the countries of production in the same condition that it reaches Leghorn, viz., steeped in brine, and the manager of one of the factories I visited confirmed this with an air of very natural chagrin by telling me that he had himself seen 600 hogsheads of fruit shipped in brine in one vessel last year from Bastia for England.

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* A graduated test for measuring the density of the syrup.

THE CHEMISTRY OF SALIVA.*

BY DR. G. STICKER.

The author has published in the *Deutschen Medizinal-Zeitung* a long and highly interesting communication upon saliva and the portions more important to pharmacy are here reproduced in a condensed form.

Human saliva is colourless or presents a somewhat bluish tinge and has a sweetish or saline taste. The specific gravity varies between 1·002 and 1·008, but under a purely vegetable diet this is lowered. In the evening and after the different meals the saliva is heavier than in the morning or when fasting; in the former case too it presents an alkaline reaction, but in the latter it reacts faintly acid. With an increased consumption of amylaceous food the alkali in the saliva increases, but with a pure flesh diet it decreases. Whilst in the horse the quantity of saliva secreted in twenty-four hours will amount to four to six kilograms, it amounts in grown men to from 500 to 1500 grams. In the flesh-eating dog the quantity is still much smaller, since flesh-eaters require less saliva for their food, which is rich in water; the most being required by granivorous animals for their relatively dry food.

In respect to diastatic power the saliva of omnivorous man exceeds that of any other creature. In the first two months of an infant's life the diastatic power of the saliva is almost without exception wanting. Occasionally it is present in the saliva of the three months' child, but the more intense action does not become manifest until towards the end of the first year. The toothless child should therefore obtain only liquid nourishment and have flesh given to it only after the appearance of the incisors and canine teeth. The body temperature of 38° to 39° C. is the most favourable for the saccharifying action of human saliva.

Ptyalin is paralysed by alcohol and the diastatic action of the saliva is also stopped by large quantities of alkalies or acids. One per cent. solution of carbolic acid in contact with saliva deprives it after a time of the power to decompose starch. A 0·2 per cent. solution of salicylic acid diminishes the salivary fermentation, and a 1 per cent solution stops it entirely. But it is remarkable that this action is not exercised by the sodium salt of salicylic acid, notwithstanding that it possesses antizymotic properties. A similar action, but to a greater extent, is however shown by salicylic acid upon emulsin, myrosin, and synaptase, whilst pepsin and trypsin can be protected from putrefaction by the addition of salicylic acid without their specific action being injured in the least. Borax does not kill diastase, whilst quinine and arsenious acid paralyse the ferment only in very large doses. Quinine, strychnine, morphine and curare in small quantities promote the fermentative action of the salivary liquid, in accordance with the known pharmacological axiom that small doses frequently excite while large doses paralyse. A similar behaviour is shown by the pancreas-ptyalin. Sodium chloride solution up to a strength 3·85 per cent. promotes the fermentative action of a, a higher percentage diminishes it. The same n is shown by sodium sulphate and ammonium chloride, whilst the fermentative action is depressed by ammonium nitrate and potassium chloride. At a temperature of 38° to 40° C. salicin is converted by the salivary ferment into sugar and salicin, but it is not so split up by diastase. Tannin, also, is decomposed into gallic acid and sugar by the diastatic ferment of the saliva, and animal glycogen is converted by it into γ-dextrin and ptyalase.

In respect to the secretion of saliva it has been found that a temporary diminution of human saliva may be effected artificially by paralysing the nerves of secretion by means of atropine, daturine, cicutine, iodethylstrychnine and nicotine in large doses. The agents having a reflex action upon the salivary function, as, for instance, calamus root, absinth, ginger and black and cayenne peppers, stimulate the secretion, but where these fail, use is made of digitalin, nicotine, aconitine, physostigmine or pilocarpine. Potassium iodide has also proved effective in stimulating the secretion. Psychic moments, such as the perception of savoury food, or lascivious thoughts, will induce in healthy men an increased flow of saliva. A salivary flow is also caused by iodine salts, iodine and allied halogens, gold chloride and nitrate, and copper and lead salts; also by some alkaloids, as nicotine, physostigmine, and pilocarpine, muscarine, as well as by digitalin, sphacelinic acid and cornutin. It has also been observed in cases of carbolic acid poisoning.

Should the salivary glands become affected in consequence of fever, the saliva will occasionally contain as much as 5 per cent. of albumen, and also in cases of iodism and mercurialism. When there is blood decomposition, as, for instance, the dissolving of the blood corpuscles by arseniuretted hydrogen, frequently the saliva will be sanguineous. In cases of suppression of urine the occurrence of urea in the saliva has been observed. In uraemia ammonium carbonate has been ascertained to be a constituent, and in mercurial salivation valerianic acid appears in small quantities.

The passage of arsenical medicines into the saliva is frequently observed, while iodine and bromine especially find their way into it very rapidly. The interval between the taking of 0·2 gram of potassium iodide fasting and the first detection of an iodine reaction in the saliva varies between nine and twenty-two minutes, and in the urine between nine and nineteen minutes. The metals combined with the halogens iodine and bromine, such as potassium, sodium or lithium, cannot be detected simultaneously in the saliva. Mercury passes into the saliva only when the system is completely saturated with that metal. Saliva containing iodine or bromine converts starch equally rapidly into dextrin and maltose as when normal; also calomel saliva is not injured as to its saccharifying power. Copaiba balsam can be recognized in the saliva of persons who take it almost immediately. According to the investigations of L'Héritier the saliva of a healthy person contains 98·65 per cent. of water, 1·26 per cent. of organic matter and 0·09 per cent. of salts.

From antiquity a high therapeutic and toxic action has been ascribed to saliva, and emperors and kings have worked "miracles" by means of their spittle. Recently Brera has mixed saliva, on account of its easy absorption with ointments and other external applications. He reports that in chlorosis he has obtained good results by the admixture of saliva with opium, and he also speaks favourably of mixture of saliva with scilla, digitalis, aconite and sublimate. Dr. Sticker further seems to have stated in his paper that it is the custom of the German *apotheker*, when preparing mercurial ointment, to spit into the mortar, but this is distinctly contested by the editor of the periodical from which the foregoing abstract is taken.

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* From the *Apotheker-Zeitung*, March 27.

The Pharmaceutical Journal.

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SATURDAY, AUGUST 3, 1889.

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NEWCASTLE.

THE purpose of the present article is to give a few notes which may interest those of our readers who are looking forward to the approaching meetings of the British Pharmaceutical Conference and the British Association. It is not the intention to adhere to the orthodox fashion of giving first the history, and then describing the place as it now is. The more natural line is to take what will be seen by the visitor in 1889, and point out its present importance as well as its historical associations.

CAMDEN describes Newcastle as " The eye of the north; the hearth that warmeth the south with fire, an Egypt to all the shires of the north in time of famine for bread." That "*providential arrangement*" by which large rivers flow past populous centres finds expression here. The noble estuary of the Tyne has in all English history formed an important highway, and it is now the centre of a vast trade which for variety and economic importance has hardly a rival.

It is often interesting to speculate on the causes which have led to the precise location of towns and trade centres, and in the case of Newcastle and the Tyne it is easy to see the reasons which made the river invaluable in semi-barbaric times as well as those which have operated in making it a centre of trade in times more civilized.

The nucleus round which the original town was formed was one of a very definite character, and was marked by the intersection of the Roman Wall and Hadrian's Bridge over the Tyne. Just three miles farther east was the eastern terminus (Wallsend) of that remarkable wall which secured to the great Roman general and emperor his possessions in England, from the marauding tribes of Picts in the northern portion of our island, and here at a point of singular geographical fitness the same genius caused the bridge to be built, which bore the name of his illustrious family (the Ælian), being known as Pons Ælii. A narrow stretch of low shore on each side of the river, gave the requisite space for abuttments and approaches, while adjacent high ground, also on both sides of the river, gave the needful points from which defensive operations could be carried out. The waterway and harbour were thus protected, and the road for mercantile and aggressive operations on the north side of the Tyne rendered secure. A mere passing glance at the spot will suffice to show why the great constructor chose the line of his wall and the site of his bridge. Near to the town, though not actually within its limits, that wall may still be seen in short spaces, and excavations within the present century have shown not only the wall but the fort or station which protected this point. And on the site of that bridge stands the swing bridge of to-day, whose perfect mechanism for turning to allow the passage of vessels is a specimen of the hydraulic work of Mr. W. G. ARMSTRONG, at first a solicitor in the town, and now Lord ARMSTRONG of world-wide fame as a scientist and a constructor. Looking down upon that bridge is the great work of ROBERT STEPHENSON, the High Level Bridge, the lower roadway of which is far enough above the water level to permit the passage of the largest vessels, while the railway line, which will convey the visitor from the south into Newcastle, is carried above that roadway, so that on entering the town the eye glances at once upon the relics of a past full of historic interest and signs of a present full of busy life.

Fronting on the right, is the castle from which the town takes its name, although the prefix " New " has ceased to be true in the absolute sense.

A stern-looking fortress, which seems as if it must have meant business in the fighting line. One feels that its builders must have tried to produce something as nearly as possible like a fort of solid rock. It was built by WILLIAM RUFUS to render the Norman conquerors safe from the inconvenience which beset his great father on his expedition against the Scots. HARDYNG (16th century) says of the younger WILLIAM :—

> " He buylded the New Castell upon Tyne,
> The Scottes to gainstand and to defend,
> And dwel therin ; the people to incline
> The towne to buyld and wall as did append,
> He gave them ground and gold ful greate to spend,
> To buyld it well and wall it all about,
> And fraunchised them to pay a free rent out."

That black grimy building of Norman type was the keep of the castle, which, within its outer ramparts, enclosed about three acres. Its principal entrance, the Black Gate, still stands, though its pointed arch indicates reconstruction at a later date. The buildings attached to this gate and the castle itself are now used as museums, and there are shown many antiquities over which hours of interesting study might be spent; the internal structure of the castle itself will, however, probably interest visitors most. A long flight of stone steps flanked by the quaintest of old shops leads from the level of the castle to the quayside below. In the above metrical chronicle of the doings of the Red King it is recorded that to him the old town owed its wall, and this was altered as the town grew. Early in the fourteenth century the wall was 2 miles long, 8 feet thick, and 12 feet high. Each of its numerous angles bore a tower, and entrance was obtained to the town by six gates, while the south front of the town was open to the Tyne.

A few yards north of the Black Gate our attention is claimed by the Church of St. Nicholas, as being the mother church of the town, and now the cathedral of the diocese of Newcastle. Built circa 1350, its most beautiful external feature, the steeple, was added probably one hundred years later. Novocastrians are justly proud of this beautiful spire. Its tower is square, and from its top corners spring flying buttresses with graceful curve, and upon their junction is placed an elegant lantern surmounted by a spire. The spring of the buttresses is screened by small octagonal turrets. St. Giles, Edinburgh, is an imitation of this, and even Sir CHRISTOPHER WREN condescended to copy it for St. Dunstan's, London. The bestowment of cathedral honours upon this church has been handsomely appreciated by the enrichment of its interior. A fine reredos of stone has been erected, while the enclosure of the choir and canons' stalls has called forth the highest talent in wood carving of our day.

Newcastle has not contentedly rested upon its historical greatness, for, by the genius of RICHARD GRAINGER, the centre of the town has, during the earlier half of the present century, been completely remodelled; and its business streets will yield to no city in the kingdom in an architecture at once striking and substantial. The form is that of a triangle, consisting of Grainger Street, Grey Street, and the line of Collingwood Street and Mosley Street. These streets are flanked on two sides by Pilgrim Street and Clayton Street, and intersected by shorter streets. The graceful sweep of Grey Street enhances the work of the builder, and presents one of the most pleasing city thoroughfares of our land. A deep ravine in the line of this street was a formidable obstacle to the architect, and this was got over by arching, the whole of the lower end of the street being carried upon unseen arches.

The commercial exchange and shipping industry of the Tyne are managed on the Quayside, approached mainly by a street of steep gradient. Even here the hand of time has dealt gently with history's landmarks, and the castle stairs, the Dog Leap Stairs and Akenside Hill will delight the curious, while those disposed to the romantic will look with interest to the house on the sandhill, from whose window (still marked) Lord ELDON, Chancellor of England, in the days of his youthful ardour as plain JACK SCOTT, stole away the fair daughter of SURTEES the banker. Judging by the size of her point of egress, the slender damsel must have possessed a form which would fill with envy the fair habitués of Rotten Row and Bond Street.

In "The Side" much of quaintness may be seen in the old houses, in one of which Lord COLLINGWOOD was born, and in the churchyard behind stands the workshop of the famous THOMAS BEWICK. At the eastern end of the quayside lovers of song will find the Sandgate, celebrated in the famous Tyneside song, "Weel may the keel row." North and west of this portions of the old town wall appear, and although it becomes lost in the centre of the town, it may be found again near to St. Andrew's Church, where large and interesting portions of the "West Walls," with remains of its tower, will merit attention. The Friars in Charlotte Square and some old houses in Low Friar Street are also worth seeing.

The suburbs of the city are by no means unworthy of its business importance. On all sides, except the river, the town is surrounded by high ground; the portion near the river is devoted to very varied manufactures, and north of this busy and crowded strip are to be found terraces of houses well laid out, and lacking only in trees to make them boulevards of considerable beauty. It is to be hoped that the Newcastle Tree Culture Society will work this most necessary reform. Seven parks nicely placed and well kept afford breathing space and recreation ground for the citizens. Elswick Park, the most westerly of the parks, contains in its hall the models of the great sculptor JOHN LOUGH, a collection of considerable value. The Leazes Park is large and well laid out; rendered gay by the important autumn flower show of the northern counties, it will, in conference week, be specially attractive. It is placed upon a corner of the town moor, one of the grandest boons ever vouchsafed to a manufacturing town; its ample expanse of green, nearly two square miles in extent, forms the playground of the toilers in the great factories and the showground of the north of England. Here the Jubilee Exhibition of 1887 was held on a site now laid out as the latest addition to the parks. But it is to Jesmond Dene the palm must be yielded, not from Newcastle alone, but from the whole kingdom, as being one of the most lovely public parks in her Majesty's dominions. Originally a pretty glen of three-quarters of a mile in length, it was afterwards owned and beautified by Lord ARMSTRONG as a private park, and a few years ago was presented as a gift to the town, the gift being accepted on behalf of the burgesses by the Prince of WALES. The genius by which nature has been helped to be picturesque without being improved out of existence, calls forth warm admiration; and as one sits in the leafy shade listening to the sound of the waterfall, it is hard to imagine that we are scarcely outside the busy town of a hundred manufactures. Here, too, the historical breaks in again, for the ancient Pilgrim Street and Gate was the avenue for the trooping pilgrims to the well and chapel of St. Mary, which may yet be seen, the latter being still perfect in outline though small in extent. From the mound on which it stands, the "Jesus Mound," Jes-mond takes its name. A light and elegant iron bridge spans at considerable height the valley (Dene) below and forms the way to the Armstrong or Heaton Park, and so is completed the line of parks which almost encircles the town.

Before turning to the manufactures of the Tyne, a glance at the centres of learning in Newcastle is requisite. The University of Durham has with that spirited enterprise which has characterized it during the past half century extended its field so as to make the northern metropolis a most important seat of its teaching work. In Newcastle the University has its College of Medicine, and its College of Physical Science. The New College of Medicine in Bath Road, just approaching completion, is in every way worthy of the important position which this school has now reached, and its professorial staff, drawn from local practitioners of medicine, is one well qualified to do tutorial work of a high order. In its older premises, now demolished to make way for railway extensions at the Central Station, were delivered the lectures on Pharmacy of Mr. B. S. Proctor, F.I.C., which have now so largely become the text-book of English pharmacy. The College of Science, a new and handsome structure in College Street, Barras Bridge, possesses a special interest for our readers as the place where the Conference meetings of 1889 are to be held, and the fine suite of rooms so generously placed at the disposal of the pharmacists will be appreciated by all who attend. Interest will also be found in the fact that the classes of the North of England Pharmaceutical Association form an integral part of the College work. Dr. G. S. Brady, the able Professor of Biology at this College, is the brother of the distinguished pharmacist and former President of the Conference, Mr. H. B. Brady, F.R.S. In this College, by a liberal expansion of the Universities Extension Scheme, the degrees of B.Sc., etc., etc., can now be taken out by attending either day or evening classes.

The Institute of Mining Engineers finds its home in the Wood Memorial Hall, near the Central Station. Adjoining this are the fine library and rooms of the Literary and Philosophical Society, whose Committee has kindly placed the rooms at the disposal of members attending the Conference.

AWARD OF THE HANBURY MEDAL TO PROFESSOR PLANCHON, OF PARIS.

The roll of recipients of this distinction recognizing high excellence in the prosecution or promotion of research in connection with the Natural History and Chemistry of Drugs is at present necessarily but small, as it is only eight years since the biennial award was inaugurated. Members of the Society and those who take an interest in the studies to which the medal relates will, however, be gratified to find that by the decision recently arrived at by the adjudicators, the class of Hanbury medallists, notwithstanding its small number, will have acquired still more of the international character which it may be expected to present in the future. The choice has, in this instance, fallen upon a Frenchman, Professor Gustave Planchon, M.D., D. es Sc., Director of, and Professor of Materia Medica in, the École Supérieure de Pharmacie de Paris, and an honorary member of the Pharmaceutical Society. The name of Professor Planchon will be familiar to the readers of this Journal, not only by reason of the official position he occupies in connection with the Paris School of Pharmacy, but also as the author of numerous papers which have appeared in our pages, and have constituted valuable contributions to our knowledge of drugs. It may also be added that Professor Planchon is the editor of the 6th and 7th editions of Guibourt's 'Histoire naturelle des drogues simples; the author of a manual of Materia Medica entitled, "Traité pratique de la determination des drogues simples d'origine végétale." The Essay on "Des Quiquinas," by Professor Planchon, was translated into English by direction of the India Office, and among the numerous other articles contributed to French journals, a list of which will be found in the Royal Society Catalogue of scientific papers, may be specially mentioned 'Études sur les Strychnos.'

We understand that the inaugural address at the opening of the School of Pharmacy next October is to be delivered by Mr. John Marshall, F.R.C.S., F.R.S., President of the General Medical Council. For some years past the Society has been very fortunate in obtaining for this function the services of men of eminence in science and medicine, and our readers will be glad to see that on the present occasion the same advantageous condition will be maintained. This will be the second time that the delivery of the inaugural address of the session has been undertaken by a President of the General Medical Council, and the fact affords special reason for congratulation, not only as being in itself proof of the increased esteem in which the Pharmaceutical Society is now held, but also as furnishing one of the best grounds for hoping that the establishment of better and more intimate relations with the medical profession may pave the way to a realization of the objects of the Society, and a general advancement of the interests of pharmacy.

Proceedings of Societies in London.

ROYAL COLLEGE OF PHYSICIANS.

[CROONIAN LECTURE.]

RELATION BETWEEN CHEMICAL STRUCTURE AND PHYSIOLOGICAL ACTION.

BY T. LAUDER BRUNTON, M.D., F.R.S.

(Continued from page 77.)

ANALGESICS.

Non-reception and Non-perception of Painful Stimuli.—The two classes of drugs which we have already considered, general anæsthetics and local anæsthetics, both abolish pain: the latter by acting upon the peripheral terminations of sensory nerves, so that they do not receive the painful stimuli; and the former upon the nerve centres, so that they do not perceive them.

Non-transmission of Painful Stimuli.—But pain will also be relieved if the conducting power of the sensory nerve trunks or of the sensory paths in the spinal cord be so altered that painful impressions can be no longer transmitted.

Action of Cocaine on Nerve Trunks.—Cocaine has this effect upon nerve trunks when locally applied, for, when injected subcutaneously near a nerve, it may produce anæsthesia in all the district to which that nerve is distributed.*

Action of Cocaine on the Spinal Cord.—It has a similar action on the sensory tracts of the spinal cord, for Hughes Bennett† found that it rendered these tracts insusceptible to stimulation; and Mosso‡ found that both conductivity and reflex excitability in the cord are destroyed by it before the nerve trunks, either sensory or motor, are paralysed.

Action of Cocaine on the Cerebral Cortex.—It lessens the irritability of the cerebral cortex when directly applied, for if a 4 per cent. solution be applied to the motor areas, no convulsions can be produced by irritation by a faradic current.§

Excitability and Conductivity.—We must distinguish between excitability and conductivity both in nerve trunks and in the spinal cord. For these two functions of nerve fibres are to a certain extent independent of each other, and a nerve fibre may still be able to conduct stimuli from the peripheral terminations to the nerve centres, and *vice versâ*, when irritation applied to the nerve trunk produces no apparent effect. This condition may occur after exposure to great cold, and also in some pathological conditions.

Action of Drugs on the Conducting Power of Nerve Fibres.—Loss of conductivity may also be produced by the application of various substances to the nerve trunks, and a knowledge of the effect of drugs on the conducting power of nerve fibres appears to me absolutely necessary in order to understand the action of drugs on the spinal cord or on the higher nerve centres. For in the cord and brain the nerve cells and nerve fibres are so closely associated, that it is very difficult, if not impossible, to separate the action of a drug on the one from its action on the other. But in the nerve trunks we can apply the drug to nerve fibres alone. Having thus ascertained its action upon them, we may be able to judge with greater certainty what part of the drug's effect on the spinal cord is due to its action on the fibres, and what to its action on the cells.

For this reason I thought it necessary to begin a research on this subject along with my assistants, Dr. Batten and Mr. Bokenham. The method employed was to take the sciatic nerve of a frog, with the gastrocnemius muscle attached, so that its contraction or non-contraction when the nerve was stimulated might serve as an index for the presence or absence of functional activity in the nerve.

The nerve could be stimulated by a faradic current, either at the end farthest from the muscle, or at a point nearer the muscle. A large portion of the nerve was placed in a small glass chamber, into which various vapours or liquids could be introduced at will, so as to act on the nerve trunk. When the nerve was in its normal condition, the muscle contracted on stimulation of the nerve either at a spot within the glass chamber (*a*) or outside it at the further end (*b*). But if carbonic acid was introduced into the chamber, it abolished the irritability of that part of the nerve on which it acted, so that stimulation at B no longer caused any contraction of the muscle. But it did not destroy the conductivity nearly so quickly, for a stimulus applied at A would be conducted to the muscle, and cause contraction, when one applied at B had ceased to have any effect. Alcohol and ether had just the opposite effect, for they destroyed conductivity before irritability so that stimulation at A had no effect, while it caused contraction if applied at B. Phenol acted like carbonic acid, and destroyed irritability before conductivity. The action of dimethylbenzene differed according to the position of the methyl groups. Orthodimethyl, benzene, or orthoxylene had almost no action; paraxylene increased the irritability of the nerve, so that a single stimulation caused tetanus, and metaxylene did the same to a still greater extent. The number of substances experimented with has been considerable, but it would occupy too much time to discuss the results now. I would merely draw attention to the action of xylenes as having a possible bearing on the action of analgesics.

Mode of Action of Analgesics.—But our knowledge of the conduction of impressions in nerve trunks and the spinal cord is insufficient as yet to explain either the physiology of pain or the action of analgesics. We frequently notice that a very small dose of laudanum, such as 3 or 5 minims, will relieve abdominal pain without producing the least drowsiness, or, indeed, without exerting any other apparent effect upon the organism; and a similar result may be observed in severe headache from the administration of 5 or 10 grains of antipyrin. In trying to explain such phenomena we are obliged to have recourse to hypotheses. A hypothesis in itself has no value, and is worse than useless if it leads people away from facts, but it is extremely useful when limited to its proper function, namely, to help us to string together facts which are already known, and to indicate the direction in which to look for new ones. Thus Dalton's atomic theory has been of the utmost value to chemistry, and the hypothesis that the carbon atoms are united into a ring has not only rendered the classification of aromatic compounds much easier, but it has aided in the discovery of new ones.

Facts regarding the Transmission of Painful Impressions.—As the first function of the hypothesis is to link facts together, let us first see what facts we have got in relation to pain. Painful impressions are conveyed by the grey substance in the spinal cord. This seems to be shown both by physiological experiments and by clinical observations. Tactile impressions are conveyed by the white matter, probably in the lateral columns. Tactile impressions are conducted more quickly to the brain than painful ones, and a more powerful stimulus is required to produce a painful impression than a tactile one.

Fibres and Cells as Conductors.—This is exactly what one would expect from the different nature of the conducting paths of the two instances; for the nerve fibres which conduct the tactile impression have

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* Hall and Halsted, *New York Med. Journ.*, Dec. 6, 1884.

† Hughes Bennett, *Edin. Med. Journ.*, Oct., 1878.

‡ Ugolino Mosso, *Arch. f. exp. Path. u. Pharm.*, vol. ii., p. 158.

Tumass, *Arch. f. exp. Path. u. Pharm.*, vol. xxii., an almost direct course, and afford little opportunity for any weakening of the stimulus by diffusion. The branching cells of the grey substance, on the contrary, form a zigzag path which must be longer than the other; it probably presents greater resistance, and it affords more opportunity for entire loss of the stimulus by diffusion to other cells in the cord. Thus, unless stimulus is tolerably powerful, none of it may pass upwards to the brain, and therefore no painful sensation will be perceived.

Summation in Cells.—But, on the other hand, it would appear that the cells of the grey substance in the spinal cord or the sensory ganglia of the brain may be so excited by a succession of very feeble stimuli, each reinforcing the other, that the extremest agony may be produced. Thus we have all heard that one of the most dreadful tortures of the Spanish Inquisition consisted in allowing a single drop of water to fall at regular intervals; and Naunyn* has found that in some cases of spinal disease intense pain may be caused by gently touching the foot with the point of a camel's-hair pencil at regular intervals. A summation of the stimuli appears to go on in the cells, each stimulus increasing the effect of the preceding, just as a slight touch upon a swing, repeated at the proper moment, will send it higher and higher and higher until it oscillates to the fullest extent of which it is capable.

Effect of Stimuli depends on Time of Application.—But if similar touches be applied to the swing so as to interfere instead of to assist its oscillation, they will soon bring it to rest. Similar touches will thus produce opposite effects from a change in their relations to the oscillation of the swing. Translating this into physiological language, we should say that in the first instance we had a case of summation, in the latter of inhibition. Let us follow this familiar illustration one step further. We all know that when we start a swing we stand close to it at the spot where it hangs when it rests, and as its oscillations get longer and longer we move farther back. If we move a little way back our pushes will first have the effect of summation, but if we remain in that position and do not adapt our pushes to the increasing oscillation of the swing, they will lessen instead of increase its movements, or, in other words, they will have an inhibitory action. Thus we will have stimuli producing alternately an increase and a diminution in the oscillations in the swing, though the increase and diminution will not be very great.

Alternate Stimulation and Inhibition in Health.—We seem to have a somewhat similar condition in the nervous system. Some time ago I was making some experiments with one of Mr. Francis Galton's whistles, which he kindly lent me. I adjusted it so that the sound produced was almost at the upper limit of my sense of hearing. On then sounding it continuously I was struck by the fact that the sound was alternately audible and inaudible, although I ascertained that no corresponding change occurred in the strength with which the whistle was blown.

In Disease.—A similar observation was made by the younger Remak† in relation to pain in the case of tabes dorsalis. He found that when a faradic current was applied by a brush the sensation it produced gradually increased, then diminished and increased again, although the strength of the current remained perfectly the same. With a weak current, the increase each time became less, and the pauses between became greater, until at last no sensation was felt. With a stronger current the sensation gradually increased until it became so painful as to be unendurable.

Possible Effect of the Blood.—In my own case I was unable to satisfy myself that the alternate appearance and disappearance of the sound of Galton's whistle might not be due to an alternate increase in the sensibility of my auditory centres from altered supply of blood, for I observed* some years ago a capillary pulsation in man which usually occurs about once in twenty seconds, and this appeared to be nearly the time of each wave of hearing. In Remak's case the waves of sensation were from twenty to fifty seconds, and the alteration in the length of interval between them renders it probable that they were due to summation in the nervous system itself rather than to its vascular supply.

ANALOGY BETWEEN SENSATION AND MOTION.

Summation of Motor Stimuli.—A marked analogy seems to exist between sensory and motor processes in the spinal cord. In a research which Stirling made under Ludwig's direction, he showed that reflex contractions only occur from repeated shocks to the nerve centres—that is, through summation of successive stimuli.

Summation of Sensory Stimuli.—According to Naunyn the same rule holds good for pain, which he regards as also a consequence of summation. For this reason it can only occur when conduction through the grey substance is not too much disturbed, because it is only in the grey substance that summation can take place, the structures of the white columns not being adapted for it.

Summation in Peripheral Nerves.—But if the analogy between sensory and motor processes be true in the spinal cord, we should expect to find something similar in the peripheral ends of nerves.

Tickled to Death.—There is no phenomenon in physiology which strikes me as more wonderful than the extraordinary motor effects which can be produced by the application of extremely slight stimuli to the skin, phenomena which seem utterly disproportioned in their extent to the slightness of their cause. I well remember, as one of the most frightful moments of my life, being nearly tickled to death by a nurse. I do not think I could have been more than five years of age, but the agony of that moment is deeply imprinted in my memory, and I can well believe the truth of the statement that Simon de Montfort, during the persecution of the Albigenses, put some of them to death by tickling the soles of their feet with a feather. Yet of all parts of the body the skin of the soles of the feet is liable to the most constant and severe stimulation in walking, running, and leaping. It has sometimes occurred to me that possibly the different effect of a slight stimulus like the touch of a feather, which causes intense reflex action, and of a gentle but steady pressure of the finger, which gives rise to no reflex action at all, may be due to the stimulation by the latter of two sets of nerves which counteract or inhibit each other. The prolonged course of the nerve fibres in some of the tactile corpuscles may possibly have something to do with this. A similar phenomenon to the effect of steady pressure in lessening reflex action may be observed in the relief afforded by rubbing or stroking a part which has been pinched or bruised, or by scratching an itching spot.

Transference of Hysterical Hemi-Anæsthesia.—But this is much less in degree and is by no means striking, while the transference of hemi-anæsthesia to the other side of the body in hysterical patients by the simple application of a piece of metal or even a wooden button is comparable to death from tickling, both in the extraordinary character of the result and the slightness of the cause.

MODE OF ACTION OF ANALGESICS.

In considering the action of analgesics we must take into account their possible effect on nerve end-ings, peripheral and central, as well as their action upon nerve trunks and nerve cells. It is *a priori* probable that when the blood contains any drug having the power to lower the activity of nerve fibres its action will be exerted upon the peripheral ends before they have received a medullary sheath, and at the central ends where they have lost it, at their junction with nerve cells, before it can act on the nerve trunks. For not only is a nerve trunk sparingly supplied with blood, but the medullary sheath will oppose a certain obstacle to the action of drugs upon the axis cylinder. This appears to be the case with cocaine; for, at a certain stage of poisoning, irritation of the nerve trunks will produce reflex action, although irritation of the skin is no longer followed by any response, a fact which indicates that the peripheral terminations of the nerves have been paralysed before the fibres in the trunk.

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* Naunyn, *Arch. f. exp. Path. u. Pharm.*, vol. xxv., p. 301.

† Remak, *Arch. f. Psych. u. Nervenkrank.*, vol. vii., p. 505.

* Lauder Brunton, *Journal of Physiology*, vol. v., p. 14.

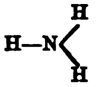
Explanations.—Dealing with hypotheses, as we must do in relation to the action of analgesics, one of the first explanations that occurs to us as probable is that the sensory impulses which in the normal condition would give rise to summation in the cord or sensory ganglia, and, being transmitted to the brain, give rise to pain, may be diffused from one cell to another, and the impulses, instead of causing summation, may even produce inhibition.

Possible Failure of Analgesics to Relieve Pain.—It is evident that if the relief of pain by analgesics is due to the diffusion of a sensory stimulus, so that it does not reach the brain, it is quite possible for a very powerful stimulus to pass to the sensory centre in spite of loss by diffusion. In such a case the pain might actually undergo a process of summation in the cord and be rendered more excruciating instead of being relieved by the remedy.

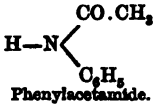
Irradiation of Motor Impulses Produced by Analgesics.—There appears to be, as I have said, a resemblance between the sensory and motor processes in the cord, and most of the analgesics, as distinguished from the anæsthetics, tend to cause irradiation of motor impulses. While anæsthetics lessen the activity of all the nervous tissues and thus produce drowsiness, loss of sensation, and abolition of motor power and reflex action, many of the analgesics, when pushed to excess, tend to produce excitement of reflex action with diffusion of movement. Thus, when the toes of a frog are slightly pressed it only draws the foot away, but in a frog poisoned by an overdose of some of the analgesics, the stimulus, instead of being localised in the cord and producing a reflex action limited to one limb, appears to be diffused through the nervous system generally, giving rise to tremor over the whole body or even to convulsions and tetanus. This condition is observed when frogs are poisoned by the most powerful of all analgesics, namely, morphine, and it is common to most of the others—cocaine, antipyrin, antifebrin, phenacetine, and exalgine.

CHEMICAL STRUCTURES OF ANALGESICS.

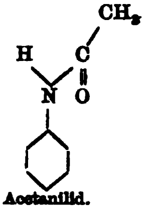
All those substances belong to the aromatic group of bodies, and it is in this group that we are likely to find the most powerful drugs to relieve pain as well as to reduce temperature. The constitution of morphine is very complicated, and we do not yet know what it is; all that can be said about it is that it is probably a quinoline of phenanthrene. Antifebrin, or as it is scientifically called, acetanilid, phenylacetamide, has the simplest constitution of any of the bodies that I have mentioned, for it merely consists of aniline in which one atom of hydrogen is replaced by acetyl. You will see from its formula that it may be regarded as ammonia, in which one atom of hydrogen is replaced by phenyl, and another by acetyl. When regarded from this point of view it is called phenylacetamide. But it may be regarded also as benzene in which one atom of hydrogen has been replaced by NH_2, and thus converted into aniline, and then one atom of H in the NH_2 has been replaced by acetyl $CO\cdot CH_3$. When regarded from this point of view it is called acetanilid. In two long researches on which Dr. Cash and I have been engaged for more than six years, as well as in some experiments in aid of which I obtained a grant from the Royal Society, fifteen years ago, we have been trying to ascertain the effect of ammonia and its various compounds on the one hand, and of substances belonging to the aromatic or benzene series on the other, upon muscle, nerve and nerve centres.



Ammonia.



Phenylacetamide.



Acetanilid.

Action of Ammoniacal Compounds.—In the course of the research we found that ammonia and its salts stimulate and afterwards paralyse the spinal cord. The stimulant action was marked in ammonia, ammonium bromide and ammonium chloride. The paralyzing action was more marked in the case of the iodide. The compound ammonias have a much more powerful paralyzing action both on the spinal cord and on the motor nerves, especially on the latter, and here again the paralyzing action is most marked in the case of the iodides.

Action of Aromatic Compounds.—The aromatic compounds all tend to produce increased sensibility, incoordination, and tremor, but they do not all seem to affect the spinal cord alike, for while benzene and its haloid compounds, mono-chlor-, mono-brom-, and mono-iodo-benzene produce in frogs tremors which remind one of disseminated sclerosis in man, with ethyl benzene the movements of the frog's legs were short, clapping, and ineffective, reminding one of locomotor ataxy in man. Aniline may be regarded either as amido-benzene, that is, benzene, C_6H_6, in which one atom of hydrogen is replaced by amidogen, NH_2, or as phenylamine, that is, ammonia, in which one atom of hydrogen has been replaced by phenyl C_6H_5.

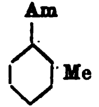
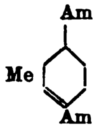
Action of Aniline.—In accordance with this constitution we found that the symptoms produced by it were different both from those of benzene and those of ammonia. They differ from those of benzene, and resemble those of ammonia in the tendency to more violent spasm and to greater paralysis of muscle and nerve.

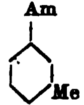
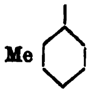
They differ from those of ammonia, inasmuch as the convulsion never assumes the form of true tetanus, the tetanic spasm which the ammonia atom would produce being broken up, so to speak, by the action of the benzene.

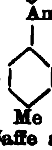
Tetanizing Agents ought to be Analgesics.—If the hypothesis be correct that a relationship exists between the power of a drug to cause diffusion of sensory and of motor stimuli in the cord, one would expect that substances which cause tetanus like ammonia, chloride of ammonia, and strychnine ought to act in some measure as analgesics. Indeed, this seems to be the case, for ammonium chloride is sometimes a very successful remedy in the treatment of neuralgia, and strychnine is sometimes useful in the lightning pains of locomotor ataxy. But the fact that ammonia, benzene, and ethyl benzene, while all tending to produce spasm, cause movements of such different kinds, indicates that they affect the motor parts of the spinal cord in different ways. We might, therefore, expect that similar differences would exist in the sensory parts of the cord, and thus one drug might have a special tendency not only to relieve pain in general, but to relieve a particular sort of pain more than another.

According to Dujardin-Beaumetz,[*] the power to relieve pain is most marked in those amidogen derivatives of the aromatic group in which an atom of hydrogen is replaced by an alkyl and especially by methyl, while the amidogen derivatives, where no such substitution has taken place, have their antipyretic action most marked. Thus acetanilid, which is an amidogen derivative of benzene, is a powerful antipyretic. It has also an analgesic action,[†] but when it is combined with methyl its analgesic power is increased.

Constitution of Acetanilids in Relation to their Action.—It is a matter of considerable importance where the methyl is placed. There are three positions in relation to the amidogen group where it can be placed in the benzene nucleus,

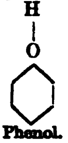
the ortho  or 

the meta  or 

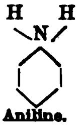
and the para 

According to Jaffe and Hilbert, the meta-methyl-acetanilid or meta-aceto-toluide is the only one which retains the antipyretic action, the compound in which the methyl is in the para position being inactive, and the ortho compound being toxic but not antipyretic.

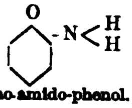
Exalgine.—These compounds have again been investigated by Dujardin-Beaumetz and Bardet, and they have found what the previous investigators missed, that the ortho-aceto-toluide has a marked analgesic power, so great that they think it deserves the name of exalgine. According to them, its power to relieve pain is very marked in all kinds of neuralgia, and is greater than that of antipyrin.[‡]



Phenol.

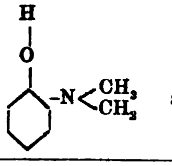


Aniline.

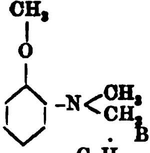


Ortho-amido-phenol.

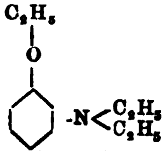
Effect of Alkyls on Aromatic Compounds.—Another most interesting research on the effect of introducing alkyls into aromatic compounds has been made by Baldi under Schmiedeberg's direction. Curiously enough though phenol and aniline are both poisonous, yet ortho-amido-phenol is not poisonous. If the two hydrogen atoms in the amidogen group in this body are replaced by two methyls,



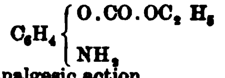
an extremely weak narcotic substance is produced, and curiously enough the narcotic action is still weaker if the hydrogen in the hydroxyl is also replaced by methyl,



But if all three hydrogens are replaced by ethyl,



the substance has a distinct narcotic action, and the body,



$$C_6H_4\left\{\begin{array}{l}O.CO.OC_2H_5\\NH_2\end{array}\right.$$

has a powerful analgesic action.

Prospect of Numerous Analgesics.—As the ways in which methyl may be combined with aromatic bodies are almost numberless, we may expect before long a great increase in the number of analgesics, and not improbably some new ones may far surpass in their power to relieve pain anything that we as yet possess. Before passing from this subject, however, I must indicate a possible source of danger from the continued employment of such analgesics.

Dangers from Analgesics.—We know that the continuous employment of narcotics, such as morphine or chloral, is apt to grow into a habit, and the consequences may be very deleterious to the mental functions. A similar habit, we know, may be established by the use of cocaine, and it is possible that something similar may occur in the case of other analgesics. But there is another possibility which I wish to indicate in addition to this, namely, that just as the brain may become deteriorated by the use of chloral or morphine, so the cord may possibly be injured by the use of analgesics. I have already mentioned that Dr. Cash and I observed in frogs symptoms bearing those of disseminated sclerosis, or of locomotor ataxy in man, and Batten and Bokenham have noticed that antipyrin may produce in frogs a condition like that of spastic paralysis. Cash and I tried to produce symptoms of permanent disease of the spinal cord in frogs by keeping up the poisoning for some time. We were unsuccessful in the attempt, as the symptoms always passed off when the poison was eliminated, but still the conditions in our experiment were very different from those which would occur from the prolonged use of analgesics by a patient, inasmuch as the treatment of the latter might continue for weeks, months, or years, whereas in our experiment time could be counted by days. A circumstance that renders circumspection in the use of analgesics all the more necessary is that various nervous disorders in which the symptoms appear to depend either upon peripheral neuritis or an affection of the spinal cord have lately been described as arising from the use of some of the new explosives, whose chemical constitution approximates somewhat to that of the analgesics. Another action of analgesics which renders caution desirable in their use is their effect upon the blood. Thus exalgine may render the blood incapable of performing its respiratory functions, and thus induce marked lividity, with tendency to collapse, and thus endanger life, while others may destroy the blood corpuscles and produce marked anæmia.

Possible Relation of Leucomaines or Ptomaines to Spinal Disease.—In relation to this, another question suggests itself: whether diseases of the spinal cord may not owe their origin, at least in part, to poisons of the aromatic series, generated either in the intestinal canal or in the tissues of the cord itself.

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[*] Dujardin-Beaumetz and Bardet, *Compt. rend.*, cviii. p. 571.

[†] Lépine, *Rev. de Med.*, 1887, pp. 306, 520.

[‡] My own experience of this drug has been somewhat disappointing, but it is much too limited to enable me to express any definite opinion.

Use of Suspension.—The remarkable benefit obtained from suspension in cases of locomotor ataxy is one of the most striking discoveries that have been made in therapeutics of recent years. It is very difficult to explain, but I should be inclined to think that suspension merely acted upon the cord in the same way that massage does upon the muscles, by removing the lymph and with it the products of nerve waste; while, at the same time, it may increase the processes of oxidation and repair by promoting a free circulation of the blood.

CIRCULATION.

The state of a patient's circulation has always been regarded as the most important guide the physician can have in regard both to prognosis and treatment. The arms of our college exhibit a hand feeling the pulse as the most characteristic act of a physician.

Test for Life.—As the old adage has it, "While there is life there is hope," and life can never be regarded as extinct while circulation continues. One of the best, if not the best, tests whether life is actually extinct or not is to tie a piece of thread with moderate tightness round the finger. If the person be quite dead no change will occur, but if there be any circulation, however slight, the end of the finger will gradually swell. Even after death has occurred and circulation has ceased in the body generally we are able to maintain the functional activity of isolated organs by means of artificial circulation, so that the lung retains its vitality, the muscles their conductivity, and the glands their secreting power for hours or even for days after the rest of the body to which they belonged are dead. On the other hand, if the circulation in an organ be arrested by contraction, plugging, or pressure upon the vessels supplying it, its function is quickly abolished, although the other parts of the body may be perfectly healthy.

"Faint Heart never won Fair Lady."—Feeble circulation leads to poor nutrition and general weakness and inefficiency, so that a faint heart has become proverbially unsuccessful. A stout, or strong heart, on the other hand, leads to active circulation, good nutrition, general power, and success in life. By keeping up an abundant supply of blood to the tissues it removes the acid products of waste which, as we have seen, powerfully tend to interfere with oxidation. But possibly this is not the only effect of a powerful heart.

Chemical Uses of the Pulse.—According to Fleischl, the shock of the blood sent into the capillaries at each cardiac systole has a mechanical action in aiding the chemical processes of tissue change, in somewhat the same way, though to a less extent, as a blow upon a percussion cap. It is therefore of the utmost importance in the treatment of disease to maintain the action of the heart, and to stimulate it when it is flagging.

Beef-tea as a Cardiac Stimulant.—It is curious to note how a well-grounded practice often holds its own amid changes of theory, and beef-tea still maintains a foremost position among our cardiac stimulants. We have other drugs which increase the power of the heart, and which are most useful in their place; digitalis, strophanthus, convallaria, adonis vernalis, and erythrophlœum, and the whole class of drugs usually known as cardiac poisons. Unfortunately, these drugs do not always give us the result we desire, and at present we are often unable to say why they fail. We do not know their chemical constitution, and therefore we cannot modify it or produce at will drugs having a similar but not identical action, as we can, to a certain extent, in the case of antipyretics and analgesics. Starting from beef-tea, however, we may perhaps obtain what we want. One of the constituents of eef-tea is xanthine. This has a very powerful action on voluntary muscular fibre, but its effect on the heart requires to be more carefully made out.

Caffeine as a Cardiac Tonic.—Methyl xanthine, or caffeine, is now recognized as an important cardiac tonic. Like xanthine, it tends to increase the contraction of muscular fibre, both voluntary and involuntary, and, when its action is pushed far enough, it produces an extraordinary state of muscular rigor. In consequence of this, voluntary muscles dipped into a solution of it frequently contract to the utmost extent of which they are capable, and when applied to the frog's heart it causes the beats to become slower and the heart more and more contracted, until it ceases to beat in systole. In this action it agrees with the other cardiac tonics, like digitalis; but a curious point is here to be noted.

Paradoxical Action of Caffeine.—Although it usually causes firm contraction of the frog's muscle, yet sometimes it causes none at all, and Cash and I have actually found it cause elongation. At present we are unable to explain this curious phenomenon with certainty.

Possible Transverse Contraction and Active Elongation of Muscle.—To me it seems most readily explained on the supposition that muscular fibre, both voluntary and involuntary, not only contracts longitudinally and thus becomes shorter, but may contract transversely and thus become longer. The varying conditions which Cash and I have observed in the frog's muscle under the influence of caffeine, may be explained by supposing that usually the longitudinal contraction is greater than the transverse, and therefore the muscle shortens; that occasionally the longitudinal and transverse contraction occur together and counteract each other, so that the muscle retains its usual length; and finally, that occasionally, though rarely, the transverse is greater than the longitudinal contraction, and therefore the muscle becomes elongated.

Practical Bearing of Physiological Questions.—But some men may say, what does it matter to us whether a frog's muscle, dipped in caffeine, becomes longer or shorter, and what possible connection with medicine can a discussion have on the question whether its fibres contract transversely as well as longitudinally? And yet it is a matter of vital importance to a patient with mitral disease whether the muscular fibres of his heart will shorten sufficiently to expel the blood from his ventricles or whether they will remain quiescent altogether, or actually elongate, so that the heart stands still in full diastole.

(*To be concluded.*)

CHEMICAL SOCIETY.

(*Concluded from page* 80.)

Note on the Determination of the Molecular Weight of Substances in Solution, especially Colloids.—By HENRY E. ARMSTRONG.—The fundamental conception underlying the now very general acceptation of the Raoult methods of determining molecular weight is undoubtedy the conception introduced by Van't Hoff that substances are present in dilute solutions in a state comparable with the gaseous state. But in gases, even in the most imperfect, the individual molecules exercise a very slight mutual attractive influence; otherwise, in fact, the gaseous state could not subsist. When liquefaction ensues, it would appear to be owing to, and to involve the exertion of, such mutual intermolecular attractions; and however continuous the states of gas and liquid may appear from a mathematical standpoint, the continuity would seem to be only that kind of continuity which is observed in dissociative changes generally. Although statistical analysis may support the conclusion that the gaseous state and that which obtains in a dilute solution are comparable, a consideration of the phenomena in the light of our knowledge of intermolecular relationships cannot at present be held to justify any such assumption. How can it be permissible, in fact, to compare the approximate truth of the laws of Boyl and Gay-Lussac with Raoult's, if in solution an all-important part be played by a factor—the solvent—which, in the case of gases, may be left almost entirely out of consideration; and if water be not a neutral substance and the phenomena of dissolution are, as many believe, of a high order of complexity. The regular and rational results which are obtained on applying the Raoult methods to dilute solutions of substances of known molecular weight are undoubtedly very striking and likely to carry conviction to many minds that the methods are of universal application; but other equally striking coincidences have been observed. Thus it is highly remarkable that the hydroxides generally—in dilute solutions be it observed—have the same heat of neutralization. This illustration is of special moment, for if we consider the supposed interagents alone and disregard the solvent as a chemical agent, it is inconceivable that such should be the case; the result must be in some way a consequence of a higher law not yet clearly perceptible through the haze of complexity which so enshrouds the phenomena of chemical change in solution. It cannot be doubted that the constancy is conditioned by the presence of water in large relative quantity, as most irregular and dissimilar results are obtained if the comparison be made for any other than dilute solutions, just as in the case of the Raoult freezing method (cf. Beckmann, *Zeit. phys. Chem.*, 1888, 638 and 715). If the argument here advanced be admitted, it follows that not only the molecular weight of a substance but also its *specific effect* must be taken into account; and this is undoubtedly the case. It is well known that acids and metallic salts, and indeed electrolytes generally, give abnormal results; they produce too great an effect. Arrhenius has suggested that such compounds are present in solution in a more or less dissociated condition—dissociated into their "*ions*;" that, in fact, such solutions contain a greater number of active molecules than are usually supposed to be present. Allowing for this increase in a manner which he has pointed out, "normal" results are obtained in place of the impossibily low molecular weights which result from the direct reduction of the experimental values. But if we are to accept this view, we must admit that water is a neutral substance, and that it plays no active part in electrolysis; in other words, such a conclusion directly involves the acceptation of a particular hypothesis as to the nature of electrolysis. The arguments on which this hypothesis is based, however, are mostly cases of circular reasoning, and there are many facts which apparently cannot be satisfactorily accounted for by it (cf. 'B.A. Report,' 1888, 356). The one argument in favour of the dissociation hypothesis which is generally regarded as all-sufficient—the argument originally advanced by Clausius, that any E.M.F., however small it may be, produces sensible electrolysis, is one of which it would be premature to accept any explanation as final in our entire ignorance of the inner mechanism of electrical actions—while the electric current is an unsolved mystery, as was happily observed by Professor Rowland in a recent lecture—especially as there are electricians who are of opinion that the Clausius hypothesis is not necessarily the only possible solution, although at present unable to suggest a more satisfactory one. But not only is the explanation of electrolysis which is usually given of a purely "mechanical" nature, and incompatible, therefore, with the view that the solvent plays an active part; it is open also to the objection that in framing it attention has been paid too exclusively to a certain limited number of phenomena, and that the bearing of the facts of chemistry generally as these present themselves to the mind of the chemist has been insufficiently considered. It is probable that this will soon cease to be the case, as signs are not wanting that it will ere long be recognized that chemical changes are essentially electrolytic phenomena, and that we may expect to witness the rehabilitation of Faraday's view of 1834 of "the identity of the force constituting the voltaic current or electrolytic agent with that which holds the elements of electrolytes together, or in other words with chemical affinity." Although it may be urged that the method which Arrhenius has introduced of correcting the results obtained in the case of electrolytes is based on an incorrect interpretation of the phenomena, it does not follow that his method is necessarily a faulty one: on the contrary. Practically the method involves nothing more than the recognition of the fact that it is possible to determine with a close approach to accuracy, and to allow for, the *specific effect* which a compound exercises. This would seem to be the case. Thus Ostwald's experiments show that in the case of acids, for example, in seeking to determine the order of activity in which these may be arranged, practically the same result is arrived at, the order deduced being very similar, when very diverse properties are made the subject of study. Molecular weight does not come into evidence as a determining cause of position in such a series, compounds such as hydrogen chloride, bromide and iodide occurring together and almost at the head of the scale of activity, while hydrogen fluoride is found low down in the series. The compounds in such a series afford "abnormal" values when examined by the Raoult methods in dilute solutions owing to their exercising a greater effect than is produced by compounds which give "normal" values; the extent to which the effect produced is in excess depends on the position in the series, and if proper allowance be made on this assumption a "normal" value is necessarily obtained, *i.e.*, a value consonant with the view which on general grounds we are led to form as to what would be the composition of the molecule of the substance if it were obtained in the gaseous state. But it has yet to be proved that such "corrected normal" values, and those directly found for neutral compounds which can be gasified, uniformly represent the true molecular weights of the dissolved substances and not merely the weights of their fundamental molecules. Whereas in dilute solutions an excessive effect is often produced which would lead to the molecular weight being under-estimated if the result were at once accepted, in the case of concentrated solutions a contrary result is frequently encountered, corresponding to more or less exaggerated estimates of the molecular weight: thus the effect produced by alcohol, for example, in a 32·5 per cent. solution is such as apparently to correspond to a molecular weight of 318 (Beckman). It is not difficult to explain this result on the mechanical hypothesis of the nature of solutions: and still less difficult on the assumption that dissolution is in the main a chemical process: inasmuch as in concentrated solutions less opportunity is given for the molecules of the dissolved substance individually to exercise their specific effect; inasmuch as molecular aggregates are more likely to persist; and inasmuch as the solvent may consist no longer of the substance ostensibly employed as solvent, but in part, at least, of a compound of solvent and dissolved substance. The reduction of the specific effect and the consequent exaggeration of the molecular weight in the cases here contemplated may be said to be due to inter- if not to extra-molecular compensation. But it is also conceivable that intramolecular compensation may take place, and that there may be compounds, the existence of which is not to be foreseen on the dissociation hypothesis, which exercise not an excessive but an inferior effect. The molecular weight of such compounds would necessarily be overestimated by the application of the Raoult methods. Benzene and thiophen may be cited as mere illustrations of what is meant by internal compensation. Benzene, it is well known, does not manifest the activity of a "triethylenic" compound, and evidently, in some manner not clearly understood, the six "surplus" affinities of the six carbon-atoms internally neutralise or compensate each other. In thiophen the sulphur appears to function only as a dyad, manifesting no tendency whatever to exhibit a higher valency in the manner so characteristic of sulphur in open-chain compounds: the inclusion of the sulphur in the chain in this case, therefore, involves a marked diminution in its activity. It may be suggested that probably colloids generally are compounds of inferior activity, such as are contemplated on the view here put forward. It is well known that they diffuse with extreme slowness (cf. *Nature*, xxxv., 598), and they are as a class very inert substances, the vapour-pressures of their aqueous solutions, for example, being almost if not the same as those of water alone at the same temperatures. The results recently brought forward by Brown and Morris for carbohydrates are of great interest, but it may be doubted whether they do more than confirm the views previously held with regard to the relative complexity of the several compounds. The same remark applies to the observations of Gladstone and Hibbert on caoutchouc. The fundamental molecule of a glucose must contain at least six carbon-atoms, and that of a saccharon (any member of the cane-sugar group) 12; that of an amylin (or dextrin) therefore most probably contains at least 24 carbon-atoms. A variety of *amyloins* might well result from the conjunction of amylon (maltose) and amylin molecules in various proportions. Maltodextrin,

$$C_{12}H_{22}O_{11}\cdot 2C_{12}H_{20}O_{12}=C_{12}H_{22}O_{11}\cdot C_{24}H_{40}O_{20};$$

inulin,

$$2C_{12}H_{22}O_{11}\cdot 4C_{12}H_{20}O_{10}=2C_{12}H_{22}O_{11}\cdot 2C_{24}H_{40}O_{20};$$

and amylodextrin,

$$C_{12}H_{12}O_{11}\cdot 6C_{12}H_{20}C_{10}=C_{12}H_{22}O_{11}\cdot 3C_{24}H_{40}O_{20},$$

representing these by the formula assigned to them by Brown and Morris, are apparently such compounds. By duplication of the molecule and withdrawal of the elements of water from such amyloins, "higher dextrins" might be formed which would still be compounds of moderate molecular weight; and even simpler compounds would result if the amyloins were merely to lose the elements of water. Compounds thus formed would undoubtedly be less active than the parent carbohydrates, owing to the "cancelling" of the hydroxyl-groups; and it may well be that they would exercise an inferior effect in solution, and one such as is observed in the case of colloids. It is undoubted that by the application of the Raoult methods a number of most interesting facts have been elucidated, which it is impossible and unnecessary to deny; but it is equally certain that we are only called on to make a rational use of them, and that slavish submission to the facts cannot be demanded. Those who directly accept the conclusions which are drawn, perhaps, have hardly realized what is involved, viz., adherence to the view that in a dilute aqueous solution of hydrogen chloride, for example, as much as 90 per cent. of the chloride is present, not as such but in the form of *free hydrogen and chlorine atoms*; such a conclusion may enable certain mathematical problems to be solved in an apparently satisfactory manner, but it is hardly one which a chemist's common sense would lead him to accept forthwith, in the absence of any explanation accounting for so extraordinary a difference between a dissolved substance at a low temperature and the same substance in the gaseous state at a high temperature. Attention may also be directed to the contradiction involved in the assumption that hydrogen chloride, although not appreciably dissociated when heated alone at 1500° in porcelain (Crafts and Meier), undergoes almost complete dissociation when dissolved in water, whereas nitrogen peroxide, according to Ramsay's experiments, exists in solution as N_2O_4, notwithstanding that it cannot be gasified unchanged, and is almost entirely resolved into NO_2 molecules at a temperature of about 200°.

Dr. Gladstone defended Raoult's freezing method, relying on the numerous coincidences between its indications and those afforded by vapour-density determinations. In illustration he referred to the polymeric C_5H_8 hydrocarbons. Mr. Hibbert and he had found that each of these, when dissolved in benzene, gave a freezing point indicating an analogous molecular composition in the gaseous and dissolved condition. The conclusion from the small lowering produced by colloids that they have a very complex molecule is only in accordance with what has been long believed on chemical grounds. No doubt there are discrepancies and difficulties; but a careful consideration of these must serve to improve our knowledge of chemical and physical theory.

Mr. Hibbert said, that in applying Raoult's method, he had found it advantageous to surround the freezing vessel with an air-chamber. The freezing point was then more definite. The contention of Dr. Armstrong against the applicability of Raoult's method to colloid substances was based on objections to the dissociation theory of electrolysis. It might be true that the only argument in favour of that theory was the fact that the smallest electromotive force was able to produce decomposition in an electrolyte, but the argument was a very strong one, and commanded the assent of nearly every physicist in Europe. With reference to the effect of colloids on boiling point, etc., the question was whether they did or did not produce a real alteration. Recent researches seemed in favour of a positive result.

The Correspondence between the Magnetic Rotation and the Refraction and Dispersion of Light by Compounds containing Nitrogen. By J. H. GLADSTONE, Ph.D., F.R.S., and W. H. PERKIN, Ph.D., F.R.S.

Note on the Oxidation of Paradiamines. By R. MELDOLA, F.R.S., and R. E. EVANS.

Monobenzyl-derivatives of the Phenylenediamines. By R. MELDOLA, F.R.S., and J. H. COSTE.

Note on a Yellow Pigment in Butterflies. By F. GOWLAND HOPKINS.—For the most part the colour effects on the wings of lepidopterous insects are probably due to purely physical causes, and not to the presence of any definite pigment. But in some cases pigments are undoubtedly present. These are for the most part very difficult to isolate; but an exception to the rule occurs in the case of a certain yellow pigment which is found in its purest form in the common English brimstone butterfly. The pigment may also be detected in the wings of a very large number of day-flying lepidoptera. It may be obtained from the wings by simple treatment with hot water, in which it is freely soluble; and it may be identified by its yielding a marked murexide reaction when evaporated with nitric acid and afterwards treated with ammonia or potash. The wings should be first treated with hot alcohol and ether, in which the pigment is insoluble, then boiled up with water, and the yellow aqueous solution filtered while hot. If the aqueous solution be now concentrated to a small bulk, and allowed to cool, the substance separates out as a yellow amorphous precipitate. It may be purified by dissolution in a fresh quantity of hot water, whence it again separates on cooling. Otherwise it may be removed from the wing by the action of dilute alkalis in the cold, and afterwards precipitated by the addition of acetic acid. The common brimstone butterfly yields somewhat less than a milligram of pigment from each insect; larger foreign species, such as those belonging to the genus *Callidryas*, may yield as much as 4 to 5 milligrams. The pigment is an amorphous powder, insoluble in alcohol, ether, chloroform, and all the more common organic solvents. It is very sparingly soluble in cold, but freely so in hot water. Its aqueous solutions have a fine blue fluorescence and are strongly acid to litmus. The substance is freely soluble in alkalis, yielding with them solutions darker in colour than is its aqueous solutions; from these it is precipitated when neutralized with acetic acid. It thus agrees closely in its physical properties with *mycomelic acid*, a yellow derivative of uric acid; though its yellow colour is more decided than is that of the latter substance. Mycomelic acid does not, however, yield a murexide reaction, while the pigment, as stated above, does so in a very marked manner. If it be boiled for some time with chlorhydric acid it is decomposed, and crystals of uric acid separate out, coloured much in the same manner as when obtained from acidified urine; on prolonged boiling with the dilute acid, urea is formed together with other crystalline substances not yet determined. There can be no doubt that the pigment is a derivative of uric acid, probably allied to mycomelic acid. It appears not improbable to the author that it may indeed be a condensation product of the two acids uric and mycomelic, and progress towards its synthesis has been made in this direction. If it be supposed that the two acids unite, with elimination of 2 mols. of water, to form a new dibasic acid, the acid would yield a silver compound containing 44·44 per cent. of silver. The pigment under discussion gives a perfectly definite silver compound, the amount of silver found in three analyses being 44·61, 44·66, and 44·42 per cent. The author hopes shortly to obtain a sufficiency of the substance for accurate ultimate analysis.

Zinc dextrosate. By A. C. CHAPMAN.—This compound is prepared by dissolving zinc hydrate in the smallest possible quantity of ammonia solution and adding the liquid to a solution of dextrose in 90 per cent. alcohol; its composition is represented by the formula $C_6H_{12}O_6 \cdot 2ZnO \cdot 3H_2O$.

β-Bromonaphthalenesulphonic Acid. By R. W. SINDALL.

Isomeric change in the Naphthalene Series. No. 5. β-Iodonaphthalenesulphonic Acids. By HENRY E. ARMSTRONG and W. P. WYNNE.

Note on the Hydration of Cyanides. By HENRY E. ARMSTRONG.

The Existence of Salicylic Acid in certain Genera of the Liliaceæ. By A. B. GRIFFITHS.—The author states that he has isolated salicylic acid from the leaves, stems, etc., of *Tulipa*, *Yucca*, and *Hyacinthus* in the following manner:—The leaves, stems, etc., cut up into small pieces, were digested with ether and the solution distilled. The residue was treated with distilled water and the solution filtered; the filtrate was then neutralized with potassium carbonate, evaporated, and finally distilled with pure chlorhydric acid. The aqueous distillate yielded on evaporation colourless, prismatic crystals, which were found to be soluble in ether, alcohol, and boiling water; but sparingly soluble in cold water. A solution of the crystals gave with ferric chloride a deep violet colour. A series of combustion analyses of these crystals were carefully performed, which he states gave the composition of salicylic acid. The crystals were found to melt at 130° C.; and on distilling them with lime, phenol and carbon dioxide were readily produced. The author states that he has estimated the percentage of the acid in various parts of the plants with the following results:—

	Tulipa.	Yucca.	Hyacinthus.
Leaves	0·0989	0·1410	0·1103
Peduncles . .	0·0812	—	0·0788
Stems	—	0·1065	—
Bulbs	0·0542	—	0·0483
Flowers . . .	trace	—	trace

The Formation of Sulphones on Sulphonating Naphthalene Derivatives by Means of Chlorosulphonic Acid. By W. M. HELLER.

On the Oxidation Products of Acenaphthene. By T. EWAN, B.Sc. and J. B. COHEN, Ph.D., Owens College.

Schützenberger's Process for the Estimation of the Oxygen in Water. By Sir HENRY E. ROSCOE, F.R.S., D.C.L., LL.D., and JOSEPH LUNT, B.Sc.—The authors find that a series of estimations made on the same sample of London tap water give results which differ 35 per cent. from the mean value, and that the time taken in titrating has a great influence, much higher results being obtained if titration be quickly than if it be slowly performed. The disturbing influence has been traced to the fact that when aerated water is introduced into an atmosphere of hydrogen, as in the usual process, it immediately begins to lose oxygen by diffusion, a fact hitherto overlooked. The result of an oxygen estimation thus depends on the degree of exposure to hydrogen during titration, and results between 0·53 and 7·56 were obtained with the same water by varying the exposure. Under favourable circumstances 20 per cent. of the dissolved oxygen diffuses, whilst in the usual form of the apparatus 50 per cent. of the oxygen diffuses during the estimation. An exposure of three minutes is sufficient to permit all the dissolved oxygen to escape. This explains the return of the blue colour during an estimation carried out in the usual manner, the *diffused* oxygen becoming reabsorbed by the reduced indigocarmine. No return of the blue colour takes place on reducing indigocarmine, when free oxygen is absent, and the action has been proved to be due to the supernatant gas, and not to any action occurring within the liquid as Schützenberger supposed. Diffusion also explains the observation made by Schützenberger that twice the amount of oxygen is found when a large amount of reduced indigocarmine is present; in that case the dissolved oxygen is at once acted on and so cannot diffuse. Ramsay and Williams, who have investigated the process, do not obtain twice the amount, but only an increase in the ratio 3 : 5. Diffusion also explains this observation, a smaller vessel having being used in their experiments a larger proportion of the oxygen was found in the usual process, in other words, three-fifths of the whole. The method adopted to eliminate this error, due to diffusion, is to run the aerated water beneath the surface of a liquid containing a measured excess of hyposulphite, and a little reduced indigocarmine as an indicator. In this way the dissolved oxygen is immediately acted on by the hyposulphite and its diffusion prevented. For the standardization of the hyposulphite, the two methods hitherto used were found inaccurate. The copper method being fundamentally wrong owing to a secondary action which occurs between sulphite and dissolved oxygen. The aerated distilled water method, hitherto used with Bunsen's absorption-coefficients, the authors show to be inaccurate, giving the values obtained by them, which agree closely with observations made by Dittmar. The new method of carrying out the process and the corrected values for the oxygen dissolved by distilled water give results for which perfect accuracy cannot be guaranteed, but are not far removed from the truth and certainly valuable. The reaction is much disturbed by the presence of free acid or alkali.

Obituary.

Notice has been received of the death of the following:—

On Saturday the 27th of July, Mr. Adam Mennie, Chemist and Druggist, Golspie, Sutherlandshire. Mr. Mennie was accidentally drowned while bathing.

Reviews.

THE USES OF PLANTS.* A Manual of Economic Botany, with Special Reference to Vegetable Products introduced during the last Fifty Years. By G. S. BOULGER, F.L.S.

The necessity for a comprehensive but conveniently portable work on economic botany has long been felt by students. Since the publication of 'Popular Economic Botany' by the late Professor Archer in 1853, there has been no popular handbook in the English language on the subject in its entirety, the nearest approach to one being the 'Treasury of Botany' and the 'Dictionary of Useful Plants,' neither of which fully meets the requirements of the student of the present day. Even so long ago as 1853 Professor Archer pointed out that "vegetable products formed nine-twelfths of the whole commerce in raw produce which employs the mercantile marine of this kingdom;" and during the last fifty years innumerable new vegetable products have been added to the list then known. In fact even the literature of vegetable technology has become so extensive as to have a whole volume devoted to it. The task of presenting to the public a small book embracing in as compact a form as possible useful information concerning all vegetable products, is therefore one requiring considerable discrimination and a very wide knowledge of commerce.

The author commences with a brief review of the state of economic botany fifty years ago and its subsequent progress; this takes the form of an introduction. The work is then divided into nine parts, including respectively articles used in connection with food, materia medica, oils and oil seeds, gums and resins, etc., dyes and tanning materials, fibres and paper materials, timber and other woods, and agricultural and other plants, these being followed by a synoptical index, in which the products are arranged under their natural orders, and by a general index. This is practically the classification commonly followed in exhibition catalogues, and is doubtless the one that in practice is found most useful.

From a general point of view the book strikes one as being admirable as a mere compilation, the information being evidently derived from the "hundreds of works" to which the author states reference has been made in the preparation of the manual. But everywhere evidence is visible that the author has not the practical knowledge of commercial products which is necessary to make the book a really valuable one. It is difficult in many instances to understand from the context whether the product described is used in this country or not. Thus the use of ground nut oil in butterine, of buckwheat in this country for buckwheat cakes (sold in every vegetarian restaurant), and of durra in adulterating flour are not alluded to. Under the head of arrowroot, several starches that do not pass in commerce, as arrowroot, are enumerated; no distinction is drawn between those which come rarely into commerce, such as that of *Tacca pinnatifida*, and those which are regular articles. In the part devoted to materia medica this want of distinction in the relative use of different drugs in one country as compared with another, is much more pronounced. The work is also by no means free from some errors of fact, such as that black mustard *contains* an essential oil (indicating a want of acquaintance with powdered mustard); and that opopanax is a gum resin largely used *in perfumery*, and that araroba is the *pith* of *Andira Araroba*. The statement concerning Balsamodendron Myrrha is also sufficiently wanting in lucidity to puzzle the learned authorities from whom it is said to be quoted.

Regarded, however, from the point of view of careful and industrious research, it is evident that we have here the result of the concentration of a vast and scattered amount of information, often conflicting in character, and it must be admitted that the work is carefully compiled as a whole. The author has also to a great extent counteracted the evil that might arise from his evident want of a really practical knowledge of his subject by referring in a very great number of cases to the works whence the information is taken. As giving a good general idea of the articles mentioned and a reference to works where fuller information may be obtained, the book will doubtless be found useful to students. The synoptical index, at the end of the book, which gives a list of the names of the plants yielding vegetable products, arranged according to their natural orders, is alone worth to the student the moderate price at which the book is published. Such a list it would be difficult to find elsewhere. It is, perhaps, too much to expect any one botanist at the present day to be practically acquainted with the commercial uses of *all* the products of the vegetable kingdom, and it may be hoped that the author, before publishing a second edition of what might be made a most useful work, will consult living experts in each branch of the subject, rather than rely on books which are sure to get out of date.

WINE. BY ALEXANDER WEBBER.*

This is described by the author as "a series of notes on this valuable product, and subjects suggested therefrom," and is the result of nearly thirty years study and experience, embodying all the points which are in his opinion worthy of notice. It is a heterogeneous collection of curious facts, humorous and other anecdotes, and quasi-scientific statements, such as (68) "Burgundy is the most blood-making of all wines, so much so that it cannot be recommended for continued daily use;" these are interspersed with some technical information, the whole being arranged in a series of short numbered paragraphs or sections, some only a line or two in length, which give the book a peculiar appearance. The index is very voluminous in proportion, being about a fourth of the whole book.

We will not dispute the author's claims to authority as a judge of good wines, but when he attempts to be scientific, the information he seeks to impart is, to say the least, very archaic. For instance (191) "Alcohol is composed of 4 parts carbon, 2 parts oxygen, 6 parts hydrogen," and (192) "Grape sugar is composed of 4 parts carbon, 4 parts oxygen, 4 parts hydrogen." His other excursions into chemistry are very similar to these. He is very enthusiastic on his subject, and is unstinting in his praise of good wine both as a beverage and as a medicine. The book may have some interest for wine drinkers, but has extremely little scientific value.

ANSWERS TO CORRESPONDENTS.

Dugald Taylor.—The plant is some species of spiræa. The specimen sent is insufficient for determination.

Safe.—We think it would be necessary, in the case you describe, to make your label indicate very distinctly that it does not hold out the preparation to be that of the B.P., for which the name you propose to use has been officially adopted as a synonym.

"*Jacques.*"—*Pharmaceutical Era*, D. O. Haynes and Co., 48 and 50, West Larned Street, Detroit, Michigan, U.S.A.; *Pharmaceutical Record Co.*, 66 and 68, Duane Street, New York, U.S.A.; *American Druggist*, William Wood and Co., 56 and 58, Lafayette Place, New York, U.S.A.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. G. Harvie, J. W. Douglas, S. Greenwood, J. H. Fisher, J. Pumphrey and Son, J. C. Sawer, Messrs. Burroughs and Welcome, H. O. Stratford, Dakin Bros., Ayrton and Saunders, Sweet Bread.

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* London: Roper and Drowley. Small 8vo., Pp. 1–224.

* London: E. T. Oliver, 1888. 16mo. Pp. i.–viii., 1–185.

LESSONS FROM FIELDS AND LANES.

AUGUST.

Now is the time for an all round examination of the order *Umbelliferæ*. From April to September some of its members are to be found in flower, so that in August both flowers, fruit and leaves may be studied in all stages. From a pharmaceutical point of view the fruit is the part to which most interest attaches, and, as in the *Compositæ*, is an important means of distinguishing the genera and species. The early flowering species have now ripened their fruit, and the most likely to be met with of these are the sweet cicely (*Myrrhis odorata*) and the common hedge parsley (*Anthriscus vulgaris*). The latter is to be found everywhere, and in June, when it is in full flower, attracts the attention of all who are in the habit of travelling by road or rail, be they botanists or not. The former is perhaps more common in the northern counties than in the southern, and is especially attractive to the country children wherever it grows, from its bold looking fruit—three times as large as the majority of umbelliferous fruits—and its strong odour of aniseed. The umbelliferous fruit is known as a *cremocarp*, a name derived from two Greek words meaning a fruit which is hung up. The fitness of the name is nowhere better seen than in the specimens before us—unless it be in the cow parsnip (*Heraclium Sphondylium*), the showiest umbellifer at present in flower, and easily recognized by its broad, robust-looking leaves, fleshy, clumsy-looking inflorescence, and flat, queer-looking fruits. The cremocarp consists of two halves, known as *mericarps*, which, before the fruit is ripe, are joined together, the joint being known as a *commissure*. When maturity has been reached the mericarps—which are simply achenes or one-seeded indehiscent fruits—separate along the commissure and remain attached by their tops each to a little stalk or *carpophare* (fruit-bearer). It is this suspension that gives rise to the name "cremocarp." In many fruits to be found in the shop drawers—such as hemlock, aniseed, caraway, fennel—this characteristic structure is well seen. If a transverse section of any of these be made and examined with a lens it will be noticed that the *pericarp* or outer covering of the fruit (corresponding to the walls of the ovary) contains *vittæ* or oil ducts.

The "fool's parsley" (*Aethusa Cynapium*) is now to be found both in flower and fruit, and should be carefully compared with hemlock (*Conium maculatum*). The plants are in many respects much alike, the chief points of distinction, however, being —hemlock is generally much taller and more bushy than fool's parsley, its stem is generally splashed with purple, its fruit looks more swollen and has wavy ridges, and it possesses both a *general* and a *partial involucre*; this last requires, perhaps, a little explanation, and to facilitate matters we will consider at the same time the structure of the flower and inflorescence of the *Umbelliferæ*. If any of the plants just mentioned as being in flower now be examined it will be found that the calyx is generally very minute or altogether missing, the corolla consists of fine unequal petals, the ovary is *inferior* and the stamens are *epigynous* (on the top of the ovary). At the base of the stamens and on the ovary a glistening honey-secreting surface will be noticed; this is known as the *disk*. The inflorescence is the feature from which the order takes its name, and is known as an *umbel* (from a Latin word meaning a sunshade). The order of expansion in the umbel is *centripetal*, the flowers are all stalked and spring from nearly the same point; sometimes the stalks instead of bearing a single flower branch again so as to form a *secondary umbel*, the inflorescence being then known as a *compound umbel*. A ring of bracts (or *involucre*) is sometimes to be found at the base of the primary umbels, sometimes at the base of the secondary umbels, and occasionally at the base of both. In the first case it is known as a *general* involucre, and in the second as a *partial* involucre or *involucel*. In hemlock both the involucre and involucel are somewhat one-sided, the bracts being reflexed and appearing to thin away towards the other side; in fool's parsley the involucel consists only of three to five long reflexed bracts, the appearance of which even in dried specimens can hardly be mistaken. Both these plants, like most of the umbelliferæ, have compound much-divided leaves.

It is quite beyond the scope of the present article to describe all the species of umbel-bearers now to be found in flower; this must be accomplished with the aid of a standard flora, the intention of the present articles being simply to point out the lines along which the student should work, and to arouse his interest by throwing into greater relief distinctions and points of resemblance which get lost in the wealth of description to be found in text-books.

By dry roadsides, on walls, and in hilly pastures, the delicate blue flowers of the hare-bell (*Campanula rotundifolia*) are now peeping from among the network of green formed by the fronds of the bracken, the boss-fern, and the buckler-fern. This is the true "blue-bell of Scotland," and differs fundamentally from the English blue-bell or wild hyacinth referred to already. It takes the generic name of *Campanula* from its bell-shaped flowers, the corolla being typically *campanulate*. The reason for its specific name is not so evident, because the round *radical* leaves from which it originates have generally disappeared before the plant forces itself on our attention by the production of flowers. Its habitat must be searched in early summer, and then the *ovate-cordate*, long-stalked leaves will be found forming delicate green rosettes. The *cauline* or stem leaves vary in shape from *lanceolate* to *linear*. The whole plant is most delicate and fairy-like, and its name of "hare-bell" is referred by some to the graceful "hair" like flower-stalks, while others trace it to the fact of its frequenting the haunts of the "hare." Its fragility contrasts strongly with the stout, fleshy character of the English blue-bell, and suggests generations of the "sparing diet" which is generally associated with rock and moor, both in respect to their *flora* and their *fauna*. There are in all nine or ten British species of *Campanula*, but most of the others are altogether more florid in their habit, the result of the richer living associated with their haunts; some of them—such as *Campanula latifolia*, and *C. Trachelium*—grow to a height of four feet, and are now among the most conspicuous features of many English lanes; "Canterbury bells" they are called by the country people. The order—*Campanulaceæ*—to which the bell-flowers belong is generally made to include the genus *Lobelia*, one of whose species—*Lobelia* *inflata*—is of pharmaceutical interest, although not to be found in this country. Nothing, however, can exceed the delicate beauty of *Lobelia Dortmanna*, a rare species to be found growing in the lakes of Scotland, Wales and the Lake district. We have found it growing very plentifully along the margin of Grasmere, and thought it ample reward for a day's hard walking. The lobelias have an irregular, bilabiate corolla with a split tube, and are thus easily distinguished from the campanulas. The honey of the bell-flowers is secreted as in the umbelliferæ by a *disk* on the top of the ovary. It is protected from unbidden guests by the broadened hairy bases of the filaments which completely surround and cover it, so that it is only the stronger insects, such as bees, that can reach the nectar. The flowers are *proterandous*, and, as in the composites, the anthers shed their pollen on a brush with which the style is provided, before the opening of the flower; they then shrivel up, leaving the as yet unripe style to distribute the fertilizing dust among its insect visitors. If, therefore, a fully-opened flower of the hare-bell be examined it will always be found that the anthers have withered up. It will be noticed that all the bell-flowers are somewhat pendulous or drooping; this simple contrivance suffices to protect the honey from rain.

It is not a far cry from hare-bell to heather, and fortunate is the pharmacist who in August can say good-bye to the laboratory and the counter and court the wild freedom of the moorland and the fell. The order *Ericaceæ*, which claims for its own the bulk of the moorland flora, includes both early and late flowering genera. The fleshy-fruit bearing members of the order, such as the bilberry, the cowberry and the bearberry, mostly flower early, and have now ripened their fruit. The fine-leaved heath (*Erica cinerea*) and the cross-leaved heath (*Erica Tetralix*) are now in full flower, and may be found on any moor. In the former the leaves are in irregular whorls of three and the flowers in irregular racemes, while in the latter the leaves are in whorls of four (cross-like) and the flowers in umbels at the apex of the stem. In the fine-leaved species the flowers are red, while in the cross-leaved they are of a delicate rose tint and have a peculiar waxy appearance. These must not be confounded with the common "ling" (*Calluna vulgaris*), which is by far the commonest kind of heather. In ling the flowers are lighter in colour, more numerous and yet less remarkable looking than in the true heaths. The corolla is shorter than the calyx and the whole plant looks hardy and well suited to its home. The flowers of *Erica Tertralix* are the best for examination; the sepals are four, the corolla is *gamopetalous*, and four toothed, while its shape is variously described as *urceolate* (urn-shaped) and *globose campanulate*. If the flower be cut open it will be found that the stamens are eight and are situated on a honey-secreting *disk* at the base of the ovary. The anthers *dehisce* (shed their pollen) by pores at their apex, a mode of dehiscence characteristic of the heath order; each of them is provided with a tail or *awn* (not to be confounded with the awns of grasses), and this awn has an important place in the mechanism of fertilisation. When an insect enters the flower in search of the honey at the base of the stamens it has to insert its head between the anthers and the corolla, and in doing so it presses down the awns which jerk the anther back and cause a discharge of pollen from the pores; this lands on the front of the insect's head, the exact position necessary to its being placed on the sticky stigma of the next flower visited. Would it not be possible for the chemist who lays himself out for the sale of "heather-honey" to attract and please his customers by showing a diagram or model of the mode of collecting it, accompanied by an explanation of the wonderful inter-dependence of the honey making flower and the honey stealing bee, each incapable of producing healthy offspring without the help of the other?

Mountainous districts should now furnish examples of an ericaceous plant of pharmaceutical interest—the bearberry (*Arctostaphylos uva-ursi*); it may be recognised by its trailing branches, leathery *obovate* leaves and red fruit. The juniper (*Juniperus communis*) is now to be found in fruit in the same district, and to the pharmaceutical student its "berries" are its most interesting feature, their interest centering in the fact that they are not berries at all. Juniper is a shrub belonging to the same order as the fir. It has *subulate* (awl-shaped) leaves which stand out from the branches like thorns; in Savin, another species of the same genus, the leaves are pressed down on the branches and this feature is generally relied on to distinguish one from the other. As indicated by the name of the order (*Coniferæ*) to which it belongs, the fruit of juniper is a *cone*, or rather the modification of it known as a *galbulus*. A cone is a compound fruit which is formed from a spike of female flowers with woody bracts; the galbulus is a cone in which the bracts (or *scales*) have become succulent. If a juniper fruit be examined closely a cross-like marking may be seen at the apex, showing the points of union of the scales; these are generally three in number, and each has at its base one or two seeds. These seeds are not contained in a seed-vessel, or, to put it in another way, the ovules are destitute of an ovary; it is from this fact that the cone-bearers are classed among naked seeded plants or *Gymno-sperms*.

Some members of the gentian tribe are now doing their best to brighten up the hilly pasture-land with their pale purple, somewhat awkward looking flowers. *Gentiana campestris* and *G. Amarella* are the most common species. *Gentiana lutea*, the medicinal species, is not found in this country; it frequents the mountainous parts of Central and Southern Europe, and differs from its British relatives in having yellow flowers—from which the specific name of "*lutea*" is derived. Yellow flowers are usually considered to be much more primitive than blue and purple ones, and in the gentians we have an excellent example of the collateral development of colour and form. The medicinal gentian has yellow open flowers which make no attempt to hide or protect their honey stores, while the more highly developed purple gentians of our home hillsides have acquired the habit of closing their flowers in dull weather so as to protect their honey from rain, and keep out unbidden guests by means of hairs and other contrivances.

A hillside ramble would be incomplete without some notice of that daintiest, yet wiriest of plants, the wild thyme (*Thymus Serpyllum*); it is to be found growing on rock which has scarcely a covering of soil, and always strikes one as looking very much at home, whether on a knoll of rotting trap rock, which its roots only hold together that they may get from it the nourishment they require, or when disputing with the hillside grasses the inch of soil in which they both happen to have been stranded. It is a member of the *Labiatæ* order, and like many of the other members of the order, has a fragrant smell, to which it no doubt owes to a great extent its great number of insect friends. The flowers are of two kinds, one being large and *hermaphrodite* (that is, having both male and female organs in the same flower), while the others are smaller and possessed of pistils only.

THE PARIS UNIVERSAL EXHIBITION.

(*Continued from page 84.*)

In the Paris Exhibition products of the distillation of wood are exhibited in a few cases, especially in those of Kestner and Co., of Bellevue, and Camus and Co., of Paris, the latter including, besides acetone, acetates and methyl alcohol, a series of substances designated as "pyrolignites" of lead, copper, soda and lime. Alcohol does not occur in the class of chemicals and pharmaceutical products as a direct exhibit, it being included in the group of Alimentary Substances. But there are one or two exhibits that have to do rather with products of the rectification of ordinary alcohol and allied compounds. Thus G. Claudon, of Conflans-Charenton, shows, besides absolute alcohol and ordinary industrial alcohol, such compounds as propylic, butylic, isobutylic and amylic alcohols and hydrate of pinacone; whilst E. Porion, of Wardrecques, together with similar products, shows a glass model of the "appareil Durin" used in the rectification. It is pretty generally known that in France potatoes and beet are largely used as materials for the production of alcohol and some statistics given in the agricultural section throw some light upon the importance which the beet has now attained in the sugar and alcohol industries. In the arrondissement of Melun, with an area of 109,000 hectares, there were in 1886–87 three sugar factories, using in the year 47,849 tons of beet (taking 1,000 kilograms roughly as equal to a ton), and producing 4,318 tons of refined sugar. A fourth factory has since been opened, and these quantities have been proportionally increased. In addition there are in the arrondissement no less than twenty-eight distilleries, all using beet as the raw material, except one, which uses the Jerusalem artichoke. The average annual consumption of beet in these distilleries is given as upwards of 72,000 tons and the production of spirit from all sources in 1886–7 as nearly 1,000,000 gallons. It appears, however, that the yield from the beet varies very much in different seasons; for whereas in 1885–6 the yield of "pure spirit" from the ton of beet was about nine gallons, in 1886–7 it amounted to about twelve gallons.

Probably the industries most numerously represented among the Chemical and Pharmaceutical Products in the Paris Exhibition, are the manufactures of soap and candles. In one part of the French court the visitor comes upon case after case of soaps of various kinds, a large proportion being of the kinds known as Castile soap and "marbled" soaps in blues and reds. Some of these soaps are of very fine appearance, and in this respect fully maintain the reputation of the French manufacturers, but a simple inspection of them through glass windows does not allow of any true judgment as to their relative qualities. To mention one point, those who have had to use continental-made soap, or handle linen washed with it, will know how often the English nose is offended by the odour depending upon the fat that has been used as a material for the soap or some coarse perfume introduced to cover it. Whether this objectionable property may reside in any of the soaps shown cannot be stated without closer examination; but it seems somewhat significant that throughout the exhibition the fact is impressed upon the public by advertisement that in the lavatories an English-made soap is provided for use. For the same reason it would be useless to mention the names of particular firms exhibiting, and it must suffice to say that some of the cases contain also soft, lime and resin soaps, and in addition there are several of the so-called "cleansing soaps" and pastes that have come so much into favour the last few years, one of them avowedly containing a ferruginous mineral as a constituent. There are a few toilet soaps shown in this court, but more of them will be found with the perfumery among the group of Furniture and its Accessories. In several instances candles and soap appear together in the same exhibit, but in most they are shown independently. Several exhibitors show "bougies à trous," of which J. Urbain, of Ivry, claims to be the inventor. Of course, "stearin" is the material most prevalent, and stearic acid, oleic acid, glycerin and products of the saponification of fats are to be seen in several cases. But paraffin, spermaceti and wax are also there, and wax especially is used for those wonderful candles, some of which may be seen six feet high and ornamented with colours and gilding from top to bottom, that are prepared for ecclesiastical purposes. As to the fatty materials used as a basis for the soaps and candles one can but speculate. The "savons blancs" (white Castile soap) are supposed to be made with pressed olive oil; the "savons verts" with olive oil that has been extracted from press residues by means of carbon bisulphide; then palm oil is an acknowledged soap material at Marseilles, and as in one case suint potash is exhibited, it would seem that wool fats play some part. But outside these, enormous quantities of fats and fixed oils are obtained from other sources that will be referred to subsequently when describing some of the raw materials exhibited in the colonial and foreign courts. Suffice it to say now that one house in Marseilles alone claims to have crushed during the year 1888 no less than 60,000 tons of seeds,—sesame, ground nut, colza, poppy, and ricinus,—with the production of 24,000 tons of oil, and 36,000 tons of cake. Another house in the same city, N. Reggio, claiming to have crushed 10,000 tons of seeds during the same time, makes a specialty of castor oil for pharmaceutical purposes, and gives the quantity of Bombay ricinus seeds crushed during the year as upwards of 1500 tons. In connection with this subject may be mentioned the exhibit of F. C. Hérubel, of Petit-Quévilly, which includes among some products of castor oil, the sulphoricinates of ammonia and soda as liquids. In the case also of A. Falcony, of Asnières, who exhibits glycerine, there are two substances labelled with the unfamiliar names "glycocore" and "glycogonine." Another glycerine compound, nitroglycerine, as dynamite, is represented in one case, but presumably only in name. There are a few special exhibits of the industry of recovering fats by means of bisulphide of carbon. The Marseilles Sulphide of Carbon Company shows among other things a very dark olive oil removed by this agent from the pulp and stones of olive residues, whilst among the waste substances worked up by means of the bisulphide is the refuse fat that has done duty as a lubricant for railway carriages. Lubricants and machine oils generally are themselves well represented in many cases, both with bases of animal and other fats, and ceresin and heavy petroleum. Here, again, it is difficult to select any for special reference, but it may be mentioned that in the case of Richard frères, of Marseilles, a lubricant apparently having Baku petroleum for its basis is demonstrated to be neutral by the artifice of allowing some to stand in a dish in contact with copper. In fact, it is noticeable that Russian petroleum and its products are kept well to the front in this exhibition. In the Russian court there is a large and interesting collection, shown by S. M. Schibaeff and Co., of Baku, of the crude naphthas and their products obtained in the neighbourhood of the Caspian Sea. With this exhibit is furnished much information on the general subject, a few points from which may be useful. The utilizable "naphtha" obtained from the Caspian district is said to be of three kinds, designated as light "naphte balachané," sp. gr. 0·868, flashing point, 35° C., point of combustion, 45°; heavy "naphte balachané," sp. gr. 0·885, fl. pt. 46°, pt. comb. 58°; and white "naphte surachané," sp. gr. 7·778, fl. pt. at ordinary temperatures. The number of wells is between 150 and 200, which yielded in 1888 about 3,300,000 tons of "naphtha," from which was obtained about 1,000,000 tons of "petroleum," that term being applied in Russia to a liquid with a flashing-point not below 28° C., and a sp. gr. of 0·823-0·824. About one-third of this quantity is used in Russia, and the remainder is exported. The "light naphtha," when worked carefully, is said to yield nearly 40 per cent. of "petroleum," and the "heavy naphtha" nearly 33 per cent.; whilst the "white naphtha" is converted by a simple refining, without distillation, into a burning material, which from its lightness ought to be classed among the "benzines" rather than among the "petroleums." Three types of "petroleum" are shown: "petroleum No. 1," sp. gr. 0·810 to 0·812, fl. pt. 30°; "petroleum," sp. gr. 0·823 to 0·824, fl. pt. 28° to 29°; and "australine," sp. gr. 0·834 to 0·840, fl. pt. 58° to 60°, pt. comb. 70° to 75°. Two "benzines" are obtained, flashing at ordinary temperatures; one of these, sp. gr. 0·717 to 0·720, is said to be burnt in special lamps and used in the india-rubber manufacture; the other sp. gr. 0·758 to 0·762, is at present without useful application. Intermediate between the "petroleums" and the lubricating oils come "pyronaphtha," sp. gr. 0·860 to 0·865, fl. pt. 99° to 110°, and "huile solaire," sp. gr. 0·870 to 0·875, fl. pt. 114° to 120°. These, it is claimed, are deserving of attention for illuminating purposes, but it is admitted that at present no lamp is known in which they can be burnt for ten or twelve hours, their power of capillary action not being sufficient to carry them up through a wick, whilst they ignite at too low a temperature to allow of their being stored near a flame, as in the case of the vegetable oils. The remaining products from the residues left at this stage are lubricating materials of varying consistence and degrees of viscosity, the final residue or tar being used in making artificial fuel. Among other articles present in this exhibit are three substances represented to be true soda soaps, formed by the combination of the alkali with "acides de divers naphtes." They are described as being soluble in water without any deposit, and as being utilizable like ordinary soap. Among other petroleum products worthy of mention is a display in the case of Deutsch and Sons, of Paris, of a number of fine "carbons" in tubes and candles.

Glue is another industry that is very well represented in the French court, and in several cases there are exhibited skin, bones and other materials used in the extraction of the products exhibited. Thus in the case of F. Poly, may be seen a quantity of "os dégélatinisées" that have the appearance of moulded pumice. Some of these exhibitors also show isinglass and clarifying materials having that substance for a basis. Blood albumen, another substance used for clarifying purposes, will be found in the case of Bourgeois and Co., of Paris, who also exhibit what they call "sang cristallisé," prepared especially for the sugar and wine industries. Closely allied with the foregoing is the manufacture of animal charcoal, which is shown, together with glue and fat from bones and manure made from the residues, by Tancrède Brothers, of Paris, and to these Coignet and Co. add one other product, namely, phosphorus.

A number of other industries are included within the limits of the Chemical and Pharmaceutical Products class, but which can hardly be dealt with at length in this report. Bleaching liquids, under the name of solutions of hypochlorite of soda, or as eau de Javelle, are shown in several cases. Peroxide of hydrogen is also represented and its effect demonstrated by accompanying displays of bleached feathers, wool, hair, ivory and sponge. Then there are varnishes, blackings, metal cleansing pastes and liquids, concerning which it can only be said that their name is "legion." But it would not be right to close this portion of the report without referring specially to the extent and importance of the exhibits of india-rubber goods both in the French and British courts. In these cases, besides waterproofing and water-tight boots, bands and tubing, the chemist and pharmacist may stumble across many little knick-knacks that may do him service. The development of this industry has provoked a demand for the raw material that has drawn supplies from many countries until recently unsuspected of growing caoutchouc trees. This is well illustrated in the case of François, Grellou and Co., of Paris, where are exhibited samples of rubber from Java, Senegal, Brazil, Mozambique, Peru, Gabon, Borneo, Madagascar, Assam, Nicaragua, Ceará, Sierra Leone, and other places. Gutta-percha goods are also shown, but not nearly to the same extent.

In the succeeding notice it is proposed to refer more particularly to some of the raw material that is to be found in the colonial and foreign courts.

(*To be continued.*)

THE SPONGE FISHERY AND TRADE OF THE UNITED STATES.*

BY RICHARD RATHBUN.

(*Concluded from page 26.*)

(*b*) *The Florida Sponge Fishery.*—The Florida sponge ground forms three separate and elongate stretches along the southern and western coasts of the State. The first includes nearly all of the Florida reefs; the second extends from Anclote Keys to Cedar Keys; and the third from just north of Cedar Keys to St. Mark's in Apalachee Bay. The Florida reef grounds have a linear extent of about 120 miles, beginning near Key Biscayne in the north-east, and ending in the south, at north-west channel, just west of Key West. The north-western half of the grounds is very narrow, having an average width of only about 5 miles and being limited to the outer side of the reefs. At about the Matacumbe Reefs, the grounds broaden out so as to cover the entire width of the reefs, which are much broader here than at the north. The entire southern half of the grounds has more or less the same breadth, which is about 13 or 14 miles. The second sponge ground begins just south of Anclote Keys, with a breadth of 7 or 8 miles, but rapidly broadens out towards the north to a width of 15 miles, which it maintains from a point about opposite Bay Fort to Sea Horse Reef, just south of Cedar Keys. The total length of this sponging ground is about 60 geographical miles: its distance from the shore varies somewhat; at the south, the inner edge approaches within 4 or 5 miles of the mainland, and comes close upon Anclote Keys; but throughout the remainder of its extent it is distant 6 to 8 miles from the shore, until it touches the shallow bottom and reefs of Cedar Keys. The depth of water on these grounds, as indicated on the Coast Survey charts, ranging from 3 to 6 fathoms, but many portions are undoubtedly shallower than this. The northern ground, which maintains a nearly uniform width throughout, is about 70 miles long by about 15 miles broad. It approaches to within about 5 miles of the shore, and terminates just off the mouth of St. Mark's river; the depth of the water is the same as upon the next one to the south; from three to six fathoms.

The total area of the Florida sponging-grounds, which are now being worked, including also those that were formerly fished upon but have since been more or less abandoned, may be roughly stated at about 3000 square geographical miles. This probably does not include all of the sponge grounds occurring in Florida waters, for the fact that new areas are being constantly discovered, would indicate that there might still be more to find, and it is certain that no very strenuous efforts have been yet made to extend the grounds already known, the discovery of new ones having generally been made by accident.

The Sponging Vessels and their Outfits.—General account.—The sponge fishery of the Florida coast differs greatly from that of the Mediterranean, in that sponges are not obtained by divers, but by means of hooks fastened at the end of a long pole and managed from a small boat. In the former region, small vessels of from 5 to 50 tons measurement are employed to visit the grounds, to afford quarters for the men, and to bring home the catch. These vessels are mostly of light draught and schooner-rigged, having proportionately large decks on which to carry boats, working gear, and the sponges as they are taken. The holds are of considerable size for storing dried sponges, and the cabins generally small, indicating a sacrifice of comfort to working room. Each vessel carries, according to its size, from five to fifteen men, one as cook, and the remainder (always an even number) as fishermen, and also a small yawl-boat to every two fishermen to be used by them in securing the sponges. In addition to the implements for taking sponges, they are provided with a sufficient quantity of provisions, wood and water for the trip, lasting from four to eight weeks.

The working outfit of a Florida sponging vessel consists simply of a few small yawl-boats called dingies, and a supply of sponge hooks and sponge glasses. Many of the dingies are built by the fishermen themselves; they are from 12 to 15 feet long, and 4 to 5 feet wide, and are built of the lightest and strongest material obtainable, the frame of mulberry or white oak, and the planking of juniper or southern white cedar. The idea is to have the boats light enough to enable two men to haul them in and out over the side of a vessel, and yet strong enough to withstand the rough handling to which they are subjected, and to safely carry the rather heavy load resulting from a half day's catch. While gathering sponges it is necessary to scull the dingy from the stern, and, for convenience in so doing, the following form of sculling-notch has been introduced:—A piece of oak plank about 6 inches wide and a foot long is notched at one end to fit an oar, and inserted at the other between two guiding strips securely fastened to the stern sheet. The sculling notch is placed at one side of the centre of the stern sheet and is made to be easily removable in order that it may be taken out of the way when not needed.

The sponge hooks are made of iron, with three curved prongs, measuring in total width about 5 or 6 inches. The entire length of a hook is about 8 inches, the upper end being made into a strong socket for the insertion of a pole.

The sponge glass as originally constructed consisted of a small, square, wooden box having a glass bottom. More recently, however, this form has given way to an ordinary wooden water-bucket, the wooden bottom of which is replaced by one of plain window glass fastened in by means of putty; the inside of the bucket is painted a dark colour. In using a sponge-glass, it is placed upright on the surface of the water and the head is thrust down into it as far as convenient. In this way very small objects can be distinctly made out on the bottom even at a considerable depth. It is customary to leave the handle or bail on the bucket, and allow it to pass round the neck when in use, so that when a sponge is discovered the sponger is not delayed in grasping his hook and bringing it into play.

The Key West Fleet.—The sponging vessels of Key West are the pride of that place, and with good reason, as they are trim and fast sailers. They rank next after the fishing smacks in size, ranging in measurement from 5 to 45 tons, and are nearly all schooner-rigged. Many of them were built or rebuilt at Key West, or in that vicinity, and like the smacks are strongly put together. The frames are made of Madeira wood, red cedar and dogwood, and the planking of yellow pine or cypress. Before being painted, every outside seam and crack in the hull is filled with beeswax to render it tight and form a smooth surface. The masts, sails, rigging and ironwork are all of the best quality and all neatly fitted. In shape they are rather wide for schooners, but being shallow and loaded with canvas, work well under sail. The mainsail and jib are of the ordinary shape, but the foresail is generally a "lug" sail, that is having no boom, and so wide as to extend aft beyond the mainmast. Otherwise it is similar to the foresail ordinarily used on schooners.

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* From the Report of the United States Fish Commission. Reprinted from the *Oil, Paint and Drug Reporter*, June 5.

These vessels are all of light draught and provided with centre boards. The hold, from the after end of the centre board to the bow, is entirely clear and unobstructed to afford ample space for the storage of sponges, boats and hooks. The cabin, extending from the bulkhead at the after end of the centre board to the stern, is generally a small affair with but few conveniences, and is composed almost entirely of sleeping compartments for the large crews that live on board. The trunk of the cabin is therefore very small in proportion to the size of the deck, the hatches being also small as well as the bitts and windlass gear forward. Cooking is done on deck, on a stove that is boxed up and kept between the masts. When ready to start for the sponge reefs, there is but little empty space anywhere on board; the decks are crowded with boats and men, and with piles of spare ropes, anchors, sponge poles, water glasses, etc., while below is stored a large quantity of wood, water and provisions. The sponging vessels of Key West are quite as expensive to build as the fishing smacks, and according to the statements of several builders and owners cost on an average about $3000 complete for a vessel of fifteen tons.

The Key West sponging fleet consisted in 1879 of eighty-six vessels, all but five of which were schooner-rigged, the balance being sloops. The combined measurement of this fleet, with the exception of four vessels, the tonnage of which was not ascertained, was 1105½ tons. The tonnage of each vessel ranged from about 5 to 45 tons. Two vessels were under 5 tons; thirty-six between 5 and 10 tons; thirty-five between 10 and 20 tons; three between 20 and 30 tons; two between 30 and 40 tons; and four between 40 and 45 tons. The total value of the vessels of the fleet was $151,350. The crews numbered most commonly either five, seven, nine, or eleven men each; the total number of men in the combined crews of the entire fleet was seven hundred and forty-four. The majority of these were Americans and a large percentage negroes; the remainder were either from the British West Indies or of unknown origin. In addition to the vessels described above, there are many small boats which fish for sponges about the reef.

The Key West vessels are divided into two distinct fleets, one called the "Bay Fleet" being composed of the larger vessels that cruise on that part of the coast lying between Anclote Keys and Saint Mark's, and the other, called the "Reef Fleet," consisting entirely of the smaller vessels that gather sponges on the reefs from Key West to Cape Florida. The vessels of the bay fleet are gone from home from one to three months according to their capacity and the success of their cruise, while those of the reef fleet are absent from one to two weeks only.

The bay fleet vessels send out two men with each dingy, one to scull and one to hook the sponges, but those fishing on the reefs assign only one man to a dingy, and he can easily manage both the sculling and the hooking, as the reef areas are smooth, clear and shoal, and the currents not strong.

The Apalachicola Fleet.—The vessels engaged in the sponge fishery from this port are all of small size and light draught, and are mostly schooner-rigged in the ordinary American style. Many of them were formerly owned in Pensacola or New Orleans, where they were probably built, while others were built up from large ship's boats and small yachts.

Taken as a class they are rough and homely and rather poor sailers, thus contrasting strongly with the Key West fleet. The total number of vessels in the Apalachicola fleet in 1879 was sixteen, one being sloop-rigged, the remainder schooner-rigged; they ranged in size from 5½ to 36½ tons, the total measurement amounting to 154⅔ tons. The combined crews numbered eighty-four men.

In addition to this fleet of vessels there were a few small open boats engaged in the sponging from Apalachicola, which were not entered upon the custom house books. The estimated value of the sixteen vessels of the regular sponging fleet was $10,700, or at the rate of about $71·30 per ton; and of the small open boats about $800. The outfit of these sponging vessels consisted of some forty dingies (two or three to each vessel), valued at $35 each, or $1400 for the entire number; and of sponge hooks and sponge glasses, estimated to be worth about $100. The total amount of capital invested in the sponge industry at Apalachicola in 1879 was, therefore, about $13,000.

Method of Conducting the Sponge Fishery.—General account, including Key West.—The Florida sponge fishery may be carried on throughout nearly the entire year, providing the weather continues favourable. The principal season for work is from May or June until the last of August, for during that period the water is generally smoother and clearer than at other periods; but it sometimes happens that the best conditions of water occur in winter, and at such times the fishery can be conducted with great success. The winter sponge fishery, when it can be carried on continuously, is said to be even more profitable than the summer, for the fishermen claim that sponges average larger in the winter than in the summer, though they cannot account for the fact. Decomposition does not begin in cold weather for three or four days after the sponges are taken. During the usually stormy months of September, October and March, nearly all the vessels are laid up, for the owners, being unable to insure them, are unwilling to risk them off the coast for such long periods when heavy gales may spring up at any time.

At the commencement of a fishing season, the owners of vessels appoint their captains, who, in turn, select their crews. As soon as the crew and outfit of a vessel are ready, it sails from port, and in from one to three days is on the fishing-ground and at work. The cook remains on board, keeps the vessel under way, and prepares the meals, while the spongers pair off into the dingies. Of the two men who occupy the dingy, one is called the "sculler" and the other the "hooker." The former stands in the stern of the boat and sculls it slowly and steadily forward, being prepared to stop it and hold it exactly in place at a moment's notice from the "hooker" or "bowman," who kneels down amid ships, or at the bow with the upper half of his body projecting over the side. The duty of the latter is to scan the bottom, and, as soon as a sponge of sufficient value comes into view, to fasten into it by means of his long sponge-hook, and bring it to the surface. It is very evident that both "sculler" and "hooker" must be men of considerable experience and dexterity in their respective occupations, in order to work together advantageously. The instant a sponge is sighted, the boat must stop, and without a moment's delay the hooked pole must be plunged downwards, sometimes to a depth of 25 to 35 feet, with sufficient accuracy to pierce an object which at the most is only a few inches in diameter. As might be expected, the task of hooking sponges is much more difficult, when, as frequently happens, the water is rough or clouded by sediment. To make his position more comfortable and prevent sores and blisters, the hooker ties sponges about his knees where they would come in contact with the bottom of the boat, and also across his chest to raise it above the rail. His posture is an exceedingly tiresome one, lying as he does with his head and shoulders over the rail, and he must retain it all day.

Formerly, when sponges were collected only in shallow waters, no difficulty was experienced in detecting them with the unaided eye, but of late years, since they have been gathered more abundantly in depths of 20 to 35 feet, it has become necessary to make use of the sponge-glass already described. The "hooker," wearing the handle of his rude glass about his neck, has both hands left free, when he wishes to use the pole, which his companion first hands to him, having started it over the side of the boat. In addition to his skill in detecting a small object on the bottom, and bringing it to the surface, he must be able to tell at sight whether it is a valuable sponge or not; and if not, pass it by. Some sponges grow so firmly attached to the bottom that it is almost impossible to pull them off with the hook. Instances are cited where the hooker, in his strenuous efforts to loosen such a specimen from the bottom, has actually pulled the bow of his boat under water and caused it to partially fill. Sheepswool sponges are said to be the most difficult to detach, and yellow sponges the easiest of those growing in moderate depths of water. When a small sponge attached to a large one is taken, it is pulled off and thrown back. These sponges are said not to attach themselves again but to remain loose at the bottom, and to be rolled about by the movement of the water. When they are again taken, showing no point of attachment, they are called "rolling johns." The useful sponges taken by the fishermen, are so-called sheepswool, boat, yellow, grass, and glove sponges; and the worthless ones which they sometimes hook, are termed by them "loggerheads," "bastard sheepswool," "bastard yellow," and "finger sponge."

The gathering of sponges from the depths in which the fishing is now mainly carried on, on the west coast of Florida, is very hard work, and only the strongest and most skilful men can succeed. Capt. Ben Pearson, of the schooner *Champion*, and others, state that they hook up the sponges from 30 and 36 feet of water. When working in such depths as these, they have to contend with stronger currents and rougher water than in shoaler localities, and in addition there is the unwieldiness of so long a pole. Sponges from these depths are, however, superior in quality to those from inshore.

Collecting goes on at all times when the water is smooth and clear—conditions not always met with. Some of the Key West spongers have partially removed the inconvenience of rough water by distributing oil over the surface, and are thus enabled to work more continuously. A teaspoonful of oil, it is said, will produce a smooth surface for as long a time as a small boat cares to work in one spot. Shark oil is considered the best for this purpose, though no reason for it is given. In summer many Key West people kill the nurse-shark and dry out the liver for this oil, which sells at $1 a gallon. During the day the dingies work steadily along the reefs, picking up sponges here and there until dinner time or night arrives, when they return to the vessel. When on the sponging-grounds the men breakfast at daylight, and soon after are in their boats, prepared for work. At dinner-time—12 o'clock—the cook blows a horn to recall them, and after a short rest the work continues until sunset. Should a boat wish to regain its vessel at any other time, in order to leave sponges, an oar is hoisted blade up as a signal, whereupon the cook sails the vessel to that vicinity. As soon as the sponges are brought on board, they are carefully spread over the deck of the vessel in their natural upright position, so as to allow the slimy matter, called "gurry" by the spongers, to run off easily. During the first stage of decomposition, they smell strongly of ammonia, and are extremely noxious to most persons unaccustomed to the odour. Later the ammonia scent disappears, leaving a stronger one very similar to that of decaying seaweed. The fishermen say that after having endured this stench for a few days they do not notice it at all.

Some of the larger of the sponging-fleet remain at anchor on the "grounds" through the night, but the majority run inshore, a distance of ten or fifteen miles.

It is the general custom among them to go to the place for curing their catch every Friday night, carrying with them the results of a week's work. Each vessel has one or more crawls (an inclosure of stakes 8 or 10 feet square, situated in water 2 or 4 feet deep) at the rendezvous. A small island, called Rock Island, located a short distance south-east of Saint Mark's River, and near the sponging-grounds, is the principal place for these crawls, and is visited by both Key West and Apalachicola vessels. The latter have a number of crawls near the Saint Mark's lighthouse, and the former have them scattered all along the coast from Rock Island to the Anclote Keys. Many of the reef fleet have their crawls at Key West and cure the sponges at home.

The Saturdays are passed in depositing the past week's catch, and cleansing the deposit of the week before. Sponges as kept on deck will generally die and lose the greater part of their gelatinous matter in one or two days; therefore, when thrown into the crawls, the chief part of the curing to be done is the removal of the outside skin or covering. In cold weather they live much longer than when it is warm, and it is sometimes difficult to cure them properly in winter. Vessels at Rock Island have sometimes been unable to cure their catch there and have brought them all home to die and then be cured.

In summer, and when they are dead at the time they are placed in the crawl, the week's soaking that they undergo softens all the remaining slime and skin they contain, and a little squeezing and beating with a short, heavy stick, called a "bruiser," suffices to cleanse them perfectly. They are squeezed as dry as possible and thrown into a dingy, to be strung on rope-yarns 6 feet long, in the form of bunches, which are first strung up to allow the sponges to bleach and dry, and afterwards stowed in the hold. As soon as dry they are in condition to sell to the wholesale merchants of Key West and Apalachicola.

When vessels have crawls in company and employ a watchman, the cured sponges are left ashore until they are ready to start home, otherwise they are carried in the hold. Until a year or two a watchman for the crawls was not considered necessary, but so much thieving was done that the spongers were finally obliged to resort to this method of protection. Each vessel pays her share towards the watchman's expenses and wages.

Sponging vessels spend from one to two months on a trip, the state of the weather and the amount of provisions on board influencing their stay on the "grounds." The results of the trips vary quite as much as with other fishing vessels, fair winds, clear water, experience and skill, all being indispensable to success. On some trips hardly enough sponges are secured to pay expenses; on others the mens' shares amount to fair wages, and again, they will share several hundred dollars for four to six weeks' work. On an average they make rather more than almost any other class of fishermen.

The share arrangements are as follows:—On Apalachicola vessels the owners of the vessels furnish the whole outfit, pay one-third of the provision bill, and receive one-third of the net proceeds of the trip, leaving the crew to pay two-thirds of the provision bill, and to share two-thirds of the net proceeds. When the members of the crew are not equally experienced and expert, the best men, such as the captain, cook, and the "hookers" draw whole shares and the others half or three-quarters of a share each. The captain usually receives additional remuneration from the owners. On Key West vessels the owners furnish the complete outfit, including provisions, and take one-half of the result of the trip, thus leaving a clear half to be divided equally among the crew. The captains are paid a certain commission by the owners. As an illustration of the profits sometimes made in this fishery, it may not be out of place to mention here one or two successful trips. During the winter of 1879-80, the schooner *Competitor*, of Key West, of 44 tons, carrying about eighteen men, made a trip of eight weeks, and stocked $4200. The same season, the schooner *Lone Star*, of Key West, 15 tons, carrying seven men, made a six or seven weeks' trip, and stocked $1935, and many others did quite as well. During the month of January, 1880, the spongers had unprecedented success, having brought in large loads of fine deep-water sponges, that sold for 2 dollars and more per pound for the best quality (sheepswool); before that, the average price had been $1 per pound for the first quality.

As soon as a vessel arrives in port with a catch, the sponges are carried on shore and piled on the wharf, each variety or quality by itself. At Apalachicola, where there is but one dealer, they are inspected and purchased at any time during the day that is most convenient to him, but at Kew West, where there are several dealers, there are certain times for inspecting and other times for buying these lots. During the forenoon the dealers examine them carefully, and cleverly estimate their worth by eye and touch in handling them. They are so expert that they can correctly judge the weight of a bunch of sponges by lifting it, and know perfectly the value of textures by sight; it is remarkable to see the accurate judgment of several of the largest purchasers. A choice lot being offered, each party separately examines it and makes a bid, and very often a party of three or more purchasers will not vary ten pounds in a lot of several hundred pounds, and the amounts offered will not vary five dollars. As they go over the lots they place a value upon them of which they keep a record on paper. During the afternoon, when all the spongers are on shore for the day, a man sells them at auction, lot by lot, to those whose papers show the highest bids. Cash is paid at once, and the crews are not delayed in getting their shares, but are able to start off on another trip in about a week from the time of their arrival.

The principal varieties sold in these markets are called "sheepswool," "yellow" and "grass" sponges. The "sheepswool" sponge is the best quality; its texture is fine, soft, and very strong, and it sells for from $1·25 to $3 per pound, the average price being about $1·75 per pound for the best quality. The "yellow" sponge is of fine but not strong texture, and is not so soft and durable as the variety just named. It sells for 25, 30 or 40 cents per pound. The "grass" sponge is of very fine and hard texture, but is not durable, and is usually so irregular in shape that it is torn easily. It does not sell for any set price per pound, and the few that come to market are sold by the lot at a price that would not exceed 8 or 12 cents per pound. A few of the small velvet sponges are obtained and sold for a high price.

As the buyers of sponges require them to be very dry when buying by the pound, and as they are not always landed in that condition, a price per bunch is sometimes agreed upon. The bunches weigh from one-half to one pound each, and the price varies considerably, depending upon the quality, size and success in cleaning and bleaching. It is the buyer's intention to obtain a pound of sponges in this way for less than when buying by the pound. There is supposed to be a difference of about 10 cents per pound in favour of the buyer when sold by the bunch, in the case of the best qualities. Several thousand dollars were paid out weekly for sponges in 1879. Twenty-two thousand dollars cash were paid for sponges during two weeks in June of that year, and the sponge trade of Key West from January 1 to March 1, 1879, amounted to $76,500.

The dealers of both Apalachicola and Key West buy for wholesale firms of New York and receive a commission as compensation. They are kept informed of the state of the New York market, and make their bids accordingly. The packing-houses are roomy and dry buildings, where large quantities of sponges can be hung up and kept dry. As soon as a lot of them is taken in, they are put through a process called "liming," that is to say, they are dipped in a weak solution of lime and sea-water, after which they are hung up out of doors to dry. Then they are stored away in the loft until needed.

The "liming" gives the sponges a bright yellow colour, which adds to their value, but when not properly done, as by the excessive use of lime, the tissues are injured and the sponges become rotten and worthless. There is no doubt that even a little lime injures a sponge, and any considerable quantity adds greatly to its weight.

They are not "limed" at Apalachicola because the fresh water of that vicinity has a bad effect upon them; consequently it is not uncommon that quantities from that place are reshipped from New York to Key West simply to be "limed." As soon as "limed" they are laid out to dry, and they must be thoroughly dried, for if left together damp they soon become ruined. Long spells of rainy weather sometimes cause the dealer to lose thousands of dollars' worth of sponges, for they become damp, turn red, and finally decay; but now some of the dealers have lofts, or upper stories to their houses, where sponges can be hung up and kept dry in all weather. For convenience in handling the sponges are strung in bunches; otherwise such large quantities could not be managed as they are.

After this process is completed sponges are trimmed, sorted and packed. Preparatory to being trimmed, boys beat them with mallets so as to remove all particles of stone, shells, or other hard substances that would dull the shears. The trimming is done with sheep-shears, and all the uneven parts and ragged edges are cut off. After this an experienced man sorts out each variety and quality, weighing them in large crockery-crates in lots of 100 or 120 pounds each. These lots are then placed under a hydraulic press and formed into compact bales, measuring about thirty inches long, eighteen inches wide, and eighteen inches thick, which are covered with bagging and corded securely. In this form they go to the wholesale dealers of the country. The "trimmings" of the sponges are saved, and when a sufficient quantity has accumulated, are baled up in the same manner as the others, and shipped to New York to be used in upholstery work.

The sponge trade has steadily increased since it was first started, and at present constitutes a large business. During 1879 not as much was done as in 1878, because of the unusually boisterous winter, and the so-called poisonous water, which destroyed a great many sponges about the "reefs," which the reef fleet would have brought in; 1880 was also considered a poor year, as the total sales at Key West amounted to only about $180,000, while the average annual sales have been about $200,000.

The Pharmaceutical Journal.

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SATURDAY, AUGUST 10, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

The business transacted by the Council at the meeting last Wednesday was chiefly in reference to matters of detail. The meeting was attended by seventeen members, the absentees being Messrs. Evans, Greenish, Richardson and Southall. Diplomas were granted to twenty-one persons as pharmaceutical chemists, of whom thirteen were also elected members of the Pharmaceutical Society. Two persons were elected associates in business, thirty-seven as associates and nineteen as apprentices or students. Several persons were also restored to the Society's registers. Appointments of Superintendent and Deputy Superintendent of written examinations for the ensuing year were made for thirty-nine places in the United Kingdom. On the recommendation of the Benevolent Fund Committee grants were made to four applicants for relief. The official notification of the death of Mrs. Hellowell, who had been an annuitant since 1881, gave opportunity for the Vice-President to draw attention to the good done by the Benevolent Fund, as testified in a letter received from the deceased's relatives expressing their gratitude to the Society for the benefit she had received. The Library, Museum, Laboratory and House Committee reported that the syllabus of the School had been revised, with the assistance of the teaching staff, and that the subject of the duties of Local Secretaries had been adjourned for further discussion. The President also informed the Council that Professor Marshall has consented to deliver the address in October, as stated in our issue of last week. In connection with the mention of the revised syllabus, Mr. Martin expressed his desire to raise a discussion of matters involved by it, and stated that he would give notice to that effect for the October meeting. At the suggestion of several members this formality was deferred for the present, so that the form of resolution to be moved might be fully digested. It was also decided that a copy of the new syllabus should be sent to each member, associate and apprentice of the Society, and that copies be sent to the Local Secretaries for distribution.

The reports of the teaching staff of the school as well as those on the prize examinations which have recently been held were as usual very satisfactory, and those relating to the Society's scholarships were of a very gratifying nature as regards the high character of the work sent in by the candidates. It would seem, as the President remarked, that these scholarships are becoming better appreciated. The fifth award of the Hanbury Medal to Professor Planchon, of which our readers were informed in last week's Journal, was communicated to the Council, and the selection of Professor Planchon for that honour was spoken of as being in complete accordance with what Daniel Hanbury would have desired. According to an official notification addressed to the President, the tenth International Medical Congress will take place in Berlin in 1890, and the invitation addressed by von Bergman, Virchow and Waldeyer to members of the Society as representing a branch of medicine, expressed a hope that some of them would be present on that occasion. Several members of Council were appointed delegates to the approaching meeting of the British Pharmaceutical Conference at Newcastle.

CONGRESS OF THERAPEUTISTS AND PHARMACOLOGISTS IN PARIS.

The International Congress at Paris on subjects connected with therapeutics and pharmacology was opened last Thursday at the house of the Sociétés Savantes, under the presidency of M. Moutard-Martin, the head of the committee of organization. A large number of medical men and pharmacists were present, and among those from foreign countries were official representatives from Belgium, Holland, the United States of America, the Argentine Republic, Italy, Roumania, Chili, Brazil, Hawai, Mexico, Venezuela, San Salvador. British medicine and pharmacy were not officially represented. After an address of welcome by M. Moutard-Martin and a statement by M. Dujardin-Beaumetz as to the mode of arranging the meetings the election of a President and officers of the Congress was proceeded with, the result being that M. Moutard-Martin was elected President by acclamation, and the other members of the Provisional Committee were elected to continue their several functions. The two sections of the Congress were then constituted, the one having reference to therapeutics specially and the other to pharmacology and materia medica. A report of the principal proceedings in the latter section will be found in another column. In the section devoted to therapeutics, presided over by M. Bucquoy, the first paper was read by M. Semmola, of Naples, on "The Observation of Changes in the Blood Corpuscles as a Control in the Administration of Mercurial Preparations." According to his observations, the appearance of the blood corpuscles in regard to number and the proportion of hemoglobine is always proportionate to the biological action of mercury. There is a difference only between morbid and healthy conditions. When the proportion of hemoglobine increases treatment with mercury may be continued; if it decreases the curative effect has been produced, and the mercury has begun to act as a poison. The general result of his investigation of this subject is that the method of observation suggested should be regarded as an exact measure of the utility of medicines which modify metamorphosis, because the actual therapeutic effect of that action is the augmentation of the blood globules and of the amount of hemoglobine. The other papers read at the first meeting by M. **Gros** on "The Action of Vesicating Substances," by M. **Lavaux** on "The Use of Cocaine in the Treatment of Affections of the Urinary Organs," and by M. **Guelpa** on "The Treatment of Diphtheria," gave rise to some discussions of a purely medical character. At the second meeting of this section papers were read by M. **Crocq** on "The Treatment of Pneumonia by Lead Acetate," and by M. **Semmola** on "The Use of Continuous Currents in Cases of Chronic Saturnism."

At the first general meeting of the Congress on Thursday, M. **Dujardin-Beaumetz** read his report on antithermic analgesic medicines, one of the subjects that had been selected by the organizing committee with the object of calling attention to the therapeutic effects of the several substances belonging to that class of medicines, and promoting their comparative study from that point of view. In the course of this report it was shown that the experience already gained is sufficient to demonstrate that these different medicines are for the most part not only analgesics but also antithermics, while several of them are antiseptics. Some of them act as antiferments, other act upon the blood globules and lower the temperature of the body by diminishing the respiratory action, while others again influence the calorigenic centres of the nervous system by acting directly upon the cerebro-spinal centres. These latter antithermics possess almost exclusively analgesic properties. The relation existing between the physiological properties of these substances and their molecular constitution is another point to which reference was made as being one of great importance to investigate. The general result of the work carried out by the author in conjunction with M. **Bardet** on this subject was described as pointing to the establishment of certain rules for estimating provisionally the physiological effects that a compound will produce. In the case of compounds derived from the aromatic series antiseptic properties belong especially to the hydrated derivatives, such as the phenol, naphthols, etc. Antithermic properties preponderate in the amido derivatives—acetanilide, kairine, thalline; lastly analgesic properties are met with, especially those amido derivatives which contain a molecule of some alcohol radicle, particularly methyl, substituted in the place of an atom of hydrogen, as in dimethyoxyquinizine acetphenetidine and methylacetanilide.

The reading of this report gave rise to a discussion in which considerable difference of opinion was expressed as to the value of the new medicinal agents in question. M. **Lepine**, of Lyons, drew attention to the fact first made known by himself that antipyrin has the power of allaying pain, and that acetanilide has the same effect, facts which lead to the idea that all antipyretics may really have an action upon the nervous system. This view of the subject, suggested in some degree by **Laborde**'s researches on the analgesic action of quinine, has been confirmed by that observer, and also by **Dujardin-Beaumetz**. But this action of antipyrine and the other antithermics upon the nervous system is not only analgesic. One result of **Lepine**'s investigations is that under the influence of those agents the consumption of glucose in the capillaries is diminished; that there is a diminution in the formation of glucose at the expense of glycogen in the liver and the muscles, which may even be determined in some instances. Then since the action of these substances upon the consumption of albumenoids being in all cases unimportant from the point of view of heat production, it would follow that it is to the diminution in the consumption of hydrocarbons in the body that must be attributed most part of the lowering of temperature which those substances produce so readily in the lower animals. M. **Lepine** considers that the substances in question are protoplasmic poisons, but much less active than quinine. Their essential character is to exercise a dynamic influence upon the nervous system modifying at the same time the sensitive impressions and the production of heat by restricting the consumption of hydrocarbon material, and in his opinion the application to them of the term analgesics gives a very incomplete idea of their mode of action. Some of the other speakers on the subject objected to the use of antipyrin and similar substances, not only by reason of their having often failed to recognize any beneficial effects, but also because their use is frequently attended with the inconvenience of a consequently prolonged convalescence, but with the exception of the salient points above mentioned the discussion was almost entirely medical. In the course of M. **Bardet**'s remarks mention was made of a preparation met with in England under the name of exalgine, which is really aceto-toluidine, having properties essentially different from those of methylacetanilide. At the conclusion of the discussion upon M. **Dujardin-Beaumetz**'s report a paper was read by M. **Assaky**, giving an account of the observations made by him on the use of diiodosalicylic acid as a remedy in rheumatic affections. That substance was found to be much more efficacious than salicylate of soda and much more to be relied upon for certainty of action. It appears also to possess very marked antiseptic properties.

The second report on selected subjects was that by M. Bucquoy on "Heart Tonics." It dealt with the numerous substitutes for digitalis that have been introduced within the last few years, convallaria, adonis venalis, squill and especially strophanthus, pointing out the necessity of ascertaining the active principles to which the action of these drugs is due, and whether the effects produced by them are the same as those of the drugs in their natural state. Other heart tonics, such as antiaris toxifera, black hellebore, erythrophlæum guinense, and nerium oleander were not considered to have been sufficiently adopted in medical practice to deserve notice. The discussion of this report was entirely medical.

The third report on antiseptics specially applicable for particular pathogenic microbes, by M. Constantin Paul, showed that though parasiticide medication presented numerous instances of practical applicability, the different substances employed for that purpose have not always the same action upon individual microbes. The reporter also gave an account of the results he had obtained with different antiseptic agents upon the microbes of putrefaction, of typhoid fever, cholera and tuberculosis. He also described the influence of temperature upon these different micro-organisms. In connection with this report, M. Semmola read a paper on "The Use of Sulphur as an Antiseptic in Medicine and Surgery," and described the successful result he had obtained with it in the treatment of typhoid fever and gastric catarrh. He also found that sulphur has a powerful sterilizing effect, and recommends the use of the powder for dusting the clothes of fever patients as well as an external application in surgical cases.

PROSECUTIONS UNDER THE PHARMACY ACT.

An Aberdeenshire paper in commenting upon the prosecutions under the Pharmacy Act reported at page 119 remarks that these convictions raise questions of considerable public interest, as the regulation of the sale of poisons is a matter of great importance. But it is held that since the law on this subject has evidently been sleeping so far as many country districts are concerned, it is right and proper that being now roused into activity it should be enforced leniently, as in all probability the persons selling poisons without being possessed of the necessary legal qualification had no intention of infringing the law. This is an opinion, the expression of which may fairly be attributed to local sympathy with the persons prosecuted; but it may also be considered that the prosecutions will have been not only useful in the public interest, but likewise as answering the purpose of a warning against the risks incurred by the unlawful sale of poisons. However the writer of the article referred to, while admitting that so long as the law remains as it is it must be enforced, suggests that it is a fair matter for consideration whether the law might not advantageously be amended. The reason assigned for this suggestion is that in one of the cases, which is considered to be probably a typical one, the shop of the person prosecuted for illegally selling poisons was six miles distant from any qualified druggist's shop, and therefore it is thought to be not at all surprising that a general dealer should in such a case seek to add to his stock in trade a supply of drugs. This suggestion involves a shifting of the question from poisons to drugs, and the difference between the two cases is important. No doubt many general dealers in remote districts do add drugs to their stock in trade, and though the practice may be in some respects a convenience, it is not without its serious drawbacks. Even the dealing in drugs and medicines, sometimes of a potent character, requires a greater amount of special technical knowledge than general dealers possess, and there have been cases in which serious mischief has resulted from the sale of what are regarded as simple drugs and medicines by unqualified persons. As regards actual poisons, and especially those which are included in the schedule of the Pharmacy Act, the case is very different. There does not appear to be in regard to them any ground for apprehending that country people would be subjected to great hardships if on account of the requirements instituted for the general public interest they were under the necessity of going six miles, or even further, to obtain such poisons as they need from a duly qualified vendor of them. The article purchased in the case referred to was corrosive sublimate, a most dangerous poison, and we cannot imagine any circumstances under which the need for this article could not have been amply satisfied even if it had to be obtained from a considerable distance. The writer of the article admits that even in the most sequestered rural districts the public safety demands that poisons should only be handled by qualified men, but it is at the same time suggested that it might possibly be an advantage to make special arrangements for such places by having a lower grade of qualification than that which now exists. We cannot concur with that view, for it is precisely under such conditions that there is the greatest risk of mischief resulting from the improper use of poisons and from mistakes in their sale. The great number of fatal accidents that occur with carbolic acid, a poison that is not subject to the restrictions of the Pharmacy Act, ought alone to be sufficient evidence that if any change be needed in the law it should be rather in the direction of augmenting those restrictions than decreasing them. In its general tenor the article we have referred to recognises the propriety of confining the trade in poisons and drugs or medicines to properly qualified persons by reason of the need for due technical knowledge of that business, and we think it cannot fail to be seen that any want of facilities for obtaining supplies of such articles is due rather to the fact that the persons needing them reside in sparsely populated rural districts than to any oppressive administration of the law relating to the sale of poisons.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 7, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Gostling, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Robbins, Schacht and Watt.

The minutes of the previous meeting were read and confirmed.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Brown, James Joseph.
Church, Edward Harry.
Cox, Herbert Victor.
Davison, Daniel.
Fuge, Harry Dixon.
Fuller, George Sydney.
Grice, Joseph Edward Brindley.
Harper, Edmund William.
Hobbs, Alfred Ernest.
Jones, John.
Latchmore, Alfred.
Livesley, Thomas Henry.
Norman, Richard Henry.
Robertson, William George.
Routley, Edwin Walter.
Smith, Albert.
Smith, Frederick.
Sturton, John Gilbert.
Thornley, John Brooks.
Wain, Clement John.
Young, Edward Francis.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Church, Edward Harry	Cambridge.
Cox, Herbert Victor	Southampton.
Davison, Daniel	Snaresbrook.
Grice, Joseph Ed. Brindley	London.
Harper, Edmund William	Rotherham.
Heap, Isaac Henry	Stoke-on-Trent.
Hobbs, Alfred Ernest	Tunbridge Wells.
Latchmore, Alfred	Luton.
Livesley, Thomas Henry	New Mills.
Norman, Richard Henry	Cottenham.
Routley, Edwin Walter	Bath.
Smith, Albert	Royston.
Stead, John Christopher	London.
Surfleet, Arthur George	Gainsborough.
Thornley, John Brooks	London.
Wain, Clement John	Tunstall.

ASSOCIATES IN BUSINESS.

The following having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Dryden, Thomas	Landore.
Heywood, William	Heywood.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Arrandale, James William	Denton.
Ashton, Thomas Richard	Manchester.
Bate, Arthur Macaulay	Northampton.
Broadbent, Harry Ralph	Manchester.
Bushby, Arthur	Manchester.
Chappelow, Thomas Henry	Southampton.
Davies, Daniel Evan	Carmarthen.
Donellan, Arthur W. Ernest	Crewe.
Elmitt, William	Lincoln.
Farthing, George Thompson	Spennymoor.
Findlay, John	Edinburgh.
Gibson, William Thomas	Collingham.
Harries, Howell	St. Clears.
Hepple, Thomas	North Shields.
Hewitt, Joseph Frederick	York.
Hughes, Thomas Edward	Newtown.
Hurd, William	Nottingham.
Jacks, Frederick	Longton.
Jacques, Sidney Paul	London.
Jeffcoat, Joseph George	London.
Judd, Walter Rossell	Liverpool.
Lawrenson, John	Radcliffe.
London, Walter Augustus	Redditch.
Marsden, Prosper Henry	Manchester.
Morton, Lawrence Knyvett	Kennington.
Parsons, Henry Imber	Barnstaple.
Perks, Alfred	Birmingham.
Price, Walter William	Worcester.
Rhodes, Alfred Barrett	Manchester.
Rodgers, Ivo Fredk. Joseph	Stafford.
Roe, George	London.
Smales, Alfred John	Darlington.
Talintyre, William John	Stockton-on-Tees.
Taubman, Frank Mowbray	London.
Watkinson, William Harrison	Farnworth.
Westlake, George Frederick	London.
Wyatt, Alvan Lovell	Stourbridge.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Armitage, Nathaniel Newborn	Armley.
Ball, William Titus	Swansea.
Burn, James Robert	Newcastle-on-Tyne.
Carpenter, Albert Hemsley	London.
Cole, Beatrice	London.
Dixon, John William	Milnthorpe.
Evans, Rees	Llanybyther.
Flood, Fanny	London.
Hill, Richard Barker	Howden.
Hole, John Beeston	Mansfield.
Knight, George Thomas	Halesowen.
Le Cudennec, Louis Edouard	Mauritius.
Mundell, Stephen	Leeds.
Pattison, Herbert George	Shrewsbury.
Seymour, William Herbert	London.
Simpson, Herbert	West Hartlepool.
Spencer, Robert Shenstone	London.
Waddington, Joseph Edwd. G.	Manchester.
Wynn, Herbert Alfred	Melton Mowbray.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

The following gentlemen were appointed Superintendents and Deputy-Superintendents of written examinations for the ensuing year:—

Superintendents.

Aberdeen	Strachan, Alexander.
Birmingham	Southall, Alfred.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Munday, John.
Carlisle	Thompson, Andrew.
Carmarthen	Lloyd, Walter.
Carnarvon	Jones, John.
Cheltenham	Barron, William.
Darlington	Robinson, James.
Douglas, Isle of Man	Brearey, Arthur William.
Dundee	Hardie, James.
Edinburgh	Stephenson, John B.
Exeter	Broom, William Willey.
Glasgow	Kinninmont, Alexander.
Guernsey	Nickolls, John Bate.
Hull	Bell, Charles Bains.
Inverness	Allan, Alexander.
Jersey	Ereaut, John.
Lancaster	Vince, James.
Leeds	Reynolds, Richard
Lincoln	Maltby, Joseph.
Liverpool	Parkinson, Richard.
London	Taylor, George Spratt.
Manchester	Benger, F. Baden.
Newcastle-on-Tyne	Martin, Nicholas Henry.
Northampton	Bingley, John.
Norwich	Sutton, Francis.
Nottingham	Parker, William Henry.
Oxford	Prior, George Thomas.
Peterborough	Heanley, Marshall.
Sheffield	Ward, William.
Shrewsbury	Cross, William Gowen.
Southampton	Dawson, Oliver Robert.
Truro	Percy, Thomas Bickle.
Worcester	Virgo, Charles.
York	Sowray, Joseph.

Deputy-Superintendents.

Aberdeen	Reid, William.
Birmingham	Churchill, Walter John.
Brighton	Savage, William Wallace.
Bristol	Pitman, John.
Cambridge	King, George.
Canterbury	Amos, Daniel.
Cardiff	Coleman, Alfred.
Carlisle	Hallaway, John.
Carmarthen	Williams, Joshua Edward.
Carnarvon	Jones, David.
Cheltenham	Fletcher, John.
Darlington	Hutchinson, Rev. E.
Douglas, Isle of Man	Davis, William Richard.
Dundee	Hardie, James Miller.
Edinburgh	Ainslie, William.
Exeter	Harris, Henry William.
Glasgow	Davison, Thomas.
Guernsey	Cumber, Charles Davis.
Hull	Stoakes, Benjamin M.
Inverness	Ogston, William.
Jersey	Ereaut, George.
Lancaster	Arkle, William.
Leeds	Smeeton, William.
Lincoln	Battle, John Sooley.
Liverpool	Hocken, Joshua.
London	Allen, Charles Bowen. Moon, Harry.
Manchester	Midgley, Charles.
Newcastle-on-Tyne	Wright, Alfred.
Northampton	Mayger, William D.
Norwich	Corder, Octavius.
Nottingham	Patchitt, Edwin Cheshire.
Oxford	Thurland, Henry.
Peterborough	Saunders, James Edwin.
Sheffield	Newsholme, G. T. W.
Shrewsbury	Blunt, Thomas Porter.
Southampton	Spearing, James.
Truro	Anstey, John Upham.
Worcester	George, Henry.
York	Wilson, Thomas William.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was of the usual character, recommending sundry accounts for payment.

The PRESIDENT moved the adoption of the report and recommendations, which was unanimously agreed to.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 53) of a registered chemist and druggist and former annuitant. In bad health, and without friends. Applicant has had eight previous grants of like amount. (Norfolk.)

£10 to the widow (aged 59) of a member for forty-one years and subscriber to the Fund for seven years. Applicant has had one previous grant; she suffers from asthma and is not able to do anything. (Hants.)

£10 to a registered chemist and druggist (aged 63) in very bad health, and without any means. Applicant has had one previous grant of £10. (Somerset.)

£10 to a former associate (aged 41), in bad health, which has led to his losing his employment; the grant is made to assist him to emigrate. (Sussex.)

One case was deferred for further inquiries, and three the Committee declined to entertain.

Death of an Annuitant.

The SECRETARY reported the death of Mary Anne Hellowell, aged 79, who had been an annuitant since 1881.

The VICE-PRESIDENT moved the adoption of the report and recommendations, and in doing so read a letter from a subscriber, conveying the intelligence of the death of Mrs. Hellowell; in which he expressed his own grateful thanks and those of the deceased's relatives for the benefits she had derived from the Benevolent Fund. The annuity had been a great blessing to her, and had made her last years much more comfortable than they could have been otherwise. The Vice-President added that it was always a satisfaction to find that the good which the Benevolent Fund was the means of doing throughout the country was appreciated.

The resolution was carried unanimously.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
June	Day . .	536	32	11	22
	Evening .	192	17	5	10

Circulation of books.	Town.	Country.	Total.	Carriage paid.
June. . . .	170	110	280	£1 4 6½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Edinburgh University Calendar, 1889.

From the UNIVERSITY.

Wilbuschewics (E.), Histologische und chemische Untersuchungen der gelben und rothen americanischen und einiger cultivirter Java-Chinarin-

den der Sammlung des Dorpater pharmaceutischen Institutes, 1889.
From Professor Dragendorff.

Attfield (J.), Chemistry, 13th ed., 1889.
From the Author.

Radcliffe Library, Oxford, Catalogue of books added during 1888.
From the Radcliffe Trustees.

Manchester Microscopical Society, Transactions and Annual Report, 1888. From the Society.

Acta horti petropolitani, tom. 10, fasc. 2.
From the Imperial Botanic Garden.

Imperial University, Japan, Mitteilungen aus der medicinischen Facultät, Bd. 1, No. 3.
From the University.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Dujardin-Beaumetz and Yvon, Formulaire, 2e éd.
Attfield, Chemistry, 13th ed.
Remsen, Inorganic Chemistry, 1889.
Boulger, Uses of Plants, 1889.

The Committee authorized the Librarian to attend the annual meeting of the Library Association in London, in September.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
June	Morning	605	38	10	25
	Evening	117	13	2	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of the seeds of *Strophanthus glaber*, False Cola Nuts, and Pichi.
From Messrs. T. Christy and Co.

Specimens of the native shears at Agra used for cutting betel nut and three carvings in betel nut; Cobalt ore, Chrome Iron ore, Nickel ore (silicate), and Kauri gum from New Caledonia; three specimens of native Sulphur from New Zealand; a specimen of Pituri and three pamphlets relating to it.
From Mr. H. B. Brady, F.R.S.

Specimens of the roots of *Aconitum Napellus* collected during December, January, February, March and April; and five microscopic slides of Aconite root. From Mr. P. W. Squire.

Specimens of the Fruits of *Cochlospermum Gossypium*, Scinde Gum, the gums of *Adansonia digitata*, *Albizzia procera* and *Acacia farnesiana*; compound galls on the branches of the teak tree; barks of *Boswellia Bhau-Dajiana*, *Sterculia urens*, *Spatholobus Roxburghii* and *Albizzia procera*, with the gum attached to it, and of *Anacardium Occidentale* with the gum of the tree.
From Mr. J. G. Prebble (Messrs. Kemp and Co.), Bombay.

To the Herbarium.

Twenty-seven specimens of Medicinal Plants.
From Mr. J. G. Prebble, Bombay.

A series of native Medicinal Plants.
From Dr. J. Farrell Easmon, Gold Coast.

Specimen of *Rhamnus oleifolius.*
From Messrs. Schœllkopf, Hartford and Maclagan.

The Committee had ordered that the Library and Museum in London and Edinburgh be closed in the evenings during August and September, that the Library and Museum in London be closed entirely during the first fortnight in September, and the Library and Museum in Edinburgh from August 19 to September 3rd, both dates inclusive.

The staff of the Society's School had attended the Committee and reported on their respective classes.

The Sessional Address.

The President had reported that he had invited Professor John Marshall, President of the Medical Council, to deliver the inaugural Sessional Address in October next.

School of Pharmacy.

The syllabus of the School had been revised with the assistance of the staff, and the Committee had recommended that a copy be sent to each member, associate in business, and apprentice of the Society. The question of the duties of Local Secretaries had been considered and was adjourned for further discussion.

The President, in moving the adoption of the report, said the subject of Local Secretaries had been considered at some length, and the members of the Committee were gradually getting to understand each other's minds, but it was thought desirable that the matter should be still further considered, and all possible assistance obtained from their friends in the country before a definite report was presented. He was very glad to be able to announce that Professor Marshall had consented to give the address in October. He was the President of the Medical Council, and a distinguished surgeon, associated with art as well as science, and was deeply sympathetic with the Pharmaceutical Society.

Mr. Martin said he presumed the adoption of the resolution would carry with it the approval of the syllabus of the School, as to which he wished to make some remarks, the purport of which he had mentioned on the previous evening at the General Purposes Committee meeting. He was quite prepared to make his remarks now, or if it were thought more convenient, to postpone them, and give a notice of motion for October, when perhaps the members of Council would have been able to think over the matter, and be better prepared to discuss and elucidate what was perhaps a somewhat difficult subject.

Mr. Cross suggested that Mr. Martin should postpone his observations until October. The questions he had raised in the Committee required careful consideration, and it would be much better for members to have the opportunity of reading a carefully prepared notice of motion.

Mr. Hampson hoped the tenour of the resolution submitted by Mr. Martin would ask the Council to place the consideration of the matter in the hands of the Committee, because it involved a great many technical details.

Mr. Martin said he was prepared to give the notice now; he thought perhaps it would be well to have it published at once so that members might have full time to consider it.

The President suggested it would be as well not to hurry it. One week's notice was all that was really required.

Mr. Harrison said Mr. Martin had already drawn attention to the matter, and most of the members knew generally what his views were; but as to the precise form of the resolution, if he would take his advice he would wait, and only give the ordinary legal notice, in order to give himself full time to see that it was worded exactly as he would like.

The motion was then put and agreed to.

It was also arranged on the suggestion of the President that copies of the syllabus be supplied to the Local Secretaries for distribution.

GENERAL PURPOSES.

The report of this Committee included the reports on the Prize Examinations, and the motto envelopes had been opened to ascertain the names of the successful competitors.

Practical Chemistry.

Professor Attfield had reported on the attendance and work of his class, the general conduct of which during the session had been satisfactory. Sixteen students had competed in this examination.

Chemistry.

Professor Dunstan had reported that the attendance and work of the students during the session had been uniformly good, and referred to the satisfactory working of the new school course. Sixteen students had presented themselves at the competition for the silver medal.

Botany.

Professor Green had reported on the Prize Competition in his class. Three papers had been set, each occupying three hours, the last paper being in practical work, and the candidates had sent in very satisfactory papers.

Materia Medica.

Mr. Holmes had reported that eight students had competed for the silver medal, and that the papers produced were extremely good.

Pharmacy and Practical Pharmacy.

Mr. Ince had reported on the examination of this class, at which eight students had competed, one of whom had succeeded in obtaining nearly full marks.

Herbarium Prize.

Professor Green had reported on the three collections sent in for this prize, and had recommended each of them for recognition by the Council.

Council Prizes.

A report on the competition for these prizes had been received from Messrs. Blunt and Bowen.

Acting on the above reports the Committee recommended that the following prize awards be made:—

Practical Chemistry.

Silver Medal..................Harry Dixon Fuge.

Certificates of Honour... John Brooks Thornley.
Richard Henry Norman.
George Sydney Fuller.

Chemistry and Chemical Physics.

Silver Medal..................John Brooks Thornley.

Certificates of Honour... Harry Dixon Fuge.
Richard Henry Norman.
Lewis Ough.

Botany.

Silver Medal..................Harry Dixon Fuge.

Certificates of Honour... Lewis Ough.
Alfred Latchmore.
William Thomas Jones.

Materia Medica.

Silver Medal..................Clement John Wain.

Pharmacy and Practical Pharmacy.

Silver Medal..................Richard Henry Norman.

Herbarium Prize.

Silver Medal ....Wm. Foskett E. Horrell.
Bronze Medal ....George James Monger.
Certificate of Honour ..... Alfred Wade Willmott.

Council Examination Prizes.

Pereira Medal (*Silver*); *and Books value £5, presented by Mr. T. H. Hills.*

Harry Dixon Fuge.

Pharmaceutical Society's Medal (*Silver*); *and books value £3, presented by Mr. T. H. Hills.*

Alfred Mander.

Pharmaceutical Society's Medal (*Bronze*); *and books value £2, presented by Mr. T. H. Hills.*

Lewis Ough.

Solicitor's Report.

The report of this Committee also included the usual letter from the solicitor reporting on the progress of cases which had been placed in his hands. Several defendants had paid penalties and costs prior to the hearing, and in two cases judgment had been obtained for two penalties and costs on the higher scale.

Several cases had been considered by the Committee, in some of which proceedings had been recommended. A report had also been received from the Assistant-Secretary in Edinburgh, stating that the proceedings which had recently been instituted against seven offenders in Aberdeenshire had all been successful.

The Council, as usual, went into committee to consider this portion of the report.

On resuming, the report and recommendations were unanimously adopted.

HERBARIUM PRIZE.

Mr. **MARTIN**, referring to the Herbarium competition, said it was very gratifying to find that three collections had been sent in, all of which Professor Green considered worthy of commendation, and he hoped this would be an encouragement to young students to collect and send in specimens. It was very satisfactory to find that the award was made on a reasonable number of specimens. It had sometimes happened that the medal had been obtained by a man who had plenty of time at command, and enough money to travel about to different parts of the country and obtain specimens. If the students who took an interest in botany throughout the country would take notice that the Professor had awarded the prize not necessarily to the largest collection, but on the quality of the work done, and would take courage and send up the best collections they could make in their immediate neighbourhood, it would be a great advantage. It would be much better if the award were made on twenty collections every year instead of three.

JACOB BELL MEMORIAL SCHOLARSHIPS AND REDWOOD SCHOLARSHIP.

The Committee appointed to make the award of the Jacob Bell Memorial and Redwood Scholarships for the ensuing session, subject to the approval of the Council, reported that thirty-one candidates had presented themselves at the following centres:—Brighton, 1; Bristol, 1; Cambridge, 1; Canterbury, 2; Cardiff, 1; Exeter, 1; Lancaster, 1 ; Lincoln, 1; Liverpool, 3; London, 11; Manchester, 2; Norwich, 2; Nottingham, 1; Southampton, 1; Truro, 1; and Worcester, 1. The envelopes bearing the mottoes of the successful candidates had been opened by the Committee and found to contain the following names:—

1. Charles Ernest Boucher.........Bristol.
2. Harry William Kilby Pears ...Brighton.
3. Edward Birchall Sherlock......Liverpool.

The Committee had therefore awarded the Jacob Bell Memorial Scholarships to

Charles Ernest Boucher
and
Harry William Kilby Pears,

and the Redwood Scholarship to

Edward Birchall Sherlock.

The **PRESIDENT** said it was very gratifying to find that a number of the candidates had obtained sufficient marks to entitle them to the scholarships; in fact ten of the competitors had obtained marks qualifying for the Bell Scholarships, and eighteen had obtained the standard for the Redwood Scholarship. Whether it was accidental or whether these scholarships were becoming more appreciated he did not know, but it was undeniable that the work sent in was far above the average.

Mr. **Martin** hoped some wealthy pharmacists would take the hint and endow further scholarships.

The report and recommendations of the Committee were received and adopted.

Votes of thanks were passed to Professor Green for his report on the Herbarium competition; to Messrs. Tanner and Saul for their report on the Jacob Bell Memorial and Redwood Scholarships; and to Messrs. Blunt and Bowen for their report on the Council Prize Examinations.

The Hanbury Medal.

A report had been received from the Adjudicators appointed under the provisions of the deed of settlement for the Hanbury Medal, awarding the gold medal to

Professor Gustave Planchon, M.D., D.Sc.,

for his researches into the natural history and chemistry of drugs. The award had been made by the President of the Chemical Society, the President of the Linnean Society, the Presidents of the Pharmaceutical Society and of the British Pharmaceutical Conference, and by Mr. Charles Ekin, a Pharmaceutical Chemist nominated an adjudicator in accordance with the deed of settlement by the Presidents of the Pharmaceutical Society and of the British Pharmaceutical Conference.

The **President** said most members were aware that Professor Planchon was the successor of Guibourt, the French Hanbury of materia medica. He had edited several editions of Guibourt's well-known work, and was also the author of a work on the determination of the purity and quality of drugs of vegetable origin, in two volumes, a work on barks, and a series of articles on the cinchonas, ipecacuanhas, and other drugs of that kind. In every way he appeared to be just the sort of man whom Daniel Hanbury would have wished to honour, and it was perhaps expressly appropriate that this year the medal should go to a distinguished Frenchman.

Mr. **Martindale** said he had been pleased to make Professor Planchon's acquaintance the other day at the Paris Congress on Materia Medica and Therapeutics, of which he was one of the Secretaries. He felt quite satisfied that Professor Planchon was a worthy recipient of the medal.

The **President** moved the adoption of the report, which was unanimously agreed to.

Report of Examinations.

July, 1889.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (9th)	8	5	3
„ (10th)	7	3	4
„ (17th)	8	6	2
„ (18th)	7	5	2
	—30	—19	—11
Minor (9th)	20	7	13
„ (10th)	25	11	14
„ (11th)	30	10	20
„ (12th)	28	9	19
„ (17th)	25	11	14
„ (18th)	25	13	12
„ (19th)	28	12	16
	—181	—73	—108
	211	92	119

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (17th)	3	2	1
Minor (17th) . . .	11	7	4
„ (18th)	13	8	5
„ (23rd)	13	3	10
„ (24th)	12	5	7
	—49	—23	—26
	52	25	27

Preliminary Examination.

	Candidates Examined.	Passed.	Failed.
(9th)	357	158	199.

Two certificates received in lieu of the Society's examination.

International Medical Congress.

The **President** said he had received an official notification inviting him to announce that the tenth International Medical Congress would take place in Berlin in 1890, when it was hoped that some members of the Society would be present. The invitation was signed by three distinguished men, Von Bergmann, Virchow, and Waldeyer, and was sent to the Society as representative of one branch of medicine.

The British Pharmaceutical Conference.

The President, Vice-President, Treasurer, and Messrs. Allen, Atkins, Cross, Gostling, Leigh, Martindale, Newsholme, Schacht, and Watt, were appointed delegates to the Conference, and the Editor, Sub-Editor and Secretary were also requested to attend.

September Council Meeting.

The **President** stated that the Members of Council would receive, in the usual course, notice for a meeting in September, but it was understood that a quorum would not be formed, and he would ask his colleagues therefore to regard the notices as merely formal.

The Congress of Therapeutists and Pharmacologists at Paris.

SECTION OF PHARMACOLOGY.

The section devoted to pharmacology, after an hour and a half devoted to preliminary matters, commenced on Thursday at half past ten, M. Delpech occupying the chair.

The first paper, entitled "General Remarks upon Tar and its Preparations, and the Means of Rendering Tar Soluble," was read by M. Verne, of Grenoble. His process consists in making a tar soap with hydrate of sodium, drying it and dissolving it in definite proportions in water. In the discussion that followed it was objected that the preparation recommended by M. Verne was a compound of tar rather than a simple solution. M. Verne maintained, however, that it contained in a soluble form the whole of the constituents of tar, the liquids insoluble in water being suspended in the form of an emulsion when the soap is much diluted, the soap itself being soluble in 2 or 3 parts of distilled water.

Then followed a paper by M. Casthélar, of Paris, on "The Preparation of Iodoform by the Use of Acetone." By the method recommended by him iodoform can be prepared directly from the alkaline iodides of sodium and potassium obtained in the kelp manufacture. The solution of these salts after being deprived of sulphur by the ordinary methods in use, on the addition of caustic soda, acetone and hypochlorite of sodium, gives an immediate yellowish white milky precipitate of iodoform. This is deposited as a fine powder, but can be obtained in fine micaceous crystals by recrystallization from toluol or other suitable solvent.

Three other papers, viz., one by M. Freyssinge, of Paris, on the acid or alkaline solutions of tar, a second by M. Causse, of Orleans, on (a) "The Preparation of White Balsam of Tolu"; (b) on "The Double Iodides of Mercury and the Alkaloids," and a third by M. Jolly on "Iodine Considered as a Therapeutic Agent in Diseases Dependent on Infection by Microbes," were taken as read, the authors not being present. M. Jolly recommends the use of iodine because in the proportion of 1 in 4000 it is a powerful antiseptic. It forms insoluble precipitates with alkaloids and would thus prevent the toxic effects of ptomaines and leucomaines, whilst its easy diffusibility is also a great advantage. The preparations recommended by M. Jolly are a wine of iodine and iodine associated with a solution of phospho-glycerate of potassium. In the form of pills he finds that extract of walnut prevents iodine from causing irritation of the stomach.

On Thursday the members of the Congress received an invitation to spend the evening in a social entertainment at the house of M. Dujardin-Beaumetz. About a hundred members attended, and a very enjoyable evening was spent.

On Friday morning, at nine o'clock, Dr. G. Planchon occupying the chair, the session was continued, the first paper being read by Dr. Balme, of Grenoble "On Antiseptic Paper for Producing Instantaneous Solution of Perchloride of Mercury." His method consists in taking a solution of known strength and dropping a quantity on paper, perforated like postage stamps, a definite amount being dropped on each square so that one square of paper dropped into fifty grams of water would give 50 grams of solution of a strength equal to the *Liqueur de van Swieten*. The paper used in the process is specially prepared, being treated successively with hydrochloric acid and dilute hydrofluoric acid, then with potassic carbonate, and finally with chloride of sodium to form a double soluble salt with the perchloride of mercury. For regulating the amount of solution dropped on each square of paper and keeping it uniform during drying special apparatus is used, for explaining which in detail an opportunity may occur later on.

The next paper was by M. Godin, "On Fumigating Porolithes for Antiseptic Purposes." This process consists in the use of a porous stone for portability in carrying liquid antiseptics and for regularity in distributing the vapour gradually when the porolithes are heated. The solution used is made by decomposing a mixture of iodide and iodate of potassium with tartaric acid, or vinegar. The exact nature of the stone used was not described beyond the name "Porolith fluorhydrique." The size of the stone used by the author is about 6 centimetres long 3 broad and 1 in thickness and it weighs about 25 grams. The stone when it has been used to absorb a volatile or corrosive acid, such as dilute hydrofluoric acid, of which it will hold 10 grams, is wrapped in paraffin paper and then in tinfoil. He also uses the porolith for the distribution of the vapour of creosote, eucalyptol and a mixture of thymol and phenol.

The next paper was by M. Jouisse (Orleans), "On Antiseptics Applied in the Form of Plaister."

M. Jacquemaine, of Villafranche (Rhône), "On the Sterilization by Means of Carbonic Acid of Various Medicinal Liquids." He exhibited specimens of monocalcic phosphate, and the same in association with pepsin kept in solution by means of carbonic acid gas. He stated that the usual deposition of a bibasic phosphate is prevented, the liquid remaining perfectly clear, while the development of the microphyte *Hygrocrocis phosphaticus* is hindered. The solution used, however, appears to be a biphosphate and hydrochlorophosphate of calcium, and the solution, although perfectly limpid, had a somewhat disagreeably acid taste. The pepsin preparation has the disadvantage of frothing too freely.

M. Rennès paper on "A Method of Utilizing without Danger Fluorides and Iodine in the Treatment of Contagious and Infectious Diseases," contained a formula for a preparation in which fluoride of ammonium formed an ingredient. The formula given was as follows:—

1. ℞ Ammonium fluoride	25	grams.
Iodine	30	„
Distilled water of *Eucalyptus globulus*	80	„
Shake together.		
2. ℞ Essential oil of canella	4	„
„ „ cloves	1	
Alcohol (rect.)	35	„
Glycerine	25	„
Syrup of Gatinais honey . . .	300	„
	500	

Mix these liquids successively, shake for ten minutes. Mix the two liquors, shake strongly and filter. Honey is used in preference to sugar because the latter contains traces of lime, which would lessen the germicidal action of fluoride of ammonium. The author has satisfied himself that this mixture is borne by the stomach. It is given in ʒj, ʒij, or 4 drachm doses.

On Saturday morning at 9 o'clock, M. Adrian being in the chair, the first paper called was by M. Miesch, on "A Form of Tampon for use like a Medicated Pessary," but it was of a character fitted rather for a chirurgical than a pharmaceutical audience and the exact nature of the material used for the tampon was not divulged. Indeed there seems to have been some difficulty in allotting this paper to the two sections of pharmacology or therapeutics.

The next paper was by G. M. Velpry (Reims), "On Granulated Products and on a Form of Saccharohydrometer."

The next paper, by M. Gareau, (Le Mans) referred (*a*) to an improvement in the preparation of the "looch blanc" of the Codex. This consists chiefly in using a certain proportion of gum arabic instead of tragacanth, and (*b*) to a process for the preparation of tinctures dependent on the fact that in macerating solids in liquids the portion first saturated is heavier than the rest of the liquid. It has already been published in the *Union Pharmaceutique* for 1887.

This was followed by a paper on the possibility of preparing a mercurial ointment, containing 80 to 90 per cent. of metallic mercury, by M. Chevret (St. Etienne). This, however, is dependent on a special apparatus. A notice of this paper must therefore be deferred until it is possible to present a sketch of the machine used.

M. Borier read a paper on the action of chaulmugra oil in skin diseases and tuberculosis. The author expressed the opinion that chalmugra oil is a specific for phthisis, leprosy, syphilis, and that its action is parasiticide or germicide. He has not, however, supported his theory by any published experiments.

At the General Meeting on Saturday afternoon, Mr. E. M. Holmes occupying the chair, the report by Professor Planchon "On New Drugs of Vegetable Origin introduced during the last Ten Years into Pharmacy" was read. Several of the authors of the papers next in order not being present Dr. Petresco, of Bucharest, was called upon to read his communication on *Bryonia alba* as a powerful antihæmorrhagic. Dr. Petresco said that his attention had been directed to the plant by one of his pupils, Dr. Elian, and that knowing that this property of the plant was not generally recognised in medical works he had directed a chemical and clinical investigation of its properties. The chemical investigation made by M. Urbeano showed that it contained a bitter principle named adeleine, a glucoside breine named after (brei, the Roumanian name of the plant), and an acid called breic. These three bodies were exhibited by Dr. Petresco, adeleine being a crystalline powder, and breine and breic acid brown syrupy liquids. The hæmostatic effects of the plant appear to be due to breine. This has been given to animals in the dose of 20 centigrams in 1 gram of water hypodermically injected for rabbits, the toxic dose for the same animal being 1½ gram. Dogs and cats have not been killed by doses of 1·40 gram subcutaneously injected. The alcoholic extract of the plant has been given in doses of 2 to 3 grams a day with excellent success in hæmorrhages, particularly from organs rich in smooth muscular fibre. An interesting point brought out in this paper was the fact that *Bryonia alba* is not purgative like the nearly allied species *B. dioica*, although adeleine has been found in both plants. Instead of breine, however, a glucoside closely resembling it, which has been named bryonine, and an acid named bryonic were obtained.

The next paper, by Dr. L. Butte, gave the results of experimental researches on the physiological and therapeutical action of aqueous extract of a Guaco (*Aristolochia cymbifera*). The drug employed by him was obtained from Tabasco, a province of Mexico. He was unable to find either an alkaloid or a glucoside in the root, but his clinical experiments lead to the conclusion that the drug possesses emetic and cathartic properties, and can only be given in small doses. He has found, however, that when applied externally for the treatment of dry eczema accompanied by intense itching and a burning sensation it gave great relief; the itching disappeared and sleep became possible. The strength of the lotion used was 20 parts of root boiled in 1000 of water, and the lotion was applied in the form of a wet compress. In numerous cases this treatment has proved most successful. In eczema accompanied by exudation the lotion does not answer, appearing to increase rather than alleviate irritation.

A paper by M. Ch. Lecerf on "The Alimentary Value and Therapeutical Use of *Soya hispida*." Attention has already been directed to the value of the seeds as a food in the East, and to their value as a nutritive agent (containing only about 6·40 per cent. of starch, 36·67 per cent. of proteid matter, and 17·00 of fat), Blondel, *Journ. de Pharm. et Chemie*, [5], xviii., p. 537. Egass, *Bull. Gen. de Therap.*, Nov. 30, 1888. Specimens of light soya bread of a light yellowish brown colour that were placed on the table were not considered at all unpleasant to taste, but rather palatable. The author stated that at first the bread had a slightly purgative action, but that this soon passes off as the patient becomes accustomed to its use.

In the paper by Dr. Riffat (Salonica) on "The Treatment of Acute and Chronic Urticaria by Tincture of Strophanthus," it was stated that in ten cases which had resisted other remedies tincture of strophanthus had been found of considerable value, especially in chronic cases. *S. hispidus* was the kind used, and the dose of tincture given was 15 to 20 drops during twenty-four hours. In acute urticaria a single dose has almost always proved sufficient to cause the disappearance of the rash as well as the itching. Dr. Riffat believes that strophanthus gives relief in this disease either by its favourable action in dyspepsia or by removing from the blood the compounds which give rise to the irritation of the nerves supplying the skin.

The communication of Senor A. R. Silva Braya on *Solanum Jurubeba* indicates that the plant is considered in the provinces in which it is collected, Sao Paulo, Minas Geraes and Pernambuco, to be an excellent remedy in hepatic and malarial diseases. He thinks that the plant is worthy of the attention of European therapeutists, and gives a number of formulæ for the preparations used in Brazil. The plant appears to yield about 10 per cent. of soft extract, of which 25 centigrams to 1½ centigrams can be taken in twenty-four hours. This extract is employed in the form of wine, syrup, tincture and ointment.

Dr. Roussel (Paris), in his paper, recommended the subcutaneous injection of volatile antiseptic remedies, such as eucalyptol, on the ground that all such bodies are eliminated through the lungs, and that if inhaled directly through the nostrils they do not reach the substance of the lung or sterilize it, but only a certain portion mixed with respired air enters the minute branches of the bronchi. He recommends olive oil as the medium for administering these antiseptics, the proportions being 5 of essential oil to 20 of fixed oil previously sterilized by heat. His results appear to have been communicated to the Academy by Professor Ball in February, 1886, and this paper, like several others, seems to have been written with the view of calling more general attention to processes, etc., which the authors consider important.

Dr. Bedoin read a note "On Antiseptic Crayons made of Gelose." Specimens of crayons were exhibited to the meeting consisting of slender sticks about one line or less in thickness made of japanese isinglass with which were incorporated various antiseptic medicaments, iodoform, &c. Owing to the enormous bulk of liquid that the gelose will absorb these crayons or bougies swell to three times their bulk and thus they are useful in stricture for dilating the constricted part whilst the substance itself possesses an emollient character. These bougies have a slender metallic axis which can be withdrawn when the gelose has absorbed moisture and become soft, and as the gelose does not dissolve but merely swells, it forms an antiseptic channel for the urine.

Dr. Schaer's report on "The Unification of Weights and Measures employed in Formulæ, and on the Utility of an International Pharmacopœia," was then read, and a resolution was passed to the effect that a universal pharmacopœia comprising all the more powerful and important remedies was most desirable. The proceedings then terminated.

In the evening a banquet was provided on the Eiffel tower, and the members of the Congress subsequently proceeded with one lady (antivivisectionist) to the very top of the tower.

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, July 31, at 4.30 p.m.

Present—Mr. Umney, President, in the chair; Professor Attfield, Messrs. Carteighe, Gerrard, Plowman, Ransom, and Mr. Naylor (Hon. Gen. Sec.).

The minutes of the previous meeting were read and confirmed.

Intimations of inability to attend were announced as having been received from Professor Bentley, Messrs. Atkins, Benger, Conroy, Dott, Groves, Martin, Martindale, Proctor, Stephenson, Symes and Thresh.

A preliminary list of officers of the Conference to be recommended to the Newcastle meeting was drafted and agreed to.

The announcement was made that an intimation had been received informally of an invitation to be given in due course to the Conference to hold its 1890 meeting at Leeds.

The Hon. Treasurer submitted a draft of the financial statement for the present year.

In his absence the Chairman compared its leading items with the corresponding ones in the balance sheet of the preceding year. The result generally was deemed satisfactory.

Mr. S. Plowman, F.R.C.S., announced that it would be no longer possible for him to act as Secretary to the Committee of the Publication of the 'Year-Book.' At his suggestion the 'Minutes of the Year-Book,' with collateral documents, were handed over to the London Secretary, who was then appointed to the vacant office.

A communication from the Chairman of the Formulary Committee was received and commented upon.

Mr. Naylor read a short letter from the Local Secretary, Mr. Clague, in which he reported the withdrawal of the offer to provide luncheon by the proprietor of the Tynedale Hydropathic Mansion, and that in place of it the Local Committee had agreed with the proprietors of the Royal Hotel to serve a "collation" in the Town Hall.

Parliamentary and Law Proceedings.

PROSECUTIONS UNDER THE PHARMACY ACT.

In Aberdeen Sheriff Court on the 6th inst.—Sheriff Smith on the bench—four cases of dealing in poisons without having the necessary qualification were disposed of. The prosecutions were at the instance of Richard Bremridge, 17, Bloomsbury Square, London, registrar under the Pharmacy Acts, and were conducted by Mr. A. E. Smith, advocate.

The first case called was that of James Anderson, Torphins, who was accused under the 15th section of the Pharmacy Act in a complaint to the effect that he, not being a duly registered chemist within the meaning of the Act, did (1) on June 24 last unlawfully keep open shop at Torphins for the retailing of poisons, thereby rendering himself liable to a penalty of £5; and (2) that contrary to the 17th section of the Pharmacy Act, on June 24 he sold 3 drachms or thereby of the poison known as corrosive sublimate, to John Rutherford Hill, 36, York Place, Edinburgh, assistant secretary to the Pharmaceutical Society of Great Britain, without the said quantity of corrosive sublimate being properly labelled poison, and that accused delivered the said poison to Mr. Hill without entering in a book the date of sale, name and address of purchaser, quantity of poison sold, and the purpose for which it was stated by the purchaser to be required, and did not get the purchaser's signature to any such entry, and thereby rendered himself liable to a penalty of £5.

After some preliminary objections by Mr. Wilson, solicitor (who appeared for accused), had been discussed and over-ruled, accused pleaded guilty.

Mr. Smith then said that the reason of bringing these charges was that it was thought desirable to make these merchants know that they were liable to the penalties for each of the offences mentioned in the Act. The principal object was to put down unqualified dealers in drugs.

Mr. Wilson, solicitor, stated that accused's shop was six miles from any qualified chemist's premises. It was a notorious fact that all over the county of Aberdeen these drugs were sold by parties who were not duly qualified practitioners. This was the first prosecution within the county. The sale of the drugs had been done quite openly, and without intentional offence. Mr. Anderson did keep a book for entering the drugs sold, but by some curious mistake in this case the entry was not made.

The Sheriff said he did not look upon this case as a very serious one. He was happy to think the offences were not intentional, but a simple failure, through negligence, to attend to the regulations. The nature of the prosecutions, he supposed, was to bring home to the minds of men the fact that this Act of Parliament existed, and that its provisions must be respected. He imposed a fine of 5*s.* on each of the two offences charged in the complaint, and also ordered accused to pay £1 15*s.* as the expenses of the prosecution.

Alexander Morren, Tarland, was next accused of selling to Mr. Hill, on June 24, quantities of cantharides, tartar emetic and opium, all poisons. He pleaded guilty, and Mr. D. Mitchell, advocate, stated on his behalf that the poisons were sold from a shop which was under the supervision of a qualified practitioner, but this was denied by the prosecution.

The Sheriff considered that the excuse was no defence at all. It did not remove risk, and the Act held that unless a shopkeeper was qualified to dispense medicines he was not to do so. The fine in this case was again 5*s.* for each of the two offences, as specified in the previous complaint, and modified expenses amounting to £3.

Robert W. Reid, New Street, Kintore, pleaded guilty of selling to Mr. Hill, on June 25, tartar emetic and opium.

Mr. Alexander Duffus, solicitor, tendered a plea of the shop being under competent medical supervision, but the Sheriff imposed a fine of 5*s.* for each of the two offences charged, and payment of £2 9*s.* as expenses.

Alexander Warrack, New Street, Kintore, pleaded guilty of selling tartar emetic to Mr. Hill on June 25, and was fined in 10*s.*, and ordained in addition to pay £2 9*s.* 11*d.* expenses.

Three other cases were settled out of Court by payment of the full penalties and expenses, and on an undertaking being given to discontinue the sales of poisons or medicine.

Review.

EXERCISES IN THE PREPARATION OF ORGANIC COMPOUNDS. By Professor EMIL FISCHER. Translated from the Second German Edition by A. KLING, with a Preface by Professor W. DITTMAR.

This little book consists of instructions for the preparation of fifty-eight organic compounds whose production involves the investigation of chemical reactions of general interest and of operations which have frequently to be conducted during the study of organic chemistry. It is only comparatively recently that organic chemistry has been made for the student a living subject, at any rate, in this country, by the arrangement of a systematic course of practical work, through which every student has to pass. It is now fully recognized that if organic chemistry is to be made useful to the student in his subsequent career it is essential that he should become familiar with the details of the methods of preparing organic compounds, since it is generally true that reactions which seem simple enough on paper involve operations which are in actual practice very troublesome for the elementary student.

The course of work laid down in this book is one which every chemical student in a German laboratory has for some years past been obliged to traverse. For the pharmaceutical student organic chemistry has a rapidly increasing importance. In the not far distant future it appears almost certain that drugs will more largely consist of compounds of known constitution prepared in the chemical laboratory. It will be expected that the pharmacist's knowledge of the methods of preparation and properties of these compounds is not less extensive and intimate than it now is of the various inorganic compounds that are employed in medicine.

The principles of organic chemistry, the general reactions and the constitution of organic compounds are best learnt in the lecture-room with the aid of a trustworthy text-book written by a master of the subject. But a student may possess all the knowledge thus obtainable and yet not be able to successfully prepare a single organic compound in a state of purity. In order that he may be able to obtain pure compounds something more than a bookish knowledge of reactions is needed, viz., an intimate practical acquaintance with the actual methods of bringing about chemical change and of isolating and purifying the compounds that are formed. This practical knowledge can only be acquired from a teacher who is himself a master of it. Even in what appear to be the simplest reactions, difficulties arise which one who is himself familiar with the manipulative process of organic chemistry is able to overcome, but which seem to be almost insuperable to the untrained worker. Practical organic chemistry carried on without the assistance of an experienced teacher means a series of failures. Professor Fischer's book will be of great assistance to students who are working in a properly equipped laboratory under competent supervision. To students who are thus fortunately placed we strongly recommend these exercises, written as they are by one of the greatest living masters of the science, who is himself an arduous worker and who has within recent years made brilliant contributions to its advancement.

It has, however, to be borne in mind that this book is far from complete in itself. There is no systematic arrangement and the compounds are not tabulated on any definite plan. It is, therefore, a book which will be most useful as constituting a series of laboratory notes to be employed by those who are attending lectures on the subject and a parallel course of practical instruction. As soon as the reactions and constitution of a compound have been fully discussed by the lecturer, the details of the method of preparing it can be learnt by the student from this book, and after the substance has been obtained in a state of purity, its characteristic reactions may be examined.

On the whole, the list of selected compounds is a good one, though it is somewhat weak in paraffin derivatives, and would, of course, need to be supplemented to suit the requirements of special classes of workers.

It is difficult to speak highly of the translation. Having regard to the circumstances under which the book is likely to be used it is perhaps sufficiently satisfactory. It is evident, however, that the translator is not an adept in the subject, since he is unfamiliar with the usual English equivalents for German chemical terms, as, for example, when he speaks in the preparation of naphthalene sulphonic acid, of the naphthalene being "sulphurized," and throughout the nomenclature used is very crude, in fact the compounds are often designated by most undesirable names. The translator would have done better if he had consulted the "Instructions to Abstractors," which have been issued by the Editor of the *Journal of the Chemical Society*, with the view of promoting uniformity in chemical nomenclature. The system there laid down is now coming into very general use, and has already been adopted in several standard works.

BOOKS RECEIVED.

HEALTH TROUBLES OF CITY LIFE. By GEORGE HERSCHELL, M.D., Lond., etc., etc. Bristol: John Wright and Co.

CHEMICAL LECTURE NOTES. By PETER T. AUSTEN. Ph.D., F.C.S. New York: John Wiley and Sons. 1888.

Obituary.

Notice has been received of the death of the following:—

On the 22nd of July, Mr. James Winterborn, Chemist and Druggist, Redborn, Hertfordshire. Aged 74 years.

On the 1st of August, Mr. Henry Smith, Chemist and Druggist, 90, South Street, Liverpool. Aged 73 years.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PHARMACEUTICAL SOCIETY AS PART OF A TEACHING UNIVERSITY.

Sir,—In the *Schoolmaster* of the 18th ult. there was an excellent article headed "Why should London Wait?" urging for a teaching university for London. As we are well aware, there is not here—in the first city of the world—a university partaking of the nature of a teaching and an examining body. There are numerous colleges and institutions doing the teaching part very ably, but what is urged is that there should be a university similar to those of Oxford or Cambridge, and that such colleges as King's, and institutions like the Birkbeck, might become affiliated. I need hardly say no mention was made of the Pharmaceutical Society; why should not such a Society become one of the chosen few? No one can deny that the teaching of our worthy Institution is carried out in a most praiseworthy manner, and many of its scholars have proved themselves to be first-class scientific men as well as thorough pharmacists; a proof of this may be seen in the fact that many of our pharmaceutical chemists are fellows of the Chemical Society and Institute of Chemistry, besides many other scientific societies.

The name of a university always brings to my mind the thought of a degree, and I have often thought there ought to be pharmaceutical as well as medical degrees. It occurs to me, now that a reform is being sought for in our London University, that this would be a suitable time for the Pharmaceutical Society to join in the agitation to become affiliated with other colleges who are moving in the matter, to seek to get examinations conducted on similar lines to the Major, but more advanced, to be open only to those who have passed our present Minor and Major for the purpose of conferring pharmaceutical degrees on successful candidates. Why should we not have graduates in pharmacy in England as well as in America? or are we always to be behind in educational matters? It cannot be argued that our subjects studied are not worthy enough, for a great part of the B.Sc. examination consists of them. Surely the elementary training—I mean apprenticeship—of pharmacists would not be too degrading, for it is far above the early work of many medical men, and lastly, the dispensing duties would not render candidates ineligible for such honours. This, at least, would form a new goal for our members to work for, a distinction unique in itself. It would also prevent many of our best men, wishing to go higher with their studies, from entering the medical profession, which is already seriously overcrowded; for it is mainly to receive a distinctive degree that many rush into the ranks of medicine. Surely we are not ashamed of our profession, and our excellent President—the champion of educational reforms—ought to be commissioned to use his talented powers to procure for us a university recognition. Let the chemist adopt these high and noble principles; the public are not slow to perceive distinctive features in a profession, and a means of showing what qualifications are held, is to display their diplomas in prominent parts of their pharmacies. Let us sink paltry tactics, which at the best only bring a small amount of the "filthy lucre," too often the desired goal and degrading influence of many young fellows entering the struggle of life.

164, Lambeth Walk. J. WELLESLEY DOUGLAS.

MUSAMBRA, A VARIETY OF EAST INDIAN ALOES.

BY DAVID HOOPER.

Writers on Indian materia medica have described in their works an impure aloes called *Musambra*, said to be made in India. In looking through vernacular lists of drugs of the present day, the word *musambra*, or some other form of it, is seen to be applied generally to aloes, whether imported into India or not, and it will be seen from the following list that the appellation is not restricted to any one part of the peninsula. Mussabar, musabbar (*Hindustani*); musanbar, moosumbir (*Dukhni*); mosbabbar (*Bengali*); mussbar, sibar (*Kashmiri*); musambara-bolla (*Muhratti*); mushambarum, moosumbrum (*Telugu*); musambra (*Canarese*). The Telugu name is that used on the Madras Railway, a line running between Madras and Calicut.

The name, speaking with etymological accuracy, is a compound of *mur* and *sibr*, the Arabic names for the two drugs myrrh and aloes. I cannot find, however, that such a compound exists as an article of commerce. It might be difficult to detect the admixture of a small quantity of myrrh in aloes, but any considerable quantity would increase the amount of resins present and interfere with the odour. The samples of musambra examined in my laboratory were free from the addition of any myrrh, and this seems to be the usual experience. Under the head of "Aloes," in the catalogue of the Calcutta Exhibition, it is stated that this drug, "combined with myrrh, constitutes the musambar of Bombay," but I have not been able to obtain a sample. Dr. Dymock says the term *musanbra* is incorrectly used for aloes, which must be true in many parts of India; but as the name has been known for at least a century in Mysore, and as a sample found in that country is different from hitherto described varieties of Indian aloes, it seems to be a subject worth investigating.

Ainslie in 'Materia Indica,' Pt. 1, p. 10, says: "There is a coarse kind of aloe called *musambrum*, common in the bazaars, which is prepared perhaps in India from this species (*A. perfoliata*, Linn.) . . . . . This species of the plant is common in India, though I cannot learn for certain that any of the drug is prepared from it."

J. J. Wood, in the revised edition of 'Materia Indica,' published in Madras, 1871, gives a note as follows:—"Aloes met with in the bazaars, as prepared in the provinces, is variable in quality, usually inferior, being darker in colour than the other kinds, extremely bitter, and having a nauseous taste."

Kanny Loll Dey, in 'Indigenous Drugs of India,' has a paragraph to the following effect: "The bitter inspissated juice (of *A. Indica*) constitutes the medicinal aloes mussubber of the bazaar."

Dr. Kirkpatrick, of Mysore, some twenty years ago compiled a "List of Asiatic Medicines used by the Hakeems, with uses and doses," giving in each case the Canarese and English names of the drugs. Under the name of Moosamber he describes the properties and doses of aloes, without giving a description of the drug or its botanical origin.

Dr. O'Shaughnessy in 'Bengal Dispensatory,' under the article "Aloes Indica, Royle," says it is "probably the source of some of the common aloes (*musabbir*) of the bazaars," which is "black, brittle, of semivitreous fracture, and too impure for medical use."

Most of the above authorities designate the most impure kind of Indian aloes as *musambra*, but not one of them speaks with certainty of its local manufacture from the plant.

The classification of Indian aloes was attempted by O'Shaughnessy and Pereira, and a reference to the varieties distinguished by the names of the countries whence they were obtained, will be of interest in comparing them with our present knowledge of the drug. O'Shaughnessy mentions three kinds, as under:—

Socotrine, imported, 82 per cent. soluble in water.

Kurachi, nearly black, opaque, rather vascular, shelly structure of fracture, faint smell, powder blackish. It is identical with the better kinds of mushaber of the Bengal bazaars. Water dissolves 52 per cent.

Dekkan, deep brown, of earthy and slightly resinous fracture, faint odour, powder brown. Soluble in water in the proportion of 98 per cent.

Dr. Pereira ('Materia Medica,' vol. ii., p. 193) describes six kinds of aloes in India:—

Kurachi, nearly black, opaque.

Dekkan, deep brown.

North India, dull black, brittle, little odour.

Guzerat, dark, more gummy, more difficult to fracture.

Salem, in blackish masses with numerous large air cavities, odour of socotrine.

Trichinopoly, resembling Cape aloes.

Dr. Dymock, in 1881, discovered the source of an aloes prepared in Jafferabad. It occurs in cakes of a black colour and pitch-like lustre. The Kurachi aloes previously described might now perhaps be referred to Jafferabad aloes, and the Salem aloes of Dr. Pereira to *Musambra*. The socotrine aloes as imported might account for some of the other varieties known as "Indian."

The specimen of aloes known as *Musambra*, and bought by the author two years ago in Bangalore, has the following characters. It occurs in thick cylindrical pieces of ½ lb. to 1 lb. or more. The colour is black, and liver-coloured in places where it is broken or rubbed. It breaks or crumbles up into small *angular* fragments, not into laminæ or splinters, as in other kinds of aloes. It is distinctly porous, and small stones and other impurities are seen to be imbedded in its substances. The odour is agreeably aromatic. The powder is dull umber brown. When moistened and examined under the microscope the crystals of aloin only slowly made their appearance, which would imply that there was a smaller quantity than usual of the active principle.

A proximate analysis of the drug gave the following result:—

Water extract	53·8
Resin soluble in acetic acid	10·4
Resin insoluble in acetic acid	8·5
Insoluble in proof spirit	1·9
Mineral impurities	21·8
Moisture	3·6
	100·0

The drug responded to the general tests for aloes. Borntrager's test = a rose colour, Cripps and Dymond's test = deep orange-red. Ditto with ammonia = claret. Nitric acid in the cold = deep red. Nitric acid vapour passed over some of the powder mixed with sulphuric acid gave no blue colour. The last two tests are characteristic of Barbadoes aloes.

Some plants of the Mysore aloes were obtained from Mr. J. Cameron, of the Lal Bagh, Bangalore, about two years ago, and were planted out in the Botanic Gardens, Ootacamund, for the purpose of flowering them for identification; but the elevation and cold were unfavourable to the growth. Last year, during a tour through Travancore, an aloe similar to the Mysore plant was found to be very abundant, and to be used by the natives in medicine. Flowers, fruits and leaves were brought back and submitted to Mr. Lawson, the Madras Government Botanist, who with very little hesitation referred them to *Aloe vulgaris*, Lamark, the figure of which is represented in Bentley and Trimen's 'Medicinal Plants,' plate 282. The *A. indica* and *A. litoralis*, mentioned in the Pharmacopœia of India, as has been suggested before, might be placed under the denomination of *A. vulgaris*, a plant which seems to be well established, at least in Southern India. *A. vulgaris* affords the Barbadoes aloes of commerce, which gives peculiar reactions with nitric acid and its vapour. The Mysore aloes, in giving similar reactions, confirms to some extent the evidence of its being made in the country from a plant which is so abundant. If the imported article should ever become scarce the natives will not be backward in manufacturing the drug for themselves, if, indeed, this is not already done. The aloes plant is not a true native of India, and the introduced *A. vulgaris* is not at present recognized in modern works of materia medica of this country, but considering its easy growth and the extensive uses to which it is put by the natives in medicine, it will shortly have to take up an official position with other indigenous drugs.

THE CULTIVATION OF MEDICINAL PLANTS IN CAMBRIDGESHIRE.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

Having been informed that a portion of the aconite leaves used in commerce is grown in Cambridgeshire, and being desirous of determining how far the plants grown in the same district, as well as in different counties, vary in character, I obtained permission from Mr. W. Moore, of Foxton, who is apparently the largest grower of this plant in Cambridgeshire, to examine the plant grown by him, when in blossom. On arriving at Foxton, I found that besides aconite, belladonna and henbane are also grown by Mr. Moore; only seven acres out of a large farm being devoted to these three medicinal plants, the usual proportion being about three acres each of henbane and belladonna, to one of aconite. A little foxglove is also grown. The cultivation has now been carried on at Foxton for about thirty years. The soil is apparently a mixture of chalk and gravel, with a little clay.

ACONITE.—This is planted in rows about two feet apart, and about one foot between each plant. The fresh plantations are generally made in March soon after the leaves appear, when the young plants are divided and planted out. Mr. Moore assures me that young plants are formed on the rootlets, as represented in Bentley and Trimen's illustration, and also at the bases of such stems as lay on the ground. This prolific formation of new roots may possibly arise from the fact that the aconite is usually cut down in the middle of June, when the flowers have begun to open, and the store of nourishment that would have gone to form seeds is probably diverted to forming roots. There does not appear to be any regular demand for aconite root of English growth, and to meet such demand as exists, a few roots are dug up in autumn, generally in October, and dried.

At the time I visited Foxton the plants were in perfection, about half of the flowers being expanded. The leaves were of a full dark green, and the flowers of a deep blue colour. The helmet was not quite so semicircular as in the typical *Aconitum Napellus*, and the inflorescence showed a general tendency to branching. The whole of the plants, however, manifested a remarkable uniformity, were of very robust growth, and were flowering at the proper date, and the leaves possessed the characteristic taste of aconite. This uniformity is due to the fact that Mr. Moore never sows the seed, but always divides the root. Indeed, the plant is cut for making extract while still in flower, and therefore before the seed is formed. Mr. Moore does not, however, make the extract himself, but sends the fresh plant, packed like faggots, to London. The aconite is usually cut overnight and sent off by an early morning train, so as to prevent as far as possible any withering by exposure to the hot sun.

Although the plant is slightly divergent from the typical *A. Napellus*, it possesses the great advantage of uniformity, and the root obtained from it would be therefore far more dependable than the foreign root, either for use in medicine or for chemical analysis.

HENBANE.—This is sown in March or in the beginning of April, and is cut about the middle of June in the next year. For drying only the flowering tops are collected, not the stem leaves, and are rapidly dried in hot air in a kiln, in which about 2 to 4 cwt. can be dried in two days. The soil does not appear so well suited for henbane as the deep rich fen land of Lincolnshire, and the plant is frequently attacked in dry seasons with a fungus which causes wrinkling and discoloured spots on the leaves. Here, as elsewhere, henbane is a very uncertain crop, three out of five seasons usually failing to afford a profitable return. The plant, beside being attacked by the fungus, has its leaves riddled with a little beetle resembling the turnip flea, and in the autumn a voracious grub, apparently that of *Mamestra brassicæ*, eats out the central leaf bud of the plant, so that they do not come up the second year. In the autumn the large root leaves are sometimes collected and dried, and are sold under the name of "First cutting of biennial plant," at a lower price than the flowering tops of the second year.

The variety cultivated at Foxton was obtained from wild plants found near Foxton, and has the broad leaf so characteristic of the wild henbane, as distinguished from the narrow thistle-like form cultivated in some counties. No use is made of the henbane roots, although it is hardly conceivable that they should not contain a sufficient amount of alkaloid to pay for extraction.

BELLADONNA.—This is grown from seed which is drilled in during the spring. The ground suits the plant admirably, being chalky, and although level is sufficiently porous to ensure the requisite drainage. It is, however, exposed to the full force of east winds, and hence the frosts, if late, are apt to injure it in spring, when it is about 1 ft. or 1½ ft. high. Later on it is in some seasons much attacked by green fly, which causes the leaves to pucker and wither. This generally takes place in the beginning of June.

The plant is usually sold in the green state for extract making, and the leaves are not dried. The plant is cut about the end of June. The second and third year afford the best crop of leaves, and the fourth year the roots are dug up and dried and the seed is sown in another locality. The first year after sowing, the leaves are not fit to cut, so that practically there are only three years during which the plants yield a crop.

FOXGLOVE.—This is only cultivated on a small scale, as the wild plant is largely collected elsewhere for the purpose. The leaves are generally gathered in June from the biennial growth before the flowers have expanded.

In conclusion, I wish to take this opportunity of expressing my thanks to Mr. Moore for the liberal manner in which he has afforded information concerning the details of cultivation, etc., of the above-mentioned plants.

MEDICAL MEN IN FICTION.*

That medical men are making silent yet rapid advances in social position and estimation is becoming evident, even to the outside public. A recent writer in a weekly periodical says, "Outside the profession medical men are assuming important social and political positions, which are hardly sufficiently recognized by the press and the public. Bad times are depriving landlords and their agents and country parsons of much of the local influence they formerly possessed, and in many cases are even driving them from their country houses, while the great diffusion of riches, as shown by the recent report on 'Trade Depression,' has saved the doctor from similar misfortunes, and the lowering of the county franchise has placed him in more immediate contact with the great mass of the voters, and brought them more immediately within the sphere of his daily influence. The tendency, moreover, of local government is in the direction of increasing the power of sanitary boards, and so of increasing the local influence and importance of medical men. A few years ago it was a comparatively rare occurrence for a country doctor to be made a county magistrate, and it was almost impossible to get one or two sent to Parliament, but now both appointments are common, and will become more and more common as medical men recognize their new position and responsibilities. They have no land or tithe question to place them at a disadvantage or breed ill-feeling between them and the voters, and they are not outdone by either the country gentlemen or the clergy in their sympathy and willingness to help the sick and needy, as witness their voluntary professional services at the hundreds of medical charities throughout the country. It is to be hoped," the writer concludes, "they will use their new power wisely and well."

It is not an uninteresting or unphilosophical subject of contemplation to observe how the popular estimation of our profession has altered during past times as shown in general literature.

Passing by Chaucer's "veray parfait practisour," who did not read his Bible, but "loved gold in special," and Shakespeare's "starved apothecary," who for "a consideration" sold Romeo poison, and advancing to the literature of the eighteenth century, we find that medical men, according to our popular literature, were very little esteemed. We find the three great humourists of that age, Sterne, Fielding and Smollett (himself a medical man), agreeing in holding up to ridicule and reprobation the medical men they introduced into their pages.

Dr. Slop, in 'Tristram Shandy,' is believed to be the caricature portrait of a celebrated York antiquarian physician of the day, but from the moment he appears on the scene he becomes a mark for satire and a butt for ridicule. "Imagine to yourself," says Sterne, "a little, squat, uncouth figure of a Dr. Slop of about four feet and a half perpendicular height, with a breadth of back and sesquipedality of belly which might have done honour to a sergeant in the life guards." He enters the room after a ridiculous adventure, all plastered with mud, and disappears from the book in an elegant scene where he bedaubs the maid with a cataplasm, and in return receives something less pleasant in his own face, while his pedantry, professional and religious, his midwifery forceps, and his absurdities, are the constant theme of Sterne's satire. Mr. Shandy may be philosophical, Uncle Toby benevolent, Corporal Trim pathetic, Yorick eloquent; Slop alone exhibits no redeeming quality on any occasion. In a certain passage of the same work, Sterne draws a picture of what would happen if the world were turned topsy-turvy, and he says of the profession of medicine, "In this corner of the picture you would see a son of the divine Æsculapius writing a book against predestination, or perhaps worse, feeling his patient's pulse instead of his apothecary's, a brother of the faculty in the background upon his knees in tears, drawing the curtain of a mangled victim to beg his forgiveness, offering a fee instead of taking one." To do Sterne justice, he never missed an opportunity of laughing at the profession. In his correspondence from France we find, "My physicians have almost poisoned me with what they call *bouillons rafraichissants*; 'tis a cock flayed alive and boiled with poppy-seeds, then powdered in a mortar, and afterwards passed through a sieve. Then there is to be one crawfish in it, and I am gravely told it must be a male one, a female would do more hurt than good."

A Dr. Hill tells the following anecdote of Sterne in the 'Royal Female Magazine' for 1760, and vouches for its truth. "At the last dinner that the late, lost, amiable, Charles Stanhope gave to genius, Yorick was present. The good old man was vexed to see a pedantic medicine-monger take the lead and prevent that pleasantry which good wit and good wine might have occasioned, by a discourse in the unintelligible jargon of the profession, concerning the difference between the phrenitis and the paraphrenitis, and the concomitant categories of the mediastinum and pleura. Good-humoured Yorick at once fell into the cant and jargon of physic as if he had been one of Radcliffe's disciples. 'The vulgar practice,' says he 'savours much of mechanical principles, the venerable Ancients were all empirics, and the profession will never regain its ancient credit till practice falls into the old track again. I am myself an instance; I caught cold in leaning on a damp cushion, and after sneezing and snivelling a fortnight, it fell into my breast. They blooded me, they blistered me, and gave me robs and bobs and lohocks and eglemata, but I grew worse, for I was treated according to the exact rules of the College. In short, from an inflammation it came to an adhesion, and all was over with me. They advised me to Bristol that I might not do them the discredit of dying under their hands, and the Bristol people, for the same reason, consigned me over to Lisbon. But what do I? Why I considered that an adhesion is in plain English only a sticking of two things together, and that force sufficient would pull them asunder. I bought a good ash pole and began leaping over all the walls and ditches in the country. From the height of the pole I used to come down *souse* upon my feet like an ass when he tramples on a bulldog, but it did not do. At last when I had raised myself perpendicularly over a wall, I used to fall exactly upon a ridge of it on the side opposite to the adhesion. This tore it off at once and I am as you see. Come, fill a glass to the empirick medicine!"

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* Reprinted by permission from the *British Medical Journal*.

It might have been hoped that Smollett, himself a physician, would have dealt more gently with his own profession, but since his medical characters have less of burlesque and more of pure caricature in them he almost treats us worse than Sterne did. It is true that Roderick Random, one of his heroes, was a surgeon apothecary, but in one part of his career he was also a footman, and he seems to have abandoned both occupations with equal alacrity when his hour of fortune struck. Smollett describes Crabb and Potion—county practitioners of the day—as villainous compounds of the rogue, the drunkard, and the shopkeeper, and Potion, who turned Random out of doors to become the slave of the more worthless Crab, is a portrait of Smollett's own master, John Gordon, a Glasgow apothecary, while Crab is the likeness of the master of a friend.

The description of Lavement, the French apothecary in London, is little more flattering. This, for instance, was his method of compounding a prescription. "He had a great deal of business, but as he was mostly employed amongst his fellow refugees, the profits were small. However, his expense for medicine was not great, for he was the most expert man at a substitute of any apothecary in London, so that Random was sometimes amazed to see him make up a physician's prescription without the least hesitation, though he had not in the shop one drug mentioned in it. Oyster shell he could invent into crab's eyes, common oil into oil of sweet almonds, syrup of sugar into balsamic syrup, Thames water into aqua cinnamomi, turpentine into capivy, and a hundred more costly preparations were produced at a moment's notice from the cheapest and coarsest drugs in the materia medica, and whenever any common thing was ordered for a patient by himself, he always took care that it should be disguised in colour or taste, or both, in such a manner that it could not be possibly recognized."

Random's account of his examination for the diploma of surgeon's mate at the Surgeon's Hall has a double interest for us, first as casting a strong light on the character of the examinations of the time, secondly, as regards an almost contemporary entry in the books of the college. According to the chronology of the novel, Random's examination would take place about 1740, the scene being written about eight years later. Ten years after "at a court of examiners held at the theatre, December 21, 1758, James Bernard (was found qualified as) a mate to a hospital. Oliver Goldsmith, found not qualified for ditto." But gentle Goldsmith had no stone to throw; in all his works no word of satire or blame for his profession can be found. It is the successful Smollett, not the rejected Goldsmith, who loads the Company of Surgeons with such ridicule.

There is one other of Smollett's characters who requires passing notice, the physician with whom Peregrine Pickle makes acquaintance in Paris, and who provides his fellow travellers with a classical feast. This man with his pedantry, his ignorance, and his ill manners, is believed to be a portrait of Dr. Akenside, the then popular poet-physician, and it is probable, from Lettsom's description of him, that the portrait is not ill drawn.

Fielding has only incidental allusions to medical men and those not of the most flattering description. When Joseph Andrews, wounded, stripped, and half dead is conveyed to an inn, the local surgeon is summoned. Thinking that some gentleman or lady has been hurt, this worthy is half dressed, when a maid from the inn again rings the bell to hasten his movements. "When the wench had informed him at his window that it was a poor foot passenger who had been stripped of all he possessed and half murdered, he chid her for disturbing him so early, slipped off his clothes again and very quietly returned to bed and to sleep."

From the beginning of the present century to about the time of the Crimean war, a very different type of practitioner was introduced into current fiction. In his student days he was wild and full of animal spirits and practical jokes, being neither very studious nor particularly sober. He is represented in this stage of his career by Mr. Bob Sawyer, Mr. Ben Allen, and Mr. Jack Johnson. When duly qualified he developed into a kind-hearted, whist playing, middle-class, family surgeon, somewhat of a time server and a humbug, but honourable withal and nearly always found on the side of virtue. This was the practitioner of Miss Austen, of Thackeray, of Dickens, and of the hundred and one novelists who came between them. Here the apothecary was never taken as a hero, by any chance, and was often only introduced on the scene to certify the heroine's dangerous condition, for the harrowing of the faithless lover, or at best was set in the chimney corner to amuse the inconvenient father while the hero and heroine enjoyed the sweets of uninterrupted intercourse. In Miss Austen's delightful novel 'Pride and Prejudice' the medical man is introduced to attend to Jane's throat, with as little notice or approbation as the butcher might receive who supplied her with mutton chops. Mr. Harris, in 'Sense and Sensibility,' is only valued for his daily bulletin and unfavourable prognosis, which is not verified by the event. The surgeon in 'Persuasion' attends Miss Musgrave all through her accident in a satisfactory manner, but is else a shadow. In 'Emma,' however, we get a full length portrait of this class of practitioner. Mr. Perry was a country surgeon in large practice. His admiring patient, Mr. Woodhouse, says of him "Poor Perry is bilious, and he has not time to take care of himself, which is very sad but he is always wanted all round the country. I suppose there is not a man in such practice anywhere. But then there is not so clever a man anywhere." He does not confuse his patients by variety of climatic recommendations. "Perry," continues Mr. Woodhouse, "was a week at Cromer once, and he holds it to be the best of all sea-bathing places. A fine open sea, he says, and very fine air, and by what I can understand from him, you can get lodging there quite away from the sea, a quarter of a mile off, very comfortable." He was very attentive to his better patients. "Poor little Emma," says her father, "you were very bad with the measles, that is, you would have been bad but for Perry's great attention. He came four times a day for a week. He said from the first it was a very good sort, which was one great comfort, but the measles are a dreadful complaint. I hope whenever Isabella's little ones have the measles she will send for Perry."

Timid Mr. Chillip in 'David Copperfield,' and that worthy practitioner who attended little Nell at the village inn, belong to the same class. We all remember how the latter felt the child's pulse, "and as he did so, eyed the half empty wine glass as though in profound abstraction. 'I should give her,' he said at length, 'a teaspoonful every now and then of hot brandy and water.' 'Why that's exactly what we have done, sir,' said the delighted landlady. 'I should also,' observed the doctor, who had passed the foot-bath on the stairs, 'I should also,' said the doctor in the voice of an oracle, 'put her feet in hot water and wrap them up in flannel. I should likewise,' said the doctor with increased solemnity, 'give her something light for supper, the wing of a roast fowl now.' 'Why goodness gracious me, sir, it's cooking at the kitchen fire this instant,' cried the landlady, and so indeed it was, for the schoolmaster had ordered it to be put down, and it was getting on so well that the doctor might have smelt it if he had tried; perhaps he did."

Thackeray has drawn in Pendennis the elder an excellent picture of the same type. "Helen Thistlewood had one day hoped for a different lot than to marry a little gentleman who rapped his teeth and smiled artificially, who was laboriously polite to the butler as he slid upstairs into the drawing-room, and profusely civil to the lady's maid who waited at the bed-room door, for whom his old patroness used to ring as for a servant, and who came with even more eagerness. Perhaps she would have chosen a different man, but she knew, on the other hand, how worthy Pendennis was, how prudent, how honourable, how good he had been to his mother, how constant in his care of her," and so she married him.

In the Huxters, father and son, Thackeray has made a much less engaging sketch of men who were simply vulgar and commonplace, and in his fashionable physician, Dr. Brand Firmin, we see a mere humbug and hypocrite, but, as if in compensation Thackeray rises to a higher level than any of his predecessors in his Dr. Goodenough, a type of medical man, which in its essentials of knowledge, honour and benevolence, was as we shall see to monopolise the fiction of the following generation.

The next definite representative of this type is perhaps Tom Thurnell, whose character Charles Kingsley drew in his novel 'Two Years Ago,' published about 1857. He wages an unpopular and unsuccessful war against sanitary defects in the little Devonshire coast town where he practises, and when, in spite of his efforts and in consequence of the sanitary shortcomings of the place, cholera breaks out, he and his two friends fight with the disease to the bitter end, visiting the sick, warning the healthy, and in all ways attacking the causes of the disease. He is an intelligent, kind-hearted, gallant, straightforward man.

The modern novels whose heroes or subsidiary characters are medical men formed on such a model, are legion. In 'The Ladies of Beaver Hollow,' we have George Mildmay, the young surgeon, cheerfully walking miles in the night to the help of a pauper. Mrs. Henry Wood's medical practitioners of this stamp are many, but she had lived in Worcester and took men dear to the British Medical Association for her originals. Miss Yonge, too, Charles Reade, George Macdonald, George Eliot, "Pen Oliver," among others, have given us characters of this kind which will not die.

And so the popular conception of the men of our profession has grown. From charlatans and buffoons they have become in the eyes of their neighbours examples of the very highest and noblest type of humanity.

PRODUCTION OF COTTON-SEED OIL IN THE UNITED STATES.*

Cotton-seed oil is obtained from the seeds of the *Gossypium herbaceum*, and the percentage of oil varies in the seed from 10 to 30. From a report recently issued by the United States Government, it appears that from September 1, 1883, to September 1, 1886, there were exported from New York 88,871 barrels, and from New Orleans 186,720 barrels, making a total of 275,591 barrels from the two ports. The following is the method adopted in its preparation. The seed, when landed at the mill, is first examined. If too damp or wet, it is dried by spreading it over a floor with free access of air, exposing it on frames to the sunlight in warm weather, or by kiln drying. Drying is the exception rather than the rule in the United States. Cotton ginning is so carefully done that the seeds have little or no opportunity to become wet. Besides this, the seed is generally held at the gins for some time before it is sold to the oil manufacturer. The first process in preparing the dry seed for the mill is to free it from dust. This is effected by shaking it in a screen, or in drums lined with a fine metallic net, and containing a strong magnet, to which any iron nails will adhere, these articles being frequently present. From the drums the seeds drop into a gutter, leading to a machine which removes the lint left by the gin. This is done by a gin constructed for the purpose, with saws closer together than the ordinary cotton gin. An average of 22 lbs. of short lint is taken from a ton of the seed. This product, called "linters," is used in the manufacture of cotton batting. The clean seeds are then transferred to the sheller, which consists of a revolving cylinder, containing twenty-four cylindrical knives and four back knives. The sheller revolves at great speed, and as the seed is forced between the knives the pericarp or hull is broken and forced from the kernel. The mixed shells and kernels are separated in a winnowing machine by a strong blast of air. This removal of the husk makes a considerable difference in the meal cake, a dessicated or decorticated cake being, it is said, five times more nutritious and wholesome than an undecorticated cake. Being thus cleaned, shelled, and separated, the kernels are carried by a system of elevators to the upper storey, and then pass down into the crusher rolls to be ground to flour. Cold pressure produces a very good salad oil, and this is the method generally pursued in Marseilles and other European cities for the first pressure, after which the residue is subjected to a second warm pressure. In the United States, however, warm pressure is generally preferred. The meal is heated in a meal-heater for fifteen to twenty minutes to 204° to 215° Fahr. The heated meal is placed in woollen bags, each holding sufficient seed for a cake. The bags are then placed between horsehair mats backed with leather, having a fluted surface inside, to facilitate the escape of the oil under the hydraulic pressure, amounting to 169 tons. With the most improved presses the hair mats are now, however, done away with. The bags remain in the press seventeen minutes, the solid oilcake of commerce remaining behind. This cake forms a superior food for cattle, horses, sheep and swine, and is nutritious, easily digested, and fattening. The crude oil, as obtained from the press, is pumped into the oil-room, and either put into barrels for shipment, or refined. There are four qualities of the oil. Crude oil is a thick fluid, and of a dirty yellow to reddish colour; on standing, it deposits a slimy sediment. The second quality has a pale orange colour, and is obtained by refining the crude oil, which is done as follows:—After weighing, the oil is pumped into refining kettles. These are of various sizes, the largest ones being 20 to 25 feet deep, and 15 feet in diameter. These tanks are furnished with steam coils for the purpose of heating the oil, and with appropriate machinery for keeping it in motion. A solution of caustic soda is used for refining; this solution is made from 10° to 28° Beaumé in strength, and varying quantities are used, according to the nature of the oil operated upon. After the addition of the caustic soda the mixture is stirred up for forty-five minutes, and kept at a temperature of 100° to 116° F. The contents of the tank are then allowed to stand from six to thirty-five hours when the solid matters—

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* From the *Journal of the Society of Arts*, July 19.

soap and substances precipitated by the caustic alkali —gather on the bottom. This mixture is called "foots," and is used for making soap. The yellow oil resulting by this process is further purified by being heated and allowed to settle again, or by filtration, and is called summer yellow oil. Winter yellow oil is made from the above material by chilling it until it partially crystallizes, and separating the stearine formed, about 25 per cent., in presses similar to those used for lard. The cotton-oil stearine is used for making butterine and soap. The yellow oil obtained as above is treated with from 2 to 3 per cent. of fullers' earth in a tank furnished with apparatus for keeping the mixture in motion. When the fullers' earth has been thus thoroughly mixed with the oil, the whole is sent to the filter press. The fullers' earth has the property of absorbing or holding back the yellow colouring matter, so that the oil which issues from the press is almost white. The colouring matter, termed *gossypin*, is collected in a filter, carefully washed to remove any trace of acid, and dried slowly at a low temperature. It is then ready for use as a dye, and gives fast colours on both silk and wool. It is claimed that the quantity of colouring matter in a ton of crude oil is 15 pounds, although this proportion must vary considerably. Its properties are insolubility in acids, slight solubility in water, free solubility in alcohol or alkalis. In its dry state it is a light powder of a pungent odour, of a brown colour, and strongly tinctorial.

THE "ABERDEEN DAILY FREE PRESS" ON THE SUPPLY OF POISONS.

"Some one department of science, otherwise it may be of an abstruse nature, or at any rate relegated to specialists, is constantly receiving a fillip—so far as the interest of the general public is concerned—from some practical topic of the day. A cholera scare, or a hydrophobia panic, leads a certain class of people into studies of recondite investigations, and probably science may get real assistance from the increased interest. The subject of all-absorbing public attention at present is that of poisons. Mrs. Maybrick's trial has raised the interest of the public in general on this subject; while the recent prosecutions in Aberdeen under the Pharmacy Act lend more than ordinary interest to the topic locally. The subject of poisons has long been a very fascinating one in literature and in science, and an unusually troublesome one in law. At first a mere amusement for continental alchemists, it has become dignified into the science of toxicology, with a perfect literature of its own. Law has also grappled with the subject, but what is suggested in the present instance is the incomplete nature of both. Eminent specialists in the Maybrick trial failed to agree that arsenic was present. It happens that this particular poison is actually one of the easiest to detect even in infinitesimal quantities, and yet the first toxicologists of the day failed to agree on its presence. A return made of deaths from poison from 1876 to 1880, inclusive, showed that out of 1581 cases only 67 were from arsenic, 28 of these being suicides, 37 due to accident, and 2 to deliberate crime. We are told that the use of the poison for criminal purposes is a positive blunder. But the scientific side of the subject is not of such moment to the general public as the administration of the law in connection with it. It is true that in one way it is exceedingly difficult to procure a poison—the name, abode, and calling of the purchaser, the purpose for which the poison is required, and the quantity sold, all being duly recorded by the vendor, and the record signed by the purchaser. The law also lays down that no person is allowed to sell arsenic to an unknown individual unless in the presence of a witness known to the seller; and that the drug, except for medicinal purposes, and according to a doctor's prescription, must be adulterated with indigo or soot to the extent of half an ounce to every pound. Such is modern legislation on the subject. But the sale of poisons has proved a very troublesome nut for law, in most countries, to crack. In some countries its sale, as in Mantua, according to the drama, meant "present death." In Scotland, as early as 1450, law prescribed that no poison whatever was to be brought into the country, so that the present regulations, strict though they may seem, are not so rigid as some of their predecessors. But law is completely baffled in two ways. Non-qualified chemists, in fact, mere country merchants, constantly evade the law. The recent trial of three such cases in the Sheriff Court exposed only a few from a whole host of similar offenders. The prosecutor's deputy found no difficulty in getting a quantity of corrosive sublimate, a very deadly poison, in a shop at Torphins, which was not a duly registered chemist's; while at other villages he purchased other poisons with perfect publicity. Not only were these offenders not registered chemists, but they demanded no guarantee (even to make some semblance to law keeping) from the purchaser. Such cases lead to the belief that the particular section of the Pharmacy Act dealing with the question is not strictly kept. This is a very dangerous state of affairs from more than one point of view. In the first place it is placing temptation within easy reach of all. The art of poisoning will become exceedingly easy, while it would be equally difficult to detect the criminal. The present law is some sort of barrier to the crime, but such evasions break that barrier down. But what is perhaps a far greater danger is the fact of a non-qualified salesman—it may be an ignorant boy—promiscuously dispensing the most deadly drugs. People rightly regard with suspicion the honest merchant, whose sphere is to preside over the sale of butter and eggs and a pound of cheese, meddling with a subject which needs years to master. The man who deals in treacle and soft soap one minute, and proceeds to dole out corrosive sublimate or arsenic the next is, to say the least of it, an individual to be avoided; and the sooner he comes to know that there is a certain law called the Pharmacy Act the better will it be for everyone concerned. But there is another and much more effective way in which the law is broken—the way in which the Court held Mrs. Maybrick murdered her husband. One may find arsenic or other poisons in articles of everyday use—in fly papers, rat poison, or other vermin destroyers; in certain cosmetics, and in numerous other ways. Does not this suggest that legislation is not strict enough on the point? It is perfectly true that there is not a law through which a carriage and six might not be driven, but such a flagrant evasion as this is notorious. The trial of Mrs. Maybrick may lead to some amendment in this law, as it will lead to an agitation for a Court of Appeal, and if it does nothing more it will not be in vain."

The Pharmaceutical Journal.

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SATURDAY, AUGUST 17, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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NEWCASTLE.

IN the programme of Conference arrangements put forward by the local committee, no visits to factories have been included. But the matter has not been lost sight of, and the omission on the part of the organizers of the Association and Conference meetings is due to the difficulty of giving a large party of visitors an adequate insight to the work of a factory. That is in some cases insuperable, and this year a plan is to be tried by which the preservation of cards of membership will secure admission to a number of typical works on the Tyneside and district, so that it will be an easy matter for those who desire to have a more intimate acquaintance with local industries to extend their stay, and their sight seeing, by forming small parties to visit those places of interest most in accord with individual wishes. For the present, then, it may suffice to pass in brief review the industries of the river banks, and the great business of shipping for which the estuary of the Tyne is so famous.

In the higher reaches of the river lead and iron are found; lower down coal is worked and coke made from it, while at the point where the stream becomes navigable the coal producing district of Durham county spreads itself broadly away to the south, extending to the Cleveland district. Nearer to the sea, and stretching along the coast to the northward for thirty miles, is the Northumberland coal-field. The Durham colliers number about 75,000 and those of Northumberland about 25,000.

The quantity of coal which leaves the Tyne by sea is readily ascertainable, and according to the returns of the River Tyne Commissioners, the coal shipped in 1888 amounted to upwards of ten million tons, showing a slight increase as compared with 1886. In 1887 there was a slight decrease, due to the disastrous strike in the collieries on the Northumberland side, whereby the whole of the pits were laid idle for four months, and 25,000 men were thrown out of employment.

The vessels leaving the Tyne in 1888 were 13,645 in number, and their aggregate tonnage 6,269,105. By far the largest portion of the shipping is Tyne owned and Tyne built, and the shipbuilding yards of this district play an important part in providing the fleets of maritime nations, both warlike and mercantile. For, while there has been a lamentable decrease in the success of the local chemical trade, enormous strides have been made in that of ship-building in the district, which now holds the premier position in the kingdom in regard to the construction of that mighty fleet which makes "Britannia rule the wave," and in the building of vessels for other nations.

Last year only two wooden vessels, and these of very small dimensions, were built on the Tyne. But this is more than compensated by the extent of the iron and steel shipbuilding of to-day. The year 1888 possessed a double interest to those who like to mark the progress of the age, for it was at once the centenary of steam navigation and the jubilee of the passage of the Atlantic by steam-driven vessels. From the carefully compiled and exhaustive annual report of the *Newcastle Chronicle* it appears that the number of ships built in 1888 in the districts of the Tyne, Wear, Tees, West Hartlepool, Whitby and Blythe, was 278, the aggregate tonnage being 506,897 out of a total of 903,687 for the whole of Great Britain and Ireland. The fluctuating character of this trade may be gathered from the following data:—

	1881.	1882.	1883.	1884.
Tonnage built	1,000,000	1,200,000	1,250,000	750,000
	1885.	1886.	1887.	1888.
Tonnage built	540,422	473,675	578,668	903,687

It will, of course, be borne in mind that above all other trades that of shipbuilding affects other industries in its variations, for the materials involved spread themselves over a large number of manufactures of a dependent character.

Almost the whole of the manufacturing district of the Tyne is embraced in one or other of the Conference excursions, and in brief review it is proposed to indicate the situation of the various works, not exactly following the line in which they will then be presented, but beginning at the sources and proceeding towards the sea. Where the South Tyne rises the watershed is rich in silver lead ore, and there is to be found the valuable Greenhurth mine, while the Tyne tributary, the Allen, flows through the rich mining district owned by Mr. BEAUMONT. The annual yield of this district has reached 20,000 tons of lead ore, which is worked up, together with imported ores, into varied products in important lead works nearer to the sea. On the North Tyne iron mines are worked. Lower down the collieries of Prudhoe, Wylam, Ryton, Stella and Throckley are found, and then begins a series of works which stretches with hardly a break for eighteen miles to the sea. On the north side are the steel works of Messrs. JOHN SPENCER and SONS at Newburn, whose special features are anchors and the large steel frames employed in shipbuilding. Lower down on the other side are Swalwell Ironworks, and a little farther on the north bank the vast area of the Elswick Yards is reached. As many as 15,000 men have found employment here at one time. The Armstrong guns are constructed here, as well as the scarcely less deadly quick-firing ordnance, the leviathan breech-loading 110-ton gun, requiring a charge of 1000 pounds of powder, and discharging a missile of 18,000 lbs. with a muzzle velocity of 2128 feet per second, and also the perfected Gatling, which discharges 104 rifle bullets in two and half seconds. By the amalgamation of the Armstrong firm with that of C. Mitchell and Co. the entire work of constructing an ironclad, fitting her with engines, and arming her with guns is accomplished by this one vast concern. From this yard was launched the warship *Victoria*, which divides, with her sister ship, the distinction of being one of the two largest vessels afloat. The fact that she was launched fourteen miles from the sea furnishes proof of the success of the Tyne Commission in rendering the river navigable by large craft. Perhaps the most signal superiority of the firm may be found in the application of hydraulic power to the handling of monster cannon. The financial success of the concern may be guaged by the fact that the present price of the stock is £215, original stockholders receiving 11 per cent. dividend.

On the south bank of the river, at Dunston and the Teams, are creasoting works and various industries connected with the chemical elaboration of tar products. Lower down, both sides are occupied by locomotive works, those of the North Eastern Railway Company at Gateshead and of Hawthorn, Leslie and Co., and the historic firm of Robert Stephenson and Company on the Newcastle side. The High Level Bridge is then reached, and passing by the wharves of Newcastle Quayside there are on both sides numerous factories whose names are familiar to commercial men. The Newcastle Chemical Works spread like a town on the south side, while opposite are the largest marine engineering works on the Tyne, those of Messrs. Hawthorn, Leslie and Co. Shipyards and engineering works rapidly succeed each other, with chemical works interspersed. Wallsend has lost its distinction for coal; it has now, however, aluminium works which may have a great future. Jarrow is here on the right, and Palmer's immense works merit notice not only from their size but also from completeness. Iron ore is brought in at one end and steel clad ships are launched fully equipped at the other. By the sharpest of transitions from this black and busy scene, the name of Jarrow and the old church near the river cause our minds to turn to old Saxon times, for this was the home of the venerable Bede.

Then the docks are approached. On the south side are the Tyne Docks of the North Eastern Railway Co., and on the north the Northumberland and Albert Edward Docks of the River Tyne Commissioners, presenting unequalled facilities for the loading of coal. Fast sailing vessels created a demand for rapid shipment, and every day steamers of 3000 or 4000 tons go empty to the coal staiths and next tide leave again, their capacious holds having been filled with a celerity that is perfectly bewildering. Beyond these are North and South Shields, whose piers are stretched forward to shelter this long harbour from the North Sea beyond. Here the visitor—his ears still ringing with sound of the hammers of the shipyards and other sounds of busy life—may step ashore to seek the quiet of a stroll along the sands on either side, or to visit the ruins of the old priory of Tynemouth standing on its bold promontory of rock.

A sketch of the ground to be traversed on the Thursday excursion will close this article. Leaving the Central Station and passing rapidly along the line of the Elswick workshops and other factories, the Tyne is crossed at Scotswood, just above the Suspension Bridge and beyond the entrance of the River Derwent. Then catching a parting whiff of chemical fumes and smoke Blaydon is passed. The Tyne here changes its character; very soon its sylvan scenery and broad windings through a lovely valley give an earnest of the rural beauty of a journey through its higher reaches. But if the travellers were afoot the tongue of a good guide would not move fast enough to tell its records or point out its prettiest peeps. Wylam, the birthplace of George Stephenson, is the village opposite when the first bridge is reached; the cottage where he was born is at the east end of the village. The castle on the hill top on the left just as the next station is passed is Prudhoe Castle. This site with the land surrounding it was bestowed by the Conqueror on one of his followers, whose family in the early part of the twelfth century built this stronghold. The next stream coming down from the south is Cherry Burn, on whose banks Bewick, the father of wood engraving, was born, and to its rustic scenes he owed his love of the poetic and the beautiful, which found such eloquent expression in his artistic work. On the right are the woods of Bywell, backed by a fine tier of woodland away to the north. Soon Corbridge is reached, where the ancient Watling Street crossed the Tyne. The burn tumbling down from the south, midst wooded banks, is the Devil's water, once the home of the Earl of Derwentwater, whose warm espousal of the cause of the Stuart family, to which he was related, cost him his head after the defeat of "Bonnie Prince Charlie" in 1715.

Hexham shows up well from its picturesque and commanding situation near to the confluence of the

North and South Tynes. The town itself is interesting; its quaint streets with quainter names lead to the Market Square. The Abbey church there is a puzzle to the antiquary! Its crypt is Saxon, but built with Roman stones, bearing the names of Severus and others. The church was built in 674 by Bishop and Saint Wilfred; it was destroyed by the Danes and rebuilt in the latter part of the twelfth century. Much of the glory of the old Abbey has departed, but there is still a solemn beauty in its lofty transept, and enough remains of carved work in wood and stone to show what it once was. In the Abbey are stored many Roman remains that have been found in the town. The Moot Hall and the old Castle are close by. The rising ground above Hexham is very beautiful and affords magnificent views of the Tyne valleys. So far the route has been westward, keeping to the line of the river, and parallel to the course of the Roman Wall, which four or five miles north still preserves a well marked line. On resuming the train journey the Border Counties Railway Line leads up the valley of the North Tyne and across the Roman Wall near to Chollerford past several castles to Reedsmouth junction; it then runs east for a few miles and then again north, climbing by steep gradients until Rothbury is reached, splendidly situated among the purple heather in the beautiful dale of the Coquet. As the train slows and the traveller looks for his ticket he may sigh to think that it is a return ticket "available only for the day of issue." But if he be a wise man (as of course all pharmacists are) he will hasten to drink all he can of the beauties of Cragside, which lies charmingly before him with all that art can do to make the scene more lovely.

THE QUESTION OF RAILWAY RATES FOR MERCHANDIZE.

A circular has been issued by Mr. Courtenay Boyle, the Assistant Secretary of the Board of Trade Railway Department, in reference to the mode of procedure proposed to be adopted at the hearing of objections to the classification of merchandise traffic and schedules of maximum rates applicable thereto, which have been submitted by the Railway Companies under the provisions of the Railway and Canal Traffic Act, 1888. The first of a series of sittings of the Board of Trade for the hearing of objections will be held on Tuesday, the 15th October next, at 8, Richmond Terrace, at 11 a.m. The Board of Trade considers that the course most convenient to adopt in dealing with this matter in the public interest will be to afford all persons who have forwarded objections to the several classifications of merchandise traffic and the corresponding schedules of maximum rates, the opportunity of appearing before the Board at its sittings in support of their objections, and the several railway companies the same opportunity of appearing in support of their proposals. In this way it may be expected that there will be an arrangement arrived at satisfactory to both parties concerned, as it seems improbable that the railway companies should be influenced by other considerations than such as would be conducive to an increase of traffic.

The Board of Trade proposes that as far as possible uniformity should be introduced into the classifications, general conditions and schedules of maximum rates throughout the United Kingdom, and it is also desired to avoid the inconvenience and expense that would be incurred if it were necessary to discuss the objections in the case of every schedule submitted by the railway companies. With those objects in view it is proposed to take the classification and schedule of the London and North-Western Railway Company as the basis for discussion, so that persons who have lodged objections to the schedules of any other railway company will be allowed to appear and support them so far as they may be applicable to the schedule of the London and North-Western Company. Objectors will also be allowed to appear themselves, or to be represented by duly authorized persons.

We learn from the Secretary of the London Chamber of Commerce that a letter has been received from the Board of Inland Revenue stating that it has been decided to adopt further amendments of the regulations relating to the export of medicinal tinctures. In future the name of the person for whom the tinctures are bottled, or some distinguishing mark without the name, is to be placed on the outside of the case, instead of the maker's name, on condition that the licensed maker, after filling in the requisite form, will write after the particulars of notice the full name and address of the person for whom the tinctures are bottled, and in whose name they are to be exported, or specify instead the distinguishing mark which the exporter intends to use. General instructions to that effect will be issued without delay to the Board's officers.

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It will be seen from our reprint of an article in the *Aberdeen Daily Free Press*, at page 126, that the opinions we expressed in regard to the sale of poisons by unqualified persons have been endorsed by that paper, and the impropriety of allowing general dealers in country places to sell poisons has been fully recognized. So far from regarding it as a hardship that the legal restriction of the sale of poisons should be enforced, it is held that the man who deals in treacle and soft soap one minute, and proceeds to dole out corrosive sublimate or arsenic the next is, to say the least of it, an individual to be avoided, and the sooner he comes to know that there is a certain law called the Pharmacy Act the better it will be for every one concerned. This is a common sense view of the matter that ought to commend itself to the most ordinary capacity, and suffice to relieve the Pharmaceutical Society from reproach for putting the law in force. It might no doubt be more appropriate if this duty were confided to the police authorities, and that arrangement would have the effect of saving the Society from the considerable expenses incurred in these prosecutions for the unlawful sale of poison. But while the law remains as it is the duty rests with the Society, and in performing that duty the Society is rendering a public service.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on the 7th inst., at the rooms of the Society, No. 11, Harcourt Street, at three o'clock.

The President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President, Mr. Payne, and Messrs. Wells, McCormack, Whitla, Beggs, Merrin, Simpson, Professor Tichborne, and Mr. Hodgson, Treasurer.

A letter was read from Mr. Hodgson stating that he withdrew his resignation in compliance with the unanimous request of the Council, as he would be extremely sorry to take any step which would be in the slightest degree injurious to the Society, particularly at the present crisis.

The President: I am sure it is a pleasure to us all to receive this letter from Mr. Hodgson and to see him amongst us again to-day. As I stated on the last occasion, he would be a serious loss to the Society if he were to leave us at this juncture, because of the care and ability which he has always devoted to our affairs.

Mr. Hodgson: Mr. President and Gentlemen,—I feel indebted to you for a great many kindnesses bestowed on me in past years; and while I felt constrained under the circumstances to send in a resignation, as you thought that the loss of my humble services would be injurious to the Society, I could not as an original member of it bring myself to carry out my original intention. I was fortified in that by several very kind letters which I received from members of the Council pointing out that my retiring at this particular time might have an injurious effect. Under the circumstances I thought it better to withdraw my resignation and endeavour to do my best for your interests in the future as I have done in the past.

The Vice-President said that although frequently Mr. Hodgson and he had not agreed on some points, yet nothing would have given him greater sorrow than his retirement.

Mr. Hodgson: I beg to return my thanks to you all for your kindness, and I hope I shall prove myself worthy of it.

A letter was read from Mr. William Allen, expressing his thanks for the kind wishes of the Council, conveyed in a letter of the 3rd instant, but stating that he could not see his way to accede to the request of the Council expressed in the resolution passed at the last meeting that he should continue to act on the committees, as he should not be able to attend either of the two meetings of the Council that would take place during the remainder of his term of office.

Mr. Wells: That is only a resignation with respect to committees, but it is his intention to resign membership of the Council.

Mr. Hodgson asked was it not possible to bridge the matter over? There was no more useful member of the Council than Mr. Allen. His knowledge of practical pharmacy was great, and they wanted a man of his calibre among them. He had filled the Presidential chair and had been at all times a most active member of the Committees. Therefore his loss, if he retired, would be a serious one.

Mr. Wells said he could endorse every word that Mr. Hodgson had said. He had known Mr. Allen intimately in connection with the Council for some years and could bear testimony to the fact that he was a most regular attendant at the committees and one of the very best men on them. He had also given a great amount of time and attention to many things connected with the Society, more especially the examinations. It was to Mr. Allen that the present high standard of their examinations was due. He went to great trouble about them, visited the English Society's examinations and collected information from different sources, by means of which he had brought the examinations of the Society to a standard that they need not be ashamed of. He believed he could say without fear of contradiction that there was very little difference now between the examination of their Society and the Major of the English Society. He had spoken to gentlemen who had passed both and who had told him that in chemistry one examination was certainly as stiff as the other. To Mr. Allen that was due. He had had a long conversation with him that morning, and he feared he had made up his mind to retire, as he had not been very strong for some time past and his medical adviser had recommended him to take things a little easier. It would be useless again to ask him to remain on the Committees, but he thought it would not be out of place to address a communication to him to the effect that having heard that he was about to resign his seat, they strongly requested him to reconsider that determination. Mr. Allen had had more practical experience of the working of the Council than any of them.

The President: I can endorse everything that has been said about Mr. Allen. When I was Examiner and he was Visitor at the examinations I had a good deal to say to him. Perhaps he might be induced to remain on the committees till the end of the year.

Mr. Hodgson: Would it be out of place for two or three members to call on him and try to induce him to reconsider his determination, at least so far as membership of the Council is concerned?

Professor Tichborne: Is his resignation before the Council?

The President: No.

Mr. Wells: It is implied in his letter.

Professor Tichborne: What I would suggest is that an attempt should be made in a private way to induce him to remain on the Council. It would hardly do to take formal notice of a resignation that does not exist.

Mr. Simpson said he had had a conversation with Mr. Allen and he was then perfectly undecided about remaining on the Council, although he had made up his mind that he could not attend the Committees.

Professor Tichborne: I propose that the President and Mr. Hodgson be requested to call on him with the view of inducing him to remain on the Council.

Mr. Simpson: I have great pleasure in seconding that.

The motion was unanimously agreed to.

Letters from Mr. R. J. Downes dated the 2nd, 9th and 10th of July were read protesting against the election of a President and Vice-President at the July meeting of the Council and also protesting against a suspension of standing orders which took place at the June meeting.

The Vice-President: I move that that letter be simply marked "read." If members of the Society do not feel satisfied with the way in which the Council conducts their business they have their remedy.

Professor Tichborne: Well, I would be rather inclined to treat the letters of a member of the Society with a little more respect, more particularly as we have a good answer to give him. It is merely necessary for the Registrar to refer him to clause 7 of the Pharmacy Act (1875), which is as follows:—"The persons by this Act named as president and vice-president of the said Council, and their successors in such offices respectively, shall hold the office of president and vice-president respectively during one year, but shall be eligible for re-election, and in case of any vacancy in the office of president or vice-president of the said Council caused by such president or vice-president ceasing to be a member of the said Council, or by the resignation or incapacity of any such president or vice-president, such vacancy shall be filled by the election of some member of the said Council to fill such vacancy." In other words, we were not only within our rights in what we did, but were absolutely commanded to do so. As regards the suspension of the bye-laws we have a right to do that also if the Council be unanimous on the point.

Mr. Wells said that the name of Dr. Gordon was at the end of the list of candidates for membership, and all that was done was to suspend the standing orders for the purpose of taking his election first in order that he might afterwards be elected a member of the Council.

The Vice-President: Which the Council had a perfect right to do.

Mr. Wells said as to the leave asked for, the use of the room by the Irish Pharmaceutical Chemists' Association, he was personally asked to try to get the thing carried. It was a very small matter, and he believed the President would have had a right to grant the leave without coming to the Council at all. He seconded the motion of Professor Tichborne.

The President said he would be sorry Mr. Downes should think that any letter of his was slighted, but that Mr. Hill's request was only a formal matter, whereas Mr. Downes made a very serious charge against the Council.

Mr. Hodgson said Mr. Downes was an old member of the Society and a clever and intelligent gentleman, and it would be desirable to give him an answer, although he (Mr. Hodgson) quite agreed that the Council were perfectly within their rights in what they did.

It was ordered that the Registrar should write a reply to Mr. Downes, directing his attention to the section of the Act relating to the election of President and Vice-President, and pointing out what were the rights of the Council in the matter referred to. A letter was read from the Irish Pharmaceutical Chemists' Association, requesting that the President would as soon as possible call a general meeting of all members and licentiates of the Society, in order to consider their present position in connection with the proposed Pharmacy Act (Ireland) 1875 Amendment Bill.

The Registrar was directed to write to Mr. Hill, suggesting that the matter should be held over until the annual meeting of the Society.

A letter was received from Messrs. Casey and Clay, on the subject of their charges in connection with the promotion of the Pharmacy Amendment Bill of 1888.

It was ordered that they should be requested to furnish particulars.

A letter from Mr. A. R. G. Clark asking that his Practical Pharmacy certificate should be returned to him, as it was his indenture paper. He had asked from the firm with whom he served a signed declaration of his having served the apprenticeship, which he would be prepared to send to the Council instead of the indenture paper. Letters from Messrs. R. I. Galbraith and J. S. Gilbert also asked that their Practical Pharmacy certificates should be returned to them, and undertook to forward copies.

Mr. Wells said that in consequence of it having been discovered on former occasions that bogus certificates were sent in, a resolution was passed by the Council that the candidate's pharmacy certificates should be kept and filed. He did not of course for a moment say that the gentlemen who now asked for their certificates had sent in bogus documents; but the rule had been made on the subject because, if the certificates were given back, and it were afterwards discovered that the party had not *bonâ fide* given the required period of service the Council would have no evidence to act upon.

Professor Tichborne: I am afraid we cannot impound a man's indentures.

The President: Would not copies of the documents answer our purpose?

Mr. Wells: No; because if you took proceedings against a man for obtaining a degree under false pretences you should have the original certificates.

Mr. Hodgson said if the original certificates passed out of the hands of the Council they would be powerless. He thought for reasons into which he need not enter that they should be retained; but not indentures.

On the motion of Professor Tichborne, seconded by Mr. Simpson, it was ordered that Messrs. Clark, Galbraith and Simpson should be requested to send certificates from their employers for the purpose of being filed and that the original documents would then be returned to them.

The President said the next matter was a letter which had been received from the Committee for the organization of the Seventh International Pharmaceutical Congress at Milan in September, 1890, asking whether any members of the Council would attend to represent the Society there.

The Vice-President suggested that the letter should remain on the table for a month, and gentlemen could report to the next meeting of the Council whether they intended to go or not.

A letter was read from the Honorary General Secretaries of the British Pharmaceutical Conference asking for the names of the gentlemen to be appointed as delegates to attend the meeting.

On the motion of Mr. McCormack, seconded by Mr. Merrin, Messrs. Wells and Beggs were appointed delegates to the Conference.

A letter was read from the Liberal Pharmaceutical Association asking for the use of the Society's rooms for their meetings.

Mr. Wells: We are a non-political body, and I object to such titles as "Liberal" or "Conservative."

The Vice-President: We have always opposed the introduction here of anything approaching politics or religion, and I think it highly desirable that we should continue in that course. The title of this society when I saw it on the agenda paper certainly struck me.

The President: I quite endorse the Vice-President's remarks. Still it is a question whether the word "Liberal" in this title is political or not.

Mr. Hodgson said he did not at all like the idea of their rooms being used for any purposes outside those of the Council and the Society. If they had a house of their own they should be delighted to make it available for any purposes connected with the legitimate objects of the Society; but their Council room had been got up at considerable expense, and he did not like its being used by anybody. They had already granted the use of the room to one association, and now they had another asking for it.

The Vice-President moved that a reply be sent to the letter stating that as politics were never admitted into the discussions of the Society, and as the title of the applicant's society conveyed the idea of a political association, the Council felt obliged to decline to lend their room.

Mr. Wells seconded the motion, which was unanimously agreed to.

The Vice-President moved, pursuant to notice:—

> "That members summoned to and attending special meetings of the Council residing outside the city of Dublin be refunded first-class railway fare to and from such meetings."

The position of the country members of the Council should be considered. Some of them lived at long distances from Dublin, and had to spend more than one day in coming to the meetings and going home again. The members of the Council would observe that this resolution did not apply to the ordinary meetings of the Council, but only to the special meetings. It was possible that within a week or ten days after an ordinary meeting they might be summoned to attend a special meeting. The city members no doubt did not wish to transact important business without having their country brethren to assist them; but if the country members did not attend great power was left in the hands of the city members. Besides, the holding of numerous special meetings was not fair to the country members, and it was rarely necessary. One of the objects of his motion was to try, if possible, to check the number of special meetings.

Mr. Hodgson said he quite went with the Vice-President in his movement. He thought it a very great hardship that gentlemen living at long distances from Dublin should be obliged to come there two or three times a month, and he would be very glad if they could see their way to relieving them of some of the expense of it; but there ought to be some radius. He (Mr. Hodgson) lived outside the city, but he did not ask first-class fare to and from Miltown.

Professor Tichborne said the Society could hardly afford to pay £12 for the railway fare of all the country members attending a meeting. He would be quite willing to do so if possible. He would pay the whole of them if he could; and certainly the Vice-President, in order that they might have him at all the meetings. But he would suggest that the motion should be postponed until they saw what their financial position was. They were not likely to have any special meetings before the next annual meeting of the Society. He did not think that at present the Council should commit themselves to what would amount to an outlay of £75 per annum if they were to pay the expenses of the country members for all the meetings.

The Vice-President: Professor Tichborne misunderstands my resolution. It only refers to the special meetings.

Professor Tichborne: I understand that; but I would like to carry out your principle, if it were possible.

Mr. Simpson said that when a special meeting was called merely to fill a vacancy on the Council it would be hardly necessary for the country members to attend it.

Mr. McCormack: We had three special meetings lately about the Pharmacy Bill.

Mr. Wells said he approved of the Vice-President's resolution. He thought they should not have any special meetings unless there was great occasion for them. Very recently there had been four meetings within one month; and if such a resolution as the one now proposed had been on the books that never would have taken place. He would second the Vice-President's motion.

Mr. Whitla said that as one of the members of the Council whom this proposal would affect he would support it in order to keep down the special meetings. Within one month he received four summonses for meetings of the Council, including the ordinary one; and one of the special meetings was within a week of the ordinary one. On that occasion they had very little information as to what business there was to be done; but he came to the conclusion that the then President would not have called a special meeting within a week of the ordinary one unless there was something very important to be dealt with. Accordingly, he attended that meeting, and he was very glad he did because it enabled him and some friends to fight against a motion which he would be very sorry to have been absent from voting on. He did not think, however, that this motion was intended to refer to the new *régime*.

Mr. Simpson: We had no special meetings lately except those in connection with the Bill.

Mr. Wells: But it is to hit at those three special meetings that the whole thing is.

The Vice-President said he would amend his motion so as to make it apply only to members residing "outside a radius of 20 miles from the city of Dublin."

The President said in any case the travelling expenses of the Vice-President should be paid.

The Vice-President said he would prefer that that suggestion should be withdrawn. He had in the past seen his way to coming to Dublin, and as long as he should continue to be Vice-President he hoped to come.

The Vice-President's motion as amended was then put and carried unanimously.

Mr. Wells read the following resolution, of which he had given notice:—

> "That we ask the Council of the Royal College of Surgeons of Ireland to reconsider their determination not to accept the certificates of licentiates of the Pharmaceutical Society of Ireland for practical pharmacy from candidates for their examination."

He read in the *Pharmaceutical Journal* a few weeks ago—and most of those present must have read also—that the above decision had been arrived at by the College of Surgeons. He also read the following:—"*The Medical Press and Circular* states that the regulation has been largely taken advantage of by certificate mongers who supply certificates for a nominal fee and without any real study. It is represented that a certificate of three months study of pharmacy can be had at ten minutes notice from certain well-known traders for 10*s*., and that the colleges had been obliged to take means to prevent evasion of the regulations in this way. Of course it will be understood that this applies to Ireland." On reading that he thought that as the representatives of the Pharmaceutical Chemists of Ireland they would not be doing their duty if they did not take steps in the matter. The charge made was a very grave one. They were all branded as being not fit to be trusted with giving certificates, because some persons granted them without the recipients having undergone proper training. But having talked the matter over with a member of the Society the latter said that what was stated in the extract he had read was perhaps not altogether the whole truth, and therefore with the leave of the Council he would substitute for the resolution which he had read the following one:—

> "That the Registrar be instructed to write to Greenwood Pim, Esq., M.A., asking if it is true that the Committee of the conjoint examinations of the Royal College of Surgeons and the King and Queen's College of Physicians have decided not to accept the certificates of licentiates of this Society for practical pharmacy from the candidates for their examinations."

It would be better, he thought, to ask those gentlemen for exact information on the subject; and then perhaps they would find that things were not as had been reported. He could himself bear out the statement that certificates could be had in Dublin for a consideration. As chemist of the City of Dublin Hospital, where he had to instruct students in pharmacy, young gentlemen had come to him on many occasions and asked his terms, and then disappeared altogether; and on making inquiry afterwards he easier was told that they could get their certificates on terms elsewhere. He had heard of a young gentleman taking out a course of practical pharmacy who had never seen a mixture made up. These things showed that the colleges had some ground for complaint; but it seemed hard that the innocent should suffer.

Mr. Whitla said he had great pleasure in seconding Mr. Wells's resolution. He could bear out the statement that facilities existed for getting pharmacy certificates where the individual had never gone through any course. He himself was once asked to give for a consideration of £20 a certificate of three years' study that would satisfy the requirements of the Pharmaceutical Society's examination.

The motion was put and unanimously carried.

The President reported that at the Preliminary examination twelve candidates had passed and seven had failed; and that at the examination for the licence seven candidates had passed out of sixteen.

Mr. Merrin said that as visitor at the examinations he saw that the majority of the candidates were unable to answer anything about the Poisons Act. Something about it should be put into the curriculum.

Mr. Simpson: The Act is in the beginning of the Poisons Book. They are bound to know it.

Mr. Merrin said he would give notice of a motion on the subject for the next meeting of the Council.

The President remarked that many candidates were not sufficiently acquainted with the Latin of prescriptions.

Mr. Merrin said he asked the Registrar for an examination paper, but was unable to get it. He was told that there was a rule of the Council that they should be withheld.

Mr. Wells said he considered that an illegal rule.

The Registrar said he did not refuse to let gentlemen see the examination papers; but his instructions were that when the papers were published in the Calendar he was to discontinue handing them out to anyone.

Mr. Wells: I can bear out what Mr. Ferrall says. I know there was a resolution passed about this, but I think it was an improper one.

A report from the Law Committee was adopted.

On the motion of Mr. Whitla, Messrs. Beggs and McCormack were appointed to serve on the Law Committee in the room of the President and Mr. Allen, resigned; and Mr. Beggs was appointed to serve on the Certificates Committee in the room of Mr. Allen, resigned.

Mr. Wells moved that Mr. John Evans be reappointed Examiner of the Society in practical pharmacy, reading and translating of prescriptions, and the British Pharmacopœia.

The Vice-President said it gave him great pleasure to second the motion. They all knew how well qualified Mr. Evans was for the office.

The motion was unanimously carried.

On the motion of the Vice-President, seconded by Mr. Wells, the following gentlemen were elected members of the Society:—Messrs. William Prott, Johnston Montgomery, James Tate, Andrew McNaught, George A. Webb, David W. Elliott, James R. Cochrane, John B. Robinson, Patrick J. Lyons, Isaac W. Nicholl and William C. Dobbin, all of Belfast; Mr. Huston Lancashire, Ballymena; Mr. James Walker, Ballynahinch; Mr. John B. Hay, Newtownards; and Mr. Solomon Donovan, Larne.

On the motion of Mr. Wells, seconded by Mr. Beggs, Mr. James N. Hardy, Dublin, was elected a member.

On the motion of Mr. Wells, seconded by Professor Tichborne, Mr. John Smith, Dublin, was elected a member.

The following gentlemen were nominated for the membership:—Proposed by Mr. Wells and seconded by the Vice-President—Messrs. John Simpson Robinson Rathmines, Dublin; Robert Jones, Cavan; Thomas D. Tate, Dublin; Robert J. Galwey, Dublin; Henry Conyngham, Dublin; and John J. Bernard, Booterstown, Co. Dublin.

Proposed by the President and seconded by the Vice-President—Mr. Joseph J. McCawlay, Hollywood, Co. Down.

Proposed by Mr. Wells and seconded by the Vice-President—Messrs. Thomas J. English; Adam R. G. Clarke, Dublin; Richard Darley Atkinson, Dublin; John E. Connor, Newry; George Browne, Dublin; J. N. Harris, Sligo; and Bernard J. Castello, Dublin.

The Council then adjourned.

Proceedings of Societies in London.

ROYAL COLLEGE OF PHYSICIANS.

[CROONIAN LECTURE.]

RELATION BETWEEN CHEMICAL STRUCTURE AND PHYSIOLOGICAL ACTION.

BY T. LAUDER BRUNTON, M.D., F.R.S.

(*Concluded from page* 96.)

Necessity of Investigation of the Action of Simple Drugs on Simple Tissues.—It is only by a thorough knowledge of the conditions which cause bodies of simple chemical structure, like caffeine or xanthine, sometimes to produce contraction and sometimes elongation of muscle, that we can hope to treat cardiac disease with certainty, either by means of these substances or by more complex cardiac tonics. The only indication that we have of life is motion, either of the body as a whole or its parts, as in the movements of the respiration or pulse, or of the blood in the test for life I have already mentioned, or in secretion, as in the case of glands kept alive by artificial circulation. In order to understand thoroughly the effect of any drug we must know what its action is upon muscular fibre, and the variations produced in its action by changes in the temperature or reaction. But muscular fibres are usually stimulated to contraction or to relaxation by efferent nerves, and they are again excited by the nerve centres from which they proceed. Unless we know the action of drugs on nerves, as well as on muscles, we cannot rightly estimate their action upon nerve centres. It is on this account that Cash and I have not only taken up the study of comparatively simple drugs, such as ammonia, compound ammonias, alkalis, earths, and the simpler aromatic compounds; but we have worked more especially at the action of those substances on muscle and motor nerves, hoping in this way to lay a foundation for future researches on higher structures and more complex drugs.

Modifications in the Action of Drugs.—The action of drugs upon voluntary muscle is not always alike. It may be different in frogs and mammals, nay, more, it may differ in two species of frogs. It may be different in voluntary and involuntary muscle, and the involuntary muscular fibre of the heart may not react in quite the same way as that of the vessels, and the intestines may differ from both. Yet a general likeness can usually be discerned between the action of a drug on all kinds of muscular fibre, and it is precisely the fact that differences exist which will give us most assistance in treatment, after we have once learned the causes of these differences. Caffeine usually, as I have said, contracts the muscles of the frog's legs, but sometimes it elongates them, and the same difference in its action is observed in the heart. Generally the heart stops in systole, but sometimes it stops in full diastole. In this respect the action of caffeine resembles that of digitalis.[*]

Complexity of the Heart.—In the heart we are not dealing with muscular fibre only, but with nerves and ganglia as well, and the effect of any drug upon this organ is the resultant of its action, not only upon all these structures in the heart, but upon the medulla as well. Moreover, when we are dealing with the heart in connection with the blood vessels the action becomes still more complex, for contraction or relaxation of the vessels will alter the resistance which the heart has to overcome. The problems we have to solve in looking for new cardiac tonics are, therefore, far from easy, but we may hope that patient investigation will solve them, and that we may ere long aid the sufferers from cardiac disease more efficiently than we can at present.

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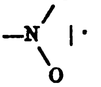
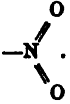
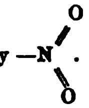
[*] C. Lauder Brunton, 'On Digitalis,' pp. 96, 105. London, Churchill, 1868.

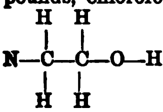
Direction in which to Look for Cardiac Tonics.—I have already pointed out that most drugs belonging to the class of cardiac tonics are also local anæsthetics, but all local anæsthetics do not appear to be cardiac tonics. Nevertheless, by looking through the class of local anæsthetics we may perhaps find some new cardiac tonics, and, at any rate, it is worth while to try.

ACTION OF DRUGS ON THE BLOOD VESSELS.

Our knowledge of the chemical nature of drugs which dilate the blood vessels is somewhat greater than of those that contract them, for the agents which cause dilatation most markedly are of very simple chemical structure. They are, in fact, nitrites, or substances which yield nitrous acid in the blood, but all nitrates have not an equally powerful action, and the efficiency of the NO_2 depends to a great extent on the radical with which it is combined, and the mode in which this combination occurs. For the group NO_2 may be arranged thus: —O—N=O, or  In each of these the nitrogen is trivalent. But it may be quinquevalent, in which case the group would be  . In nitrous compounds, it is probably O=N—O—, while in nitric compounds it is probably  . But in nitrous compounds we have two classes: nitroso and iso-nitroso. We thus see that there may be considerable differences in the NO_2 groups, and the action of this group is determined to a considerable extent by the alkyl to which it is joined and the manner in which the joining takes place.

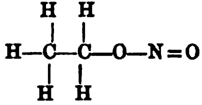
Nitrites of Methyl, etc.—When we have the junction taking place through oxygen, the group NO replacing hydrogen in alcohol, we obtain the nitrites of methyl, ethyl, propyl, butyl, amyl, and so on; but when we have the nitrogen directly united to carbon by one affinity, the group NO_2 replacing hydrogen in methane, we get the nitro compounds, nitro-methane, nitro-ethane, nitro-propane, nitro-butane, nitro-pentane.

Action of Nitro-methane, etc.—These nitro compounds appear to have less action on the vessels than the nitrites, and do not cause the same marked dilatation in them or consequent fall of blood pressure. They tend rather to produce narcosis, like the haloid compounds, chloroform, etc.



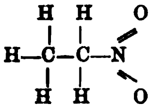
$$\begin{array}{ccccccc} & & \mathrm{H} & & \mathrm{H} & & \\ & & | & & | & & \\ \mathrm{N} & — & \mathrm{C} & — & \mathrm{C} & — & \mathrm{O—H} \\ & & | & & | & & \\ & & \mathrm{H} & & \mathrm{H} & & \end{array}$$

Ethyl alcohol.



$$\begin{array}{ccccccc} & & \mathrm{H} & & \mathrm{H} & & \\ & & | & & | & & \\ \mathrm{H} & — & \mathrm{C} & — & \mathrm{C} & — & \mathrm{O—N=O} \\ & & | & & | & & \\ & & \mathrm{H} & & \mathrm{H} & & \end{array}$$

Ethyl nitrite.



Nitro-ethane.

Amyl Nitrite.—Amyl nitrite has a rapid action, quickly occurring and quickly passing off, and since I first used it for angina pectoris in 1867 its utility in the treatment of this disease has become almost universally recognized.

Other Nitrites.—While working in Ludwig's laboratory in 1869 on the action of this drug, I satisfied myself that other nitrites, and especially that sodium nitrite, had a similar action. In 1876, Dr. Gresswell and I made some experiments, which we have not published, although a preliminary note appeared of them at the time. From these experiments it appeared that amyl nitrite had a more marked action than ethyl nitrite, but the next in the series, capryl nitrate, was less active than amyl. Recently the subject has again been taken up, and Cash and Dunstan have found that butyl nitrite is still more powerful than amyl, but the question now arises, which butyl or amyl is it whose combination with NO_2 is most efficacious, that is to say, which acts most quickly and most powerfully.

Tertiary Amyl Nitrite.—According to Bertoni the nitrite obtained from tertiary amyl alcohol or ethyl-dimethyl-carbinol acts more powerfully and for a longer time than ordinary amyl-nitrite. My assistants have tested it for me, and laboratory experiments showed that in animals, while it caused fall of blood pressure, it also produced vomiting. In one middle-aged patient suffering from angina pectoris it was not so efficacious as ordinary nitrite, and in him it produced vomiting; but in an old man it produced no vomiting, and gave more relief than other nitrites. It is possible that there may be a difference in the effect of the different nitrites in consequence of greater or less rigidity of the vascular walls. It is possible that where the vessels are not rigid ordinary amyl nitirte or iso-butyl nitrite may be best, but when the vessels are rigid a more prolonged action may be desirable, and in these nitroglycerine and Bertoni's nitrite may be preferable.

Bright's Disease.—But there are other cases in which prolonged dilatation of the vessels is very desirable. First, in cases where the heart is weak and barely able to carry on the circulation; secondly, where the tension from the vessels is very high, and there is danger of rupture, as in cases of Bright's disease. In both of these it is highly probable that we may obtain better results with the nitrites of some of the higher alkyls than with any that have yet been employed. A series of experiments is also desirable on the action of nitro-butane, nitro-pentane, and other nitro compounds in these cases.

ACTION OF DRUGS UPON THE BLOOD.

In addition to the power to dilate the vessels, nitrites have a very marked action upon the blood. When mixed with it they cause it to become of a chocolate colour, and they produce a similar change in it while it is still contained in the vessels of animals poisoned by nitrites. As Gamgee showed, nitrites, as it were, lock up oxygen in the hæmoglobin, so that blood which has been acted upon by them will not either take up or give off oxygen so readily as normal blood, but strong reducing agents will remove the oxygen, and then the reduced blood will combine with oxygen readily again. On this account nitrites do not arrest the respiration in the tissues in the same way as carbonic oxide, for when they have brought the animal to the verge of suffocation by locking up the oxygen in oxyhæmoglobin, the nitrous compound becomes reduced, and the hæmoglobin then resumes its normal functions. A few inhalations of the nitrites, such as amyl nitrite, may thus produce asphyxial convulsions, but the animal recovers quickly and certainly, unless the inhalation be maintained. The nitrite appears to behave to the oxygen of the blood corpuscles in somewhat the same way as the stopper of a bottle does to the liquid it contains, preventing anything from going out or into the bottle, but when sufficient force is applied to withdraw it, it no longer interferes with either exit or entrance. A similar effect is produced by nitroglycerine and also by hydroxylamine. Nitrites must almost necessarily interfere with oxidation of the blood, and probably it is on this account that they give rise to the appearance of sugar in the urine. Nitrites, notwithstanding their marked effect upon hæmoglobin, do not destroy blood corpuscles, and consequently do not give rise to the presence of hæmoglobin in the urine; but a number of substances, more especially those belonging to the aromatic group, like toluylene-diamine, have this power, and an interesting question arises how far paroxysmal hæmoglobinuria may not really be a form of poisoning, due to the absorption of poisonous compounds of the aromatic series, and pernicious anæmia has been attributed by Sandoz[*] to poisoning by substances formed in the intestine and absorbed from it.

ACTION OF DRUGS ON THE LIVER.

For a long time the liver, notwithstanding its great size and its remarkable position, was regarded as having little functional importance, and was supposed merely to excrete bile, a fluid which plays quite a minor part in the digestive processes. But for some years back the liver has been gradually increasing in importance, and its functions are now recognized to be various in kind as well as most necessary to the organism.

Bile only a Bye-Product although a Useful One.—The coal-tar refuse of gas works is now utilized, at least in large towns, but even in small places gas continues to be made, although the coal tar produced in the process cannot be worked up, and remains simply as refuse. In the same way the bile is certainly useful in the digestive process, preventing the decomposition, accelerating peristalsis, and aiding the pancreatic juice to digest fats. But still it is, after all, to be regarded as a bye-product of hepatic activity.

Dangers to Life.—The knowledge which we have gained during the last few years regarding the poisonous properties of some albuminous substances, and of the products which albumen yields when decomposed, makes it, as Mr. Darwin said, a wonder that we are all alive, considering how many poisonous substances are constantly formed in the intestine.

The Liver as a Gatekeeper.—Indeed, one can hardly see how life would continue long were it not that the liver has a position and function like the gatekeeper or porter of a town or castle in times of war, inspecting all comers and turning back those that are dangerous. It possesses a twofold power to prevent poisons entering the portal vein from passing into the general circulation, for it turns back some and destroys others. Some of them, such as lead, copper, mercury, and iron, are simply arrested by it, and instead of passing into the general circulation are excreted by the bile, and finally ejected from the body. Some organic poisons, such as curara, appear also to be partly excreted in the same way. But the liver appears to have not only the power of excreting poisons, but of actually destroying them, or, at any rate, converting them into non-poisonous compounds. Thus double the quantity of strychnine, veratrine, quinine, and morphine are required to kill an animal, if injected into the portal vein, as would be sufficient if injected into the jugular vein, while no less than three times the quantity of curara is requisite.[†] The liver exerts a similar power over peptones and ptomaines, as well as over compounds of ammonia with weak acids, such as ammonium acetate, but chloride of ammonium is unaffected.

Use of Glycogen in Regard to Poisons.—Organic poisons appear to have their activity lessened in the liver by combination with glycogen, for when animals are made to fast, the power of the liver to destroy the toxic action of poisons gradually diminishes as the glycogen disappears. In cases where ptomaines are found in quantity in the intestine, Roger recommends such food to be given as will quickly supply glycogen, such as milk. He explain the usefulness of milk in uræmic poisoning in this way, while beef-tea in such cases simply increases the poison. It is possible that the peculiar symptoms of tremor, faintness, and even mental weakness which occur in some patients, when fasting, and which are rapidly relieved by food, may be, in some degree, due to the ptomaines formed in the intestines, and the relief by food may be explained by their destruction by the increased activity of the liver. At the same time we must remember that ptomaines—or, perhaps, we ought rather to say leucomaines—are formed in the tissues generally, and that an increase of glycogen in the blood may combine with poisonous products in the nerves and muscles, preventing them from exerting a poisonous action, and thus removing weakness, languor or tremor due to them. The whole of this subject presents a fruitful field for further inquiry, and at present our knowledge is little more than sufficient to indicate how much there yet remains to be known.

GLYCOGENIC FUNCTION OF THE LIVER.

Another most important function of the liver is that of forming glycogen. It does this both from proteids and from carbohydrates, and thus acts, one might say, as the coal bunker of the body, storing up a reserve of nutriment to be utilized during the hours of fasting. But here again we meet with a curious action of some drugs.

Action of Ammonia.—Ammonia, as I have mentioned, is a poison, and so is ammonium carbonate if injected into the jugular vein, but the poisonous activity of these substances is greatly diminished when they are injected into the portal vein. But this is not all. The liver actually converts these poisons into food, and when they are given to an animal, along with a non-nitrogenous diet, they increase the quantity of glycogen in the liver, and ultimately pass out in the form of urea, just as albumen would have done. Some amido-compounds, such as asparagine and glycocoll, have a similar action, but this is not shared by all the amido substances, for beef-tea, and Liebig's extract, contain a number of these, and yet neither seems to act in the same way as ammonia.[*]

Removal of Glycogen from the Liver.—Notwithstanding all the labour that has been expended in investigating the glycogenic function of the liver, it cannot be said that we clearly understand, even yet, the way in which glycogen is formed in the liver, or the way in which it disappears from it. Probably, a good deal of it is carried off by the blood in the form of sugar, and some also in the form of glycogen.

Action of Poisons upon Glycogen.—We have already seen that glycogen unites with some poisons, such as morphine, and with peptones, or other poisonous products of albuminous decompositions, so as to alter their properties and lessen their poisonous activity. We might therefore expect the converse to be the case, and look for them to exert an action upon glycogen, and perhaps render it less easily decomposed. We can readily understand on this supposition how the addition of a single egg, or piece of cheese, to a meal of bread and butter will increase its staying power, so that a person will be able with this slight addition, to go on for four or five hours, instead of wanting another meal at the end of two. It would also explain the action of morphine in cases of diabetes. As Claud Bernard found that reflex dilatation of the hepatic artery would increase the transformation of sugar in the liver and induce diabetes, one was inclined to attribute the beneficial action of morphine or codeine to their sedative action on the nerve centres, preventing any irritation which might exist from affecting the hepatic vessels. But Mitchell Bruce has clearly shown that this is not the case, and that we must look to a direct action of morphine upon the liver itself for an explanation of its utility in diabetes.

Glycosuria caused by Drugs.—There are a number of substances which will produce temporary glycosuria. Many of these are supposed to act by dilating the hepatic artery; for example, amylnitrite, curara, ortho-nitro-propionic acid, and methyl delphinine, chloroform, chloral hydrate, alcohol, and hydrocyanic acid, It is not improbable, however, that some of these, at least, may cause sugar to appear, by lessening the normal processes of oxidation, by which it ought to be converted into carbonic acid. For carbonic oxide is a most powerful agent in producing glycosuria, and amyl nitrite, alcohol, and chloroform all tend to lessen oxidation. The most remarkable substance in producing glycosuria seems however to be phlorizin.* This substance, which is obtained from the root bark of apple trees, appears to have the power of preventing the organism from oxidizing or otherwise utilizing sugar. When dogs are kept without food for several days, but receive phlorizin all the time, the whole of the glycogen disappears both from the liver and the muscles; but if they are still kept without food, quantities of sugar appear in the urine, which can only be produced, so far as one can see, from the breaking up of the albuminous tissues of the body. In birds phlorizin causes glycosuria even after the liver has been extirpated.† Arsenic, antimony and phosphorus all cause the glycogen to disappear from the liver,‡ but they produce at the same time fatty degeneration, whereas phlorizin appears simply to cause a general shrinking of the liver.§

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[*] Sandoz, 'Corr. Bl. f. Schweiz. Aerzte,' 1887.

[†] Roger, 'Action du Foie sur les Poisons.'

[*] Paul Bahlmann, 'Inaug. Diss.' Erlangen, 188

Amount of Bile as an Index to Functional Activity in the Liver.—The secretion of bile, although it has attracted more attention than the other functions of the liver, is in itself of minor importance. But just as a stranger visiting a gas factory in the country, where they could not use up their waste products, might judge by the amount of tar he saw about whether they had been making much gas or not, so from the secretion of bile we may draw important conclusions regarding another very important function of the liver, namely, its power to destroy blood corpuscles. Life appears to consist of a continual process of destruction and repair, and the blood forms no exception to the rule. Its vitality appears to be maintained by constant formation and destruction of blood corpuscles. Whether the corpuscles be actually broken up in the spleen, and their fragments carried to the liver, or whether they be destroyed in the liver itself does not at present concern us.

Relation between Blood-pigment and Bile-pigment.—At all events it is in the liver, or rather perhaps we should say in the bile, that we find the remains of one of their most important constituents, hæmoglobin. Since Virchow pointed out the relationship between hæmatoidin and bile pigment, numerous researches have been made, to show that hæmoglobin could be converted into bilirubin.

Hæmoglobinuria and Jaundice.—Thus Kühne found that bile pigments appeared in the urine after the injection of hæmoglobin into the blood, and the same result has been observed after intravenous injection of substances which will dissolve corpuscles in the vessels, such as bile acids, large quantities of water, ether, chloroform and phosphoric acid. In trying to repeat some of these experiments, many years ago, I obtained a negative result, and other observers have also failed. In place of bile pigment I found hæmoglobin, and others have done the same, but Städeleman has cleared up the discrepancies. In his researc[illegible] toluylene-diamine, he found that in some ani[illegible] obtained hæmoglobinuria, and in others jaund[illegible] the jaundice was due to the fact that the bile du[illegible]e plugged by bile so thick that it would not flow along an ordinary test tube, and much less through the hepatic ducts. The mode of action of the poison with which he experimented, as well as of chloroform, water, or bile acids injected into the circulation, seems to be as follows:—They break up the blood-corpuscles, liberating hæmoglobin. This is carried by the blood to the kidneys and liver as well as to the other organs. In the kidneys it is partly excreted, giving rise to hæmoglobinuria. In the liver it is taken up by the hepatic cells and converted into bile pigment.

Hæmatogenous Jaundice.—At first the whole quantity of bile is increased, solids as well as liquids, so that toluylene-diamine may be looked upon as a most powerful hepatic stimulant. Soon, however, the solids increase out of proportion to the fluid in the bile. It becomes thicker and thicker, until it will no longer flow along the ducts, and then a part of it being absorbed from the biliary capillaries, jaundice is produced. These researches show that although all jaundice may be looked upon as of hepatic origin yet the function of the liver is so much affected by the nature of the blood, that jaundice may occur in consequence of the destruction of red blood-corpuscles, and the name of "hæmatogenous," as applied to such a form of jaundice, may therefore be justified.

Jaundice from Poisons.—One of the oldest observations on jaundice of this sort is probably that of Galen, that the skin becomes yellow in some persons after the bite of a viper. This is particularly interesting in relation to the possible causation of epidemic jaundice, or even of so-called catarrhal jaundice, in those cases where the catarrh is supposed to affect the bile ducts only, and there is no evidence of its extension to the intestine or stomach. The venom of poisonous snakes, both viperine and colubrine, paralyses both motor nerves and nerve centres, but the viperine poison differs from the colubrine in its effects upon the blood, which it deprives of its coagulating power, while at the same time it tends to destroy the red corpuscles. The researches of Weir Mitchell, Reichart, Martin and Wolfenden have shown that the poisonous substance in snake poison is not an acid or an alkaloid, but an albumose similar in its chemical reactions to the products of the ordinary digestion of albuminous foods in the stomach or intestine. It is only within the last few years that the poisonous properties of albumoses have been recognized, but poisons belonging to this class are now found to be pretty widely distributed.

Poisonous Blood in Fishes.—They occur, according to Martin, in the jequirity or abrus seed, and Mosso has recently found the blood of lampreys and hag fishes, and Springfield that of eels, to be poisonous from albumoses which it contains. The poisonous properties of albumoses are destroyed by boiling, and usually also by the simple process of digestion; but if they should be taken in large quantity into the stomach they might be able to pass through the liver in sufficient quantity to prove injurious, and, if this be so, one can just understand why Henry I. of England should have died after eating lampreys to excess.

Epidemic and Catarrhal Jaundice.—At present we are quite ignorant of the pathology of epidemic jaundice, or of those cases of catarrhal jaundice where yellowness is the only symptom, and it seems not improbable that both of these may be due to poisons of some sort absorbed from the intestine. I know of one case at least in which jaundice of this sort came on after eating ham which appeared to be tainted.

Acute Red Atrophy of the Liver.—In another case, which I saw only a few months ago, sudden illness came on a few hours after eating ham. I diagnosed the case as one of poisoning by ptomaines. Death occurred in a few days, and the *post-mortem* examination showed nothing to account for death, excepting the liver, which was in a condition of red atrophy.

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* Von [illegible]*erh. d. h. Congress. fur. inn. Med.*, 1887.

† Minkowski [illegible] Thiel, *Arch. f. exp. Path. u. Pharm.*, Bd. 23, p. 142.

‡ Salkowsky, *Vir[illegible]o's Arch.* 34, p. 78.

§ Ueber d. Einfluss[illegible]. Giften a. d. Grösse d. Leberzellen, A. Neumann, *In[illegible]ug. Diss.* Berlin, 1888.

This also is a disease of whose pathology we are ignorant, and further researches must decide whether or not it may really be simply due to the effect of poisons on the organ.

NEW REMEDIES IN DISORDERS OF THE LIVER.

But an extended knowledge of pathology is not the only gain we may hope for from a thorough investigation of the action of drugs upon the liver; we may reasonably expect great additions to our power of treating its functional disorders or even organic diseases. I have already mentioned the peculiar effect of ammonium salts upon the glycogenic function. Dr. Stewart's introduction of chloride of ammonium in hepatic abscess is a most important aid in the treatment of that disease. The biliary function appears to be modified in a remarkable way by many substances of the aromatic series which greatly increase the bile. It is a very remarkable thing that a great number of the ptomaines belong to the class of compound ammonias or amines, and the remarkable action of toluylene-diamine appeared to me to indicate the necessity for ascertaining if possible what effect would be produced on the liver by bodies of the aromatic series, free from nitrogen, as compared with the effect of similar bodies combined with ammonia. At my suggestion Dr. Collins made a number of experiments with toluene and toluylene-diamine in my laboratory, and found that both these substances greatly increased the flow of bile. Not feeling quite certain what effect toluylene-diamine and allied bodies might have upon patients, I felt a little chary of using them until I should obtain a fuller knowledge of their mode of action. In order to be ready, however, to use them as soon as I had acquired sufficient knowledge, I asked Messrs. Burroughs and Wellcome to prepare me some tabloids and capsules containing toluene and toluylene-diamine. This they kindly did, and a gentleman to whom Dr. Collins had mentioned the existence and probable use of the tabloids tried them upon his patients with good success, as he informs me.

Vegetable Cholagogues.—Most of the vegetable hepatic stimulants, iridin, euonymin, and aloes, belong to the aromatic series, although we do not know their chemical structure. Much benefit is frequently obtained by their use in so-called "biliousness," and we may reasonably expect that a full knowledge of the mode of action and chemical structure of the vegetable cholagogues will enable us, not only to apply them more judiciously, but to modify their structure, and consequently their action in various directions, to suit our wants. It is almost certain, also, that we shall obtain a very large series of new bodies which may act upon the liver, either as stimulants or as depressants, increasing or diminishing the formation of bile, and affecting the other functions of the organ, which I have already mentioned. The frequency with which functional hepatic disorder occurs, and the great discomfort which it occasions, not only to the sufferer, but to his friends, and even to the community at large, renders it most desirable that efficient modes of treatment should be discovered.

METHODS OF SEARCHING FOR NEW HEPATIC REMEDIES.

The search after new remedies has hitherto been conducted almost entirely in two ways: first, by the administration of drugs to patients, and a chemical analysis of the liver itself so as to ascertain whether the amount of glycogen and fat has been altered by the drug. According to Ellenberger and Baum, who experimented on horses, the hepatic cell when in action is larger, has a sharper contour, has a net-like arrangement of its protoplasm, and contains more granules which stain with eosin, and fewer pigment granules than the cell when at rest. This active condition of the cell occurs during digestion, but it may be produced independently of digestion by such drugs as pilocarpine, muscarine and aloes. A similar but less powerful action is exerted by salicylate and benzoate of soda and by rhubarb. On the other hand, atropine arrests the activity of the liver, so that the hepatic cells appear to be completely at rest, even in the very middle of the digestive process. A similar but less powerful action is exerted by ammonium chloride, sulphate of magnesia and calomel. Copper and lead also arrest the hepatic activity, but when they are given for a time they produce fatty degeneration of the cells and accumulation of bile in them. The action of a very large number of substances on the liver cells has been investigated by Alfred Neumann under Ehrlich's direction; and many belonging to the aromatic series have been found to produce enlargement of the hepatic cells. Amongst these are cocaine, coumarin, acetophenone, azobenzine, dibromazobenzene, dimethylparaphenylandiamine sulphate, martius yellow, orthonitrophenylpropionic acid, paraoxybenzaldehyde, paratoluidin, phenanthroquinone, and phenylthiourea.

Dr. Sheridan Delépine has kindly examined for me the changes which the hepatic cells in the rabbit undergo under the action of atropine, pilocarpine and toluene. It was found that the effect of atropine and pilocarpine on the liver of the rabbit resembles that which Ellenberger and Baum have described as occurring in the horse.

The effect of toluene is very peculiar. The outline of the cells becomes sharp, but the cells become small and the blood vessels large, so that the liver is congested. The bile also appears to be expelled from the liver, for the blood corpuscles in the vessels are not destroyed, while they usually are dissolved by the bile.

This subject is one of the greatest possible practical interest, because its investigation may explain the causation of those very common and very troublesome symptoms to which the term "biliousness" is commonly given, and which are usually ascribed to a "torpid liver." Experiments on the effects of nitrogenous and non-nitrogenous foods on the liver cells are required in order to give us a firm physiological basis; and then a study of the action of various substances belonging to the aromatic and ammoniacal groups may enable us to discover what products of albuminous decomposition on the intestine lead to hepatic congestion, "torpid liver," and "biliousness." At the same time we may hope that such an investigation will also enable us to find efficient remedies for these conditions. At all events, I think it is evident that the whole subject of hepatic stimulants must be studied anew, not by the older method of trying to ascertain their action on the organ as a whole, but rather on the cells which compose it. As I mentioned in my first lecture, the latest development of pharmacology is the "pharmacology of the cell;" and to it we must look for the fullest information regarding the action of remedies, whatever be the class to which they belong.

Time will not allow me to enter upon the relations between the chemical structure of remedies and their action upon other glands than the liver, and especially upon the kidneys. Nor can I even flatter myself that I have treated any part of my subject fully. All I have done is to attempt to give a brief outline of it, not discussing it with a view to completeness, nor always bringing prominently forward those points which would be most interesting to a chemist, but rather endeavouring to bear in mind the practical intention of these lectures, and to show as much as possible the relationship of my subject to the prevention, control, and cure of disease. In trying to do this, I have thought it advisable to look forward as well as backward, and to indicate lines of research on which work is desirable, even at the expense of time which might have been given to a fuller exposition of results already obtained. In conclusion, I must again return you my most cordial thanks, not only for the honour you have done me in selecting me to give these lectures, but for the patient and kindly hearing you have given them.

ROYAL INSTITUTION OF GREAT BRITAIN.

An Attempt to Apply to Chemistry One of the Principles of Newton's Natural Philosophy.*

BY D. MENDELÉEFF, LL.D.

Professor of Chemistry in the University of St. Petersburg.

Nature, inert to the eyes of the ancients, has been revealed to us as full of life and activity. The conviction that motion pervaded all things, which was first realized with respect to the stellar universe, has now extended to the unseen world of atoms. No sooner had the human understanding denied to the earth a fixed position and launched it along its path in space, than it was sought to fix immovably the sun and the stars. But astronomy has demonstrated that the sun moves with unswerving regularity through the star-set universe at the rate of about 50 kilometres per second. Among the so-called fixed stars are now discerned manifold changes and various orders of movement. Light, heat, electricity—like sound—have been proved to be modes of motion; to the realisation of this fact modern science is indebted for powers which have been used with such brilliant success, and which have been expounded so clearly at this lecture table by Faraday and by his successors. As in the imagination of Dante, the invisible air became peopled with spiritual beings, so before the eyes of earnest investigators, and especially before those of Clerk Maxwell, the invisible mass of gases became peopled with particles; their rapid movements, their collisions, and impacts became so manifest that it seemed almost possible to count the impacts and determine many of the peculiarities or laws of their collisions. The fact of the existence of these invisible motions may at once be made apparent by demonstrating the difference in the rate of diffusion through porous bodies of the light and rapidly moving atoms of hydrogen and the heavier and more sluggish particles of air. Within the masses of liquid and of solid bodies we have been forced to acknowledge the existence of persistent though limited motion of their ultimate particles, for otherwise it would be impossible to explain, for example, the celebrated experiments of Graham on diffusion through liquid and colloidal substances. If there were, in our times, no belief in the molecular motion in solid bodies, could the famous Spring have hoped to attain any result by mixing carefully dried powders of potash saltpetre and acetate of soda, in order to produce by pressure a chemical reaction between these substances through the interchange of their metals, and have derived, for the conviction of the incredulous, a mixture of two hygroscopic though solid salts—nitrate of soda and acetate of potash?

In these invisible and apparently chaotic movements, reaching from the stars to the minutest atoms, there reigns, however, a harmonious order which is commonly mistaken for complete rest, but which is really a consequence of the conservation of that dynamic equilibrium which was first discerned by the genius of Newton, and which has been traced by his successors in the detailed analysis of the particular consequences of the great generalization, namely, relative immovability in the midst of universal and active movement.

But the unseen world of chemical changes is closely analogous to the visible world of the heavenly bodies, since our atoms form distinct portions of an invisible world, as planets, satellites, and comets form distinct portions of the astronomer's universe. Our atoms may therefore be compared to the solar systems or to the systems of double or of single stars. For example, ammonia (NH^3) may be represented in the simplest manner by supposing the sun nitrogen surrounded by its planets of hydrogen; and common salt ($NaCl$) may be looked upon as a double star formed of nitrogen and chlorine. Besides, now that the indestructibility of the elements has been acknowledged, chemical changes cannot otherwise be explained than as changes of motion, and the production by chemical reactions, of galvanic currents, of light, of heat, of pressure, or of steam power, demonstrates visibly that the processes of chemical reaction are inevitably connected with enormous though unseen displacements, originating in the movements of atoms in molecules. Astronomers and natural philosophers, in studying the visible motions of the heavenly bodies and of matter on the earth, have understood and have estimated the value of this store of energy. But the chemist has had to pursue a contrary course. Observing in the physical and mechanical phenomena which accompany chemical reactions the quantity of energy manifested by the atoms and molecules, he is constrained to acknowledge that within the molecules there exists atoms in motion, endowed with an energy which, like matter itself, is neither being created nor is capable of being destroyed. Therefore, in chemistry, we must seek dynamic equilibrium not only between the molecules but also in their midst among their component atoms. Many conditions of such equilibrium have been determined, but much remains to be done, and it is not uncommon, even in these days, to find that some chemists forget that there is a possibility of motion in the interior of molecules, and therefore represent them as being in a condition of death-like inactivity.

Chemical combinations take place with so much ease and rapidity; possess so many special characteristics, and are so numerous, that their simplicity and order was for a long time hid from investigators. Sympathy, relationship, all the caprices or all the fancifulness of human intercourse, seemed to have found complete analogies in chemical combinations, but with this difference, that the characteristics of the material substances—such as silver, for example, or of any other body—remain unchanged in every subdivision from the largest masses to the smallest particles, and consequently their characteristics must be a property of its particles. But the world of heavenly luminaries appeared equally fanciful at man's first acquaintance with it, so much so that the astrologers imagined a connection between the individualities of men and the conjunction of planets. Thanks to the genius of Lavoisier and of Dalton, man has been able, in the unseen world of chemical combinations, to recognise laws of the same simple order as those which Copernicus and Kepler proved to exist in the planetary universe. Man discovered, and continues every hour to discover, *what* remains unchanged in chemical evolution, and *how* changes take place in combinations of the unchangeable. He has learned to predict, not only what possible combinations may take place, but also the very existence of atoms of unknown elementary bodies, and has besides succeeded in making innumerable practical applications of his knowledge to the great advantage of his race, and has accomplished this notwithstanding that notions of sympathy and affinity still preserve a strong vitality in science. At present we cannot apply Newton's principles to chemistry, because the soil is only being now prepared. The invisible world of chemical atoms is still waiting for the creator of chemical mechanics. For him our age is collecting a mass of materials, the inductions of well-digested facts, and many-sided inferences similar to those which existed for astronomy and mechanics in the days of Newton. It is well also to remember that Newton devoted much time to chemical experiments, and while considering questions of celestial mechanics, persistently kept in view the mutual action of those infinitely small worlds which are concerned in chemical evolutions. For this reason, and also to maintain the unity of laws, it seems to me that we must, in the first instance, seek to harmonize the various phases of contemporary chemical theories with the immortal principles of the Newtonian natural philosophy, and so hasten the advent of true chemical mechanics. Let the above considerations serve as my justification for the attempt which I propose to make to act as a champion of the universality of the Newtonian principles, which I believe are competent to embrace every phenomenon in the universe, from the rotation of the fixed stars to the interchanges of chemical atoms.

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* Delivered Friday, May 31.

In the first place I consider it indispensable to bear in mind that, up to quite recent times, only a one sided affinity has been recognized in chemical reactions. Thus, for example, from the circumstance that red-hot iron decomposes water with the evolution of hydrogen, it was concluded that oxygen had a greater affinity for iron than for hydrogen. But hydrogen, in presence of red-hot iron scale, appropriates its oxygen and forms water, whence an exactly opposite conclusion may be formed.

During the last ten years a gradual, scarcely perceptible, but most important change has taken place in the views, and consequently in the researches of chemists. They have sought everywhere, and have always found systems of conservation of dynamic equilibrium substantially similar to those which natural philosophers have long since discovered in the visible world, and in virtue of which the position of the heavenly bodies in the universe is determined. There where one-sided affinities only were at first detected, not only secondary or lateral ones have been found, but even those which are diametrically opposite; yet, among these, dynamical equilibrium establishes itself not by excluding one or other of the forces, but regulating them all. So the chemist finds in the flame of the blast furnace, in the formation of every salt, and, with especial clearness, in double salts, and in the crystallization of solutions, not a fight ending in the victory of one side, as used to be supposed, but the conjunction of forces; the peace of dynamic equilibrium resulting from the action of many forces and affinities. Carbonaceous matters, for example, burn at the expense of the oxygen of the air, yielding a quantity of heat and forming products of combustion, in which it was thought that the affinities of the oxygen with the combustible elements were satisfied. But it appeared that the heat of combustion was competent to decompose these products, to dissociate the oxygen from the combustible elements, and, therefore, to explain combustion fully, it is necessary to take into account the equilibrium between opposite reactions, between those which evolve, and those which absorb heat.

In the same way, in the case of the solution of common salt in water, it is necessary to take into account, on the one hand, the formation of compound particles generated by the combination of salt with water, and on the other the disintegration or scattering of the new particles formed, as well as of those originally contained. At present we find two currents of thought, apparently antagonistic to each other, dominating the study of solutions: according to the one, solution seems a mere act of building up or association; according to the other, it is only dissociation or disintegration. The truth lies evidently between these views; it lies, as I have endeavoured to prove by my investigations into aqueous solutions, in the dynamic equilibrium of particles tending to combine and also to fall asunder. The large majority of chemical reactions which appeared to act victoriously along one line have been proved capable of acting as victoriously even along an exactly opposite line. Elements which utterly decline to combine directly may often be formed into comparatively stable compounds by indirect means, as for example in the case of chlorine and carbon; and consequently the sympathies and antipathies, which it was thought to transfer from human relations to those of atoms, should be laid aside until the mechanism of chemical relations is explained. Let us remember, however, that chlorine, which does not form with carbon the chloride of carbon, is strongly absorbed, or as it were dissolved by carbon, which leads us to suspect incipient chemical action even in an external and purely surface contact, and involuntarily gives rise to conceptions of that unity of the forces of nature which has been so energetically insisted on by Sir William Grove and formulated in his famous paradox. Grove noticed that platinum, when fused in the oxyhydrogen flame, during which operation water is formed, when allowed to drop into water decomposes the latter and produces the explosive oxyhydrogen mixture. The explanation of the paradox, as of many others which arose during the period of chemical renaissance has led, in our time, to the promulgation by Henri St. Claire Deville of the conception of dissociation and of equilibrium, and has recalled the teaching of Berthollet, which, notwithstanding its brilliant confirmation by Heinrich Rose and Dr. Gladstone, had not, up to that period, been included in received chemical views.

Chemical equilibrium in general, and dissociation in particular, are now being so fully worked out in detail, and applied in such various ways, that I do not allude to them to develope, but only use them as examples by which to indicate the correctness of a tendency to regard chemical combinations from points of view differing from those expressed by the term hitherto appropriated to define chemical forces, namely, "affinity." Chemical equilibria, dissociation, the speed of chemical reactions, thermo-chemistry, spectroscopy, and, more than all, the determination of the influence of masses and the search for a connection between the properties and weights of atoms and molecules; in one word, the vast mass of the most important chemical researches of the present day, clearly indicates the near approach of the time when chemical doctrines will submit fully and completely to the doctrine which was first announced in the Principia of Newton.

In order that the application of these principles may bear fruit it is evidently insufficient to assume that statical equilibrium reigns alone in chemical systems or chemical molecules; it is necessary to grasp the conditions of possible states of dynamical equilibria, and to apply to them kinetic principles. Numerous considerations compel us to renounce the idea of statical equilibrium in molecules, and the recent yet strongly supported appeals to dynamic principles constitute, in my opinion, the foundation of the modern teaching relating to atomicity, or the valency of the elements, which usually forms the basis of investigations into organic or carbon compounds.

This teaching has led to brilliant explanations of very many chemical relations and to cases of isomerism, or the difference in the properties of substances having the same composition. It has been so fruitful in its many applications and in the foreshadowing of remote consequences, especially respecting carbon compounds, that it is impossible to deny its claims to be ranked as a greater achievement of chemical science. Its practical application to the synthesis of many substances of the most complicated composition entering into the structure of organised bodies, and to the creation of an unlimited number of carbon compounds, among which the colours derived from coal tar stand prominently forward, surpass the synthetical powers of Nature itself. Yet this teaching, as applied to the structure of carbon compounds, is not on the face of it directly applicable to the investigation of other elements, because in examining the first it is possible to assume that the atoms of carbon have always a definite and equal number of affinities, while in the combinations of other elements this is evidently inadmissible. Thus, for example, an atom of carbon yields only one compound with four atoms of hydrogen and one with four atoms of chlorine in the molecule, while the atoms of chlorine and hydrogen unite only in the proportions of one to one. Simplicity is here evident and forms a point of departure from which it is easy to move forward with firm and secure tread. Other elements are of a different nature. Phosphorus unites with three and with five atoms of chlorine, and consequently the simplicity and sharpness of the application of structural conceptions are lost. Sulphur unites only with two atoms of hydrogen, but with oxygen it enters into higher orders of combination. The periodic relationship which exists among all the properties of the elements, such, for example, as their ability to enter into various combinations, and their atomic weights, indicate that this variation in atomicity is subject to one perfectly exact and general law, and it is only carbon and its near analogues which constitutes cases of permanently preserved atomicity. It is impossible to recognise as constant and fundamental properties of atoms, powers which, in substance, have proved to be variable. But by abandoning the idea of permanence, and of the constant saturation of affinities—that is to say, by acknowledging the possibility of free affinities—many retain a comprehension of the atomicity of the elements "under given conditions"; and on this frail foundation they build up structures composed of chemical molecules, evidently only because the conception of manifold affinities gives, at once, a simple statical method of estimating the composition of the most complicated molecules.

I shall enter neither into details, nor into the various consequences following from these views, nor into the disputes which have sprung up respecting them (and relating especially to the number of isomers possible on the assumption of free affinities), because the foundation or origin of theories of this nature suffers from the radical defect of being in opposition to dynamics. The molecule, as even Laurent expressed himself, is represented as an architectural structure, the style of which is determined by the fundamental arrangement of a few atoms, while the decorative details, which are capable of being varied by the same forces, are formed by the elements entering into the combination. It is on this account that the term "structural" is so appropriate to the contemporary views of the above order, and that the "constructors" seek to justify the tetrahedric, plane, or prismatic disposition of the atoms of carbon in benzole. It is evident that the consideration relates to the statical position of atoms and molecules and not to their kinetic relations. The atoms of the structural type are like the lifeless pieces on a chess-board; they are endowed but with the voices of living beings, and are not those living beings themselves; acting, indeed, according to laws, yet each possessed of a store of energy, which in the present state of our knowledge, must be taken into account.

In the days of Haüy, crystals were considered in the same statical and structural light, but modern crystallographers, having become more thoroughly acquainted with their physical properties and their actual formation, have abandoned the earlier views and have made their doctrines dependent on dynamics.

(*To be continued.*)

Correspondence.

EVENING CLASSES.

SIR,—I see by the report in last week's Journal that Mr. Martin intends to raise a discussion upon educational matters when the Council re-assembles in October. I am an interested party, namely, a registered student, and with your permission I should like to make a few remarks upon the Society's school.

I often wonder why the Society's laboratory, admitted to be one of the best in the world, is night after night shrouded in darkness, whilst such places as King's College, Owens College, Manchester, Finsbury Technical College, and a host of others, are ablaze with light and filled with seekers after knowledge. Many of these evening workers at the metropolitan institutions belong to the pharmaceutical fraternity. I think it will be admitted that their proper place is the Society's own school; their only fault, like my own, is that they have neither the time nor the needful to go through a full day course. I have subscribed to the Society for some years; a certain percentage of my annual subscription goes towards laboratory equipment, etc., and what do I get in return? The very great privilege of being compelled to go to outside institutions for my education, instead of the school to which I subscribe.

Granted, I have the use of the library, which I duly appreciate, and the doubtful privilege of viewing chemical specimens through three or four thicknesses of glass, giving rise in some instances to optical delusions. Reading and specimen viewing are all very well in their way, but chemists are not made by such means. We students are continually having it drummed into us by our elders, that "practice is the only way to learn;" yet practice, under the present system at the Square, is the only thing denied to us. I am sure there are many students situated as myself, who would gladly attend one or two evenings per week through the winter session if they had the chance, provided the fees were arranged on a popular basis; they might also be allowed to compete for the Society's prizes after a full course of instruction. In these days of keen competition do not let us forget that the chemist's business is essentially a trade, and a most honourable one too. Give us the means of becoming proficient in our own business, and do not let us waste our energies in striving after the "new goal" or "those high and noble principles" advocated by your correspondent signing himself "J. Wellesley Douglas."

I do not think that a window full of University diplomas and assistants wearing their hoods behind the counter would enable your correspondent to get better prices for his wares than his neighbour, who is a simple pharmaceutical chemist and a practical business man.

A REGISTERED STUDENT.

W.P.—The present Director of the Jamaica Botanical Gardens is Mr. W. Fawcett, F.L.S.

W. J. Shepperd.—(A). *Polystichum angulare.* (B). *Filix Mas. Athyrium Filix-fœmina* prefers the neighbourhood of water.

Nemo.—*Viburnum Lantana.*

G. Fox.—(1) *Verbena officinalis.* (2 and 3) *Atriplex hastata.* (4) *Chenopodium album.* (5) *Senebiera Coronopus.* Specimens belonging to the natural order Chenopodiaceæ should always be sent in fruit and with lower as well as upper leaves.

J. Pumphrey.—*Lycium barbarum*: not indigenous.

J. H. Fisher.—*Erythræa Centaurium.*

M. P. S. I.—We cannot undertake to specify which is the best among the numerous recipes for preparations for stimulating the growth of hair.

E. B. Vizer.—*Lac Fermentatum,* U. S. Nat. Form.—Cow's milk, fresh, 32 fluid ounces; yeast, semi-liquid, 60 minims; sugar, 1 troy ounce. Dissolve the sugar in the milk, contained in a strong bottle, add the yeast; cork the bottle securely and keep it at a temperature between 75° and 90° F. for six hours; then transfer it to a cold place.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Barton, Shapley, Hird, Donellan, Blair, Bennett, Thompson, Interested, Botanist, F. C. S.

THE PARIS UNIVERSAL EXHIBITION.

(*Continued from page* 105.)

The notices of the raw materials exhibited by various French colonies and other countries must necessarily be somewhat unequal. In some cases, in consequence of the impossibility of getting information concerning the articles exhibited from either labels or attendants, the description of a court will have to be limited to a brief enumeration of the vegetable and other products exhibited. In other cases it has been possible to obtain special and even voluminous information relating to the local medical use of drugs exhibited and other interesting subjects, much of which has not previously been published, and to place this on record, even in a condensed form, will occupy an apparently disproportionate space. In this part of the report the courts will be taken separately in alphabetical order, according to the names of the respective countries.

ALGERIA.—As might be supposed, this important colony sends a great variety of substances, drawn from all three kingdoms of Nature, the use of many of which will no doubt develop in the parent country, if nowhere else. Here may be seen some magnificent specimens of the "Algerian onyx" that has recently received increased attention. This beautiful stone, which is a translucent limestone containing traces of magnesia and carbonate of iron, comes from the province of Oran. It is marbled in different colours and occurs in large blocks which lend themselves to ornamental sculpture and architectural purposes. Calamine is also shown in almost all shades and in considerable abundance, as well as salt from the salines, paraffin and petroleum. Maize and "hard" or glutinous corn are also well represented, together with semola and the maccaroni and vermicelli pastes for the manufacture of which the hard corn is well adapted. Among other alimentary substances are beans of various kinds, red potatoes, sweet potatoes, tomatoes in powder, olives and olive oil, some rather small figs, dates well packed and valued at 125 francs the 100 kilograms, sugar from *Sorghum saccharatum*, red and white wines from Oran, brandy and liqueurs. There is also some fine looking "maté," or Paraguay tea (*Ilex paraguayensis*), as well as the indigenous "sanguinaire," or Arab tea. The latter appears to be largely used, not only as a diaphoretic medicine in colds and febrile attacks, but also as a beverage, one firm alone (Legout and Peyron) exporting 200 to 300 kilos per year. It consists chiefly of the flowering tops of *Paronychia argentea*, L., but those of *P. nivea*, DC., *P. capitata*, Lan., *P. longiseta* and *P. Cossoniana*, Web., are also collected. "Café nègre," from *Cassia occidentalis*, is also shown. Another product used as food by the natives occasionally is the carob or locust bean (*Ceratonia siliqua*), and these are accompanied by various oil materials, such as ricinus seeds (*Ricinus sanguineus*), ground nuts, Indian hemp seed and linseed. Among other medicinal seeds or fruits may be noticed anise, sweet fennel, dill, cummin, caraway, coriander, henbane, stramonium, stavesacre and conium. The cummin, anise and the caraway, which is like that of Mogador, are large varieties, but the coriander is not larger than the English or Dutch kind. The coriander leaves, in spite of the disagreeable odour (like that of the common bed bug) which they possess in the fresh state, are stated to be used as a substitute for parsley by the Arabs. All the above plants are cultivated in Algeria to a limited extent, but coriander more extensively than the others. One point in connection with these aromatic fruits and seeds requires notice here. It appears that the Arabs cultivate conium in Algeria and use the fruit as a sedative under the name "harmel," a name also applied to the aromatic seeds of *Peganum Harmala* (Rutaceæ). Sometimes by way of distinction the former is called "harmal-el-djezari" or "harmel d'alger," but this is not usually the case. It is doubtful if the henbane seeds are the produce of *H. niger*, which is rather a rare plant, *H. albus* being the common species. Another species, *H. Falezlez*, common in the Sahara district, evidently possesses powerful properties, being used as a poison. *Datura Stramonium* is common in Algeria, and the seeds are collected for export. Although mandragora grows in Algeria it does not appear to be collected. "Garou" (*Daphne Gnidium*) bark, which is official in the Codex, is shown in little oblong bundles about three inches in length by one to two in diameter, suspiciously like those sold in this country as the bark of *D. Mezereum*. Among other medicinal substances are thapsia root, from which the rubefacient resin is obtained; bryony root; eucalyptus, myrtle, mallow and walnut leaves; and the leaves of *Artemisia herba-alba*, which under the name of "chikh" enjoy a reputation among the natives as having tonic, aperient and vermifuge properties. The fruit of *Anagyris fœtida*, or false senna, is of interest as giving rise to as many cases of poisoning in Algeria as laburnum does in this country. Its active principle, the alkaloid anagyrine, discovered by M. Bechamp, of Montpellier, in 1867, recently formed the subject of a research by M. Gallois and Hardy (*Compt. Rend.*, cvii., 247), and Dr. Reale (*Pharm. Journ.*, [3], xviii., p. 743). *Atractylis gummifera*, known as "adad," is another toxic plant, of which the root and gummy exudation (the latter valued at 10 francs per kilo) are shown. Like anagyris, it frequently gives rise to cases of poisoning, the exudation being sold as a kind of glue. The root is also used in Morocco (*Pharm. Journ.*, [3], vi., 522), and an account of the plant may be found in the *Bull. Soc. Bot. Fr.* (vols. xiii. and xiv.). Henna, used by the natives for dyeing the nails, is also employed by the Arabs as a vulnerary, and as a remedy for leprosy. It forms an important article of commerce in Algeria. It does not appear that the essential oil of the flowers, which has a delicious odour, like that of the tea rose, is distilled in Algeria, although several essential oils are distilled in considerable quantities. Of *Eucalyptus Globulus* about 2000 kilos of volatile oil are said to be produced annually in Algeria, the leaves being only in slight demand for medicinal purposes. About 120 species of eucalyptus are cultivated in Algeria, but the essential oil of only one other species, *E. citriodora*, is shown, and it does not appear that either this or that of myrtle, which is also exhibited, is a commercial article.

The oil of wormwood shown is probably not derived from *A. Absinthium*, which is a comparatively rare plant, growing in the mountainous part of Algeria. The species commonly used appears to be *A. arborescens*, L., which is employed in medicine by the natives and is sold in all the markets. The oil is prepared by peripatetic distillers who carry their apparatus to districts where the plant is abundant. The oil of pennyroyal is largely distilled, the amount being estimated at about 2000 kilos. Oils are also distilled from *Mentha rotundifolia*, *M. aquatica*, *M. sylvestris*, and some calamints, but under what name these enter French commerce is not stated. The oils of lemon, neroli and petit grain do not form a large industry. Messrs. Chiris and Gros, of Boufarieh, state that although they turn out about 150 to 200 kilos of oil of neroli bigarade annually, the trade has been much injured by the competition with Paraguay, as that country sends over an oil under that name at a much cheaper rate, which, however, possesses more nearly the odour of petit grain. A *genuine* essence of lemon cannot be made at a marketable price, and the oils made by the cold process are therefore only used for local consumption. Orange leaves are, however, exported in considerable quantity, and orange flower water is made on a large scale. The oil of geranium is extensively distilled in Algeria, one firm alone at Boufarieh producing about 2000 kilos per annum. The plants chiefly cultivated are *Pelargonium Radula*, *P. capitatum*, Ait., and *P. roseum*, Willd. The plants afford three crops for distillation during the year.

It is somewhat surprising that this branch of industry has not been more developed, since several plants grow freely in the country which might yield valuable perfumes. Thus the ladaniferous cistuses are common; *Lavandula vera* and *Rosa gallica*, etc., grow freely; and the flowers of *Citharexylon quadrangulare*, common in streets and gardens, would lend themselves to enfleurage. *Lippia* (or *Aloysia*) *citriodora*, better known in this country as the lemon-scented verbena, is largely cultivated, one firm (Legout and Peyron) exporting 700 to 800 kilograms of the leaves annually. "Cassie" flowers (*Acacia Farnesiana*), as well as the pod and seeds, are also shown. Cassia flowers form a distinct industry, the trees being largely cultivated for the flowers, and often spring up spontaneously. As much as 20,000 kilograms of flowers are said to be used by one firm alone (Chiris and Gros) at Boufarieh.

It is interesting to notice the prices given on some of the specimens as to the market value in Algeria of some of the products used in this country. Thus pomegranate bark varies in price according to the size of the pieces and the part of the plant it is derived from, trunk bark being valued at 2 francs per kilo, branch bark 1½ francs and root bark at 60 centimes per kilo. It appears to be largely collected, Messrs. Legout and Peyron (Algiers) exporting annually from 2000 to 3000 kilos, part of which is destined for the manufacture of pelletierine. Chian turpentine ("terebinthe dit de Chio"), apparently derived from *Pistacia Terebinthus*, is valued at 20 francs the kilo, the specimen, so far as could be judged from the outside of the bottle, appearing of good quality. The Arabs use the curious long, horn-shaped galls of this tree, as well as the leaves, for tanning and to give a black dye.

Pistacia atlantica is said to yield a turpentine called "alk," and *P. Lentiscus* an oleo-resin which does not dry into mastic. An aromatic fixed oil is obtained by boiling the lentisc seeds in water; and is used as an application for rheumatism by the Arabs.

Vesicating insects are exhibited of two kinds, one being a mixture of various species of *Mylabris*, differing slightly in markings from the Chinese drug. These are valued at 20 francs the kilo. The other specimen consists of the well-known *Meloe majalis*, and is valued at 12 to 16 francs per kilo.

A fine specimen of ergot of diss (*Ampelodesmos tenax*) is shown. This is valued at 4 to 8 francs per kilo and is stated to be more active than ergot of rye (see *Pharm. Journ.*, [3], xvi., p. 684). As noticed in the report on the Paris Exhibition of 1878, many of the herbs and roots exhibited are practically substitutes for other species used in European countries. To those then mentioned may be added *Pæonia atlantica*, *Berberis hispanica* and *Glycyrrhiza brachycarpa*, used respectively as substitutes for peony root, barberry bark and liquorice root. *Santolina Chamæcyparissias* and *Santolina squarrosa* are also employed by the Arabs in place of camomile.

Other plants mentioned in the official catalogue as being used by the Arabs in medicine are:—

Peganum Harmala (Rutaceæ); used for rheumatism, purulent ophthalmic and skin diseases.

Melilotus macrocarpa, Durieu (Leguminosæ), the seeds of which are employed as an antispasmodic.

Opuntia Ficus-Indica (Cacteæ). The rasped mucilaginous stems are made into a poultice, and the flowers, which are mucilaginous and astringent, into a drink for diarrhœa.

Diotis candidissima (Compositæ), febrifuge and emmenagogue.

Marrubium vulgare; used as a febrifuge under the name "maroube," the somewhat similar name "maroute" being given to *Anthemis Cotula*.

Limoniastrum Grunovianum (Plumbaginaceæ) is used as an antiscorbutic.

Cynomorium coccineum (Balanophoreæ), employed as an astringent.

Juglans regia. The root bark is used as a dentifrice.

Ulva lactuca (Algæ), used both as a food and as a vermifuge.

Other plants employed in medicine by the Arabs, but of which the uses are not given, are *Pulicaria mauritanica*, *P. dysenterica*, *Inula viscosa*, *Calamintha officinalis* and *Teucrum Polium*, the leaves of the walnut, the seeds of *Urtica pilulifera* and the fruits of *Juniperus phœnicea*. *Juniperus oxycedrus* is said to be very abundant and much employed by the natives for preparing huile de cade.

Among the chief medicinal exports of the country pellitory and squill roots figure largely. One Algerian firm exports yearly from 500 to 600 kilos of the dried squills, of which a reddish-coloured bulb is shown. The bulb is said to sometimes attain a weight of 7 or 8 kilos. *Spergularia rubra* is exported to the extent of 300 to 400 kilos, the leaves and flowers of *Malva sylvestris* to 1000 or 1200 kilos, *Erythræa Centaurium*, sometimes mixed with *E. pulchella*, which is less bitter, to 2000 or 3000 kilos, and borage flowers still more largely, by Messrs. Legout and Peyron, of Algiers. These figures give some idea of the extent to which the trade in herbs is carried on in Algeria. Another important Algerian industry is illustrated in the exhibits of "vegetable horsehair," cellulose from the trunk and leaf of the date palm, alfé, and other paper-making materials. Cork in fine slabs is exhibited and some tobacco. (*To be continued.*)

BALSAMODENDRON BERRYI.

BY DAVID HOOPER.

Buchanan's interesting 'Journey through Mysore, Canara and Malabar' mentions (p. 8, vol. ii.) a species of myrrh about which little is known. "Many of the hedges here and in other parts of Coimbatore, are made of a thorn called *Mulukilivary*. It seems from its habit to be a *Rhus*; but not having found the fructification, I am very uncertain concerning its place in the botanical system. It makes a very good fence; cuttings three or four cubits long are put into the ground between March 12 and April 10. The ends are buried in the earth about a span, and very soon shoot out roots. From the moment it is planted it forms a fence against cattle; but seems to require a better soil than either *Euphorbium Tirucalli* or *E. Antiquorum*, which are the most common hedges here, and will grow anywhere."

The Mulukilivary in the above extract is the *Balsamodendron Berryi*, Arnot, and Coimbatore, the habitat of the plant, is a district lying to the south of the Nilgiri Hills. Hearing that a gum resin similar to the official myrrh could be obtained from this shrub, inquiry was made for samples and for information respecting it. The District Forest Officer of North Coimbatore forwarded me a sample of the gum resin in October last, and furnished the following information. The gum-resin is used here by the natives medicinally. It is not collected for commercial purposes. It may be more abundantly procurable between the months of February and July. The cost of collection would come to Rs. 4 per maund (of 25 lbs.). The District Forest Officer of South Coimbatore sent me a sample rather inferior to the first, pointing out that the exudation was not used by the natives in the district in medicine or the arts, nor was it collected for commercial purposes.

The gum-resin was in pale yellow, yellowish-brown, or brown translucent fragments, tough, and breaking with a shining conchoidal fracture. The surface had an oily appearance, and when scratched or rubbed with some hard implement showed milk-white markings. Pieces of reddish-brown bark were attached to some fragments, and others were adhering to cloth in which it had been collected. Powder was of a dirty white colour, and when rubbed up with water made a thin emulsion. The odour was oily, not fragrant. Colonel Beddome alludes, however, to an aroma given off by the plant. The taste was simply mucilaginous. It dissolves for the most part in water, leaving a few flocks of soft resin and impurities undissolved.

A selected sample of the gum-resin gave to water 84 per cent. of gum; it contained 5 per cent. of moisture and 6·6 per cent. of mineral matter. The gum was gelatinized by ferric chloride, and like that from true myrrh, was not precipitated by neutral plumbic acetate. The resin was soft, transparent, tasteless, odourless and neutral in reaction. It was soluble in alcohol, ether, bisulphide of carbon and chloroform. The solution in alcohol was not coloured by ferric chloride, and gave a right-handed rotation when examined with polarized light. The resin moistened with alcohol gave no colour with concentrated nitric or hydrochloric acid, and no violet liquid was obtained when bromine was added to its solution in carbon bisulphide. The resin separated by alcohol and evaporated was exposed to the heat of a water-bath for a week and remained soft and tenacious; after this it was exposed to the air for about two months, but its consistence was not altered, and when examined under the microscope was seen to be perfectly amorphous.

The myrrh from the *Mulukilivary* is evidently distinct from the true myrrh, Arabian myrrh and *Bissa Bol*. Its freedom from bitterness and fragrance would render it unfit as a substitute for the genuine drug and useless as a medicinal agent. It gives off no odour when burnt, and is therefore unsuitable as an ingredient in incense. It forms a good adhesive mucilage, and might be used as a convenient addition to some kinds of confectionery. An allied species of myrrh yielding a similar exudation is the *Balsamodendron pubescens*, growing in Beluchistan, and remarkable for the large proportion of gum in the gum resin.

THE PRESERVATION OF RHUBARB FROM INSECTS.

BY J. CH. SAWER, F.L.S., AND A. R. FERGUSON.

One of the queries propounded by the Committee of the American Pharmaceutical Association in 1874 was concerning the nature and identity of the insect which attacks rhubarb root, and Mr. Saunders, of Ontario, undertook to answer it.* At the annual meeting of that Society in 1875, Mr. Saunders was unable to reply, and requested the matter to be deferred for another year. Subsequent reports of the proceedings of the Association make no further mention of it.

The investigation now detailed was made at the request of a London drug broker, who furnished us with samples of the root containing the live insect; the object of the inquiry not being to identify the insect by name, but to ascertain the conditions of its life and the best method of exterminating it without damaging the drug.

The sample consisted of lumps which must have been originally of fine quality. These lumps, after being sawn in halves, were divided into several parcels for experiment, one piece being kept separately apart in a glass jar as original, for comparison. The interior of the lumps was found to be completely honeycombed by the insect, which was the caterpillar of a small greyish-white moth, commonly found in drug rooms where rhubarb is stored in bulk. The holes, or workings, were partly clogged up with a brown pulverulent mass which proved to be the excreta of the insect. The worms were of one-eighth to three-eighths of an inch in length, of a yellow or pale pinkish-brown colour. Examination under the microscope revealed a number of dark markings or spots of a black colour along the body, slightly elevated, with hairs springing from the centre of each spot. Apparently there were five pairs of legs, with hairy projections at the joints and claws at the end. The head consisted of two chocolate-coloured lobes, with legs at each side, and two inner claws or pincers. Two wedge-shaped black marks were observed at the back of the head.

Experiment I.—To estimate the loss of weight, if any, which the root undergoes by being placed in a vacuum :—

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* 'Proceedings of American Pharmaceutical Association,' 1875, p. 571, and 1876, p. 818.

Weight of sample before exhaustion,	6·2525	grams
„ „ after „	6·2520	„

Experiment II.—To ascertain the effect, if any, which a vacuum has on the caterpillar in the root. —A small piece, weighing 6·23 grams, was thoroughly exhausted of air by means of an aspirator water-pump; a caterpillar came out of a hole in the root and crawled over the surface for a little distance. The vacuum was maintained for thirty minutes, during which, although the insect was sluggish in its movements, no sign of its giving way to the vacuum was apparent. A tall glass cylinder was then filled with carbon monoxide gas, and this gas was admitted to the exhausted receiver in which the insect was placed. After being allowed to inhale this gas for forty-five minutes it was removed and at once placed in a small glass jar, firmly closed, and set aside for ten days on a shelf in the laboratory for observation. At the end of this time the jar was opened, and slightly warmed. The insect appeared as if nothing whatever was wrong; beyond a slight darkening in the colour of its body no change could be observed. The effect on the root of this treatment was to make it not so hard as the fresh root, more easily broken between the fingers, and of not so fresh and strong an odour; it was more easily cut with a knife than root which had not been acted on, and had altogether a more spongy feel.

Experiment III.—To ascertain the effects of heat on a piece of the root and the caterpillar.—A small lump, with an insect upon it, was placed in a test-tube closed with a cork, through which a thermometer was inserted, also a piece of glass tube to allow of the escape of the heated air. The result was that at 45° C. the insect was twisting about, and at 80° C. was dead. Its body was shrivelled up by this treatment.

Experiment IV.—Placed an insect and a piece of root in a hot-water oven, temperature 90° C. At moment of introduction insect was lying torpid—

Fifteen seconds afterwards it was lively.

Thirty seconds afterwards it was quiescent, passive.

One minute afterwards it was still alive, but very feeble.

Two minutes afterwards it was quite dead.

Three minutes afterwards its body curled up, split and shrivelled.

Determination of loss of weight or moisture by heating in hot-water oven at 90° C. :—

Original weight of sample . .	8·103	grams
Weight after 10 min. exposure .	7·958	„
„ 20 „ .	7·820	„
„ 35 „ .	7·620	„
„ 45 „ .	7·542	„
„ 60 „ .	7·439	„

Another sample, weighing 5·815 grams, was exposed for ten minutes and then weighed 5·695 grams; this was then left exposed in an open glass capsule on a shelf (the day being moist and damp).

After 10 minutes it weighed .	5·700	grams
„ 25 „ „ .	5·702	„
„ 35 „ „ .	5·710	„

This sample being left exposed to the air till the next day weighed 5·900 grams, thus gaining by moisture ·085 gram on its original weight, proving its power of absorption. After being thus heated for ten minutes the colour remained normal and the odour as usual and of same intensity, but it was not quite so hard as originally. This exposure of ten minutes may be excessive, as the insect was proved to die in two minutes at a temperature of 90° C., and in experiment III. was dead at 80° C.

Experiment V.—With pyrethrum.—A lump of the root with an insect upon it was placed in a small glass beaker and pyrethrum (or insect powder) sprinkled over it until completely covered. After twenty-five minutes contact the insect was active, and did not seem in any way inconvenienced.

Experiment VI.—Fumigation with sulphur dioxide gas.—A lump of the root with an insect was placed in a small glass jar, through which a current of SO_2 was caused to pass from a generator. The insect being forced to admit this gas by the air-tubes along its body was unable to sustain its suffocating effects ; it was observed to writhe and twist about in evident pain, and in ten minutes was quite dead.

A piece of the root alone was then submitted to a much longer exposure to a current of the gas, with the result that it did not appear to be injured in any way whatever. Its texture remained perfect ; the sponginess which was noticed in a previous experiment was entirely absent ; the yellow colour of the exterior and pale pink colour of the interior were unaltered. Not the slightest difference could be observed when compared with a fresh piece of root except the odour of the sulphur dioxide gas, and this disappeared totally after one hour of exposure to the free air.

Process suggested for manipulating the rhubarb on a large scale :—As a result of these experiments it would appear that a combination of the heating process and the suffocating process is preferable, because, if the gas were applied to the root in its normal state the moisture contained in it would absorb a large volume of the gas and might tend to bleach it. Also, if any of the insects existed in the state of eggs, the gas alone might not destroy them. To combine the two processes the root might first be placed in a jacketed iron chamber heated by water to a temperature of 80° or 90° C. for five to ten minutes ; the root then immediately placed in a tall wooden cylo or narrow upright case with a moveable bottom, and the gas evolved from a pan of burning sulphur blown through it from beneath by means of a revolving fan—the gas escaping from the top into a tall chimney. After about fifteen or twenty minutes of this treatment, the ignited sulphur to be removed, and a blast of ordinary air to be forced through by the fan for about an hour. The root could then be emptied out by removing the bottom of the cylo, and be packed into cases as usual ; or, for further security into zinc-lined cases and soldered down, as the danger of fresh infection would lie in the chance of moths from other parcels depositing their eggs therein. Of course the degree of heat applied and the actual time of exposure both to heat and to the gas, in working on a large scale, would have to be determined by experiment, so as not to risk softening or bleaching the roots. Also the time of year for making the operation should be considered. Probably the best time would be when the egg first hatches, as the tenure of its life might then be more feeble.

OIL OF CAMPHOR.*

BY HENRY TRIMBLE AND HERMANN J. M. SCHRŒTER.

From the literature of camphor oil we find that no two investigators have obtained the same or even similar results. The physical descriptions of the oil are so different as to lead one inevitably to the conclusion that the commercial oil is a variable article. With this idea in mind we collected eight samples from different sources in Philadelphia and New York, and first made a preliminary examination of them with the following results:—

No I. was obtained of Mr. Samuel F. Simes of Philadelphia, who assured us that this sample correctly represented the crude oil from Japan. It had a reddish-brown colour, a specific gravity of 0·9632 at 16° C., and a boiling point of 180° C. The odour strongly resembled that of camphor and sassafras.

No. II. from Fritzsche Brothers, New York, was of a darker brown colour, much darker than No. I. It had a specific gravity of 0·9819 at 16° C., boiling point of 180° C., and an odour of camphor and sassafras.

No. III. was likewise from Fritzsche Brothers, and was marked "German." It had a sp. gr. of 0·8877 at 16° C., and a boiling point of 170° C. It was colourless, with terebinthinate and mild camphor odour.

No. IV. from a wholesale drug firm of Philadelphia was probably the same as No. III., as its boiling point was the same, its sp. gr. 0·8863 at 16° C., and its other physical properties identical.

No. V. from a dealer in New York was no doubt the same as III. and IV., as it only differed by having the sp. gr. of 0·8803 at 16° C.

No. VI. from a New York importing firm, marked "rectified," had a sp. gr. of 1·006 at 16° C., and boiled at 210° C. Its colour was a light yellow, and odour that of sassafras and slightly camphoraceous.

No. VII. from wholesale druggists of Philadelphia was similar to No. VI., with a sp. gr. of 0·9903, boiling point of 206° C., and somewhat darker colour.

No. VIII., also from a wholesale drug firm of Philadelphia, was dark reddish-brown, with an empyreumatic and camphoraceous odour, a sp. gr. of 0·9546 at 16° C., and a boiling point of 198° C.

They all had an acid reaction; all were miscible in all proportions with 95 per cent. alcohol.

As I. and II. appeared to represent the crude product, they were taken for analysis. No. I. we were able to get in considerable quantity, and in most of the following work it was used.

The remaining samples were submitted to fractional distillation *in vacuo*, and samples III., IV. and V. were found to contain from 1–3 per cent. of camphor in solution in the light fractions of camphor oil. Samples VI. and VII. consisted of the intermediate portions of the commercial oil, the lowest and highest boiling fractions being entirely absent. Sample VIII. contained all the fractions, the lightest in smaller quantity, but it was quite empyreumatic, and yielded a considerable quantity of a solid residue at 235° C. Each sample was submitted to the action of polarized light, I., II. and VIII. being first decolorized with animal charcoal. The following readings were obtained with the 200 mm. tube in a Wild polaristrobometer:—

1.	+ 49°.
2.	+ 32·6°.
3.	+ 61°.
4.	+ 62·2°.
5.	+ 62·2°
6.	+ 28·6°.
7.	+ 38·2°.
8.	+ 1°.

The following results, it will now be understood, apply to sample No. I. An alcoholic solution of ferric chloride produced no change when mixed with the oil, and negative results were likewise obtained with saturated solution of sodium bisulphite and with alcoholic ammonium sulphide. Alcohol and fixed oils were found to be absent from the sample.

On agitating the oil with water the latter absorbed the acidity, which was found by appropriate tests to be due to acetic and formic acids. The same portion of oil, after agitation with water, was boiled for some hours with an aqueous solution of potassium hydrate in a flask attached to an inverted condenser. The resulting potassium compound, decomposed by a mineral acid, separated into two layers. The aqueous layer was distilled, and in the distillate butyric acid was found, besides acetic and formic acids as above.

Three litres of the oil were fractionated *in vacuo*, and the distillate collected in four portions as follows:—

Per cent.		In vacuo.	Ord. pres.
1.—20	obtained between	90°–110° C.,	or 180°–200° C.
2.—35	„ „	110°–120° C.,	„ 200°–210° C.
3.—25	„ „	120°–130° C.,	„ 210°–220° C.
4.—20	„ „	130°–150° C.,	„ 220°–240° C.

A small amount of resinous residue remained. A quantity of the oil was also distilled at ordinary pressure, but this method resulted in decreasing the amount of the higher boiling fractions and rendering them more empyreumatic. It was found, however, after the original oil was once fractioned, that the lightest portions could with advantage be distilled at ordinary pressure, but those of higher boiling points decomposed, and the use of vacuum was continued with them through all the rectifications. By redistilling the above four fractions, the lightest ones over sodium, until nearly constant boiling points were obtained, the following fractions resulted:

Fraction.	Boiling point.
A.—145°–155° C.	
B.—158°–161° C.	159°
C.—161°–167° C.	
D.—167°–169° C.	168°
E.—170°–171° C.	171°
F.—171°–175° C.	
G.—175°–177° C.	176°
H.—177°–180° C.	
J.—180°–182° C.	180°
K.—182°–202° C.	
L.—202°–206° C.	204°
M.—206°–212° C.	
N.—212°–214° C.	213°
O.—214°–230° C.	
P.—230°–235° C.	232°
Q.—235°–245° C.	
R.—245°–248° C.	247°
S.—250°–280° C.	Green oil.

It had better be explained that the fractions P, Q, R and S were not the result of fractional distillation alone, but were obtained by treatment to be hereafter explained from fresh portions of the oil. Only those fractions having constant boiling points were examined. All the polariscope readings were made in the 200 mm. tube, confirmed by the use of the 100 mm. tube. The vapour densities were made with the Victor Meyer apparatus. The combustions were carried out in an open tube with cupric oxide and a stream of oxygen. Over ninety combustions were made during the progress of the work, which has been carried on uninterruptedly since last December.

Fraction A. 145–155° C.—This fraction was found only in small quantity, having strong terebinthinate odour, of sp. gr. 0·8593 at 16° C., and dextro-rotary = + 53°. It was submitted to combustion with following results:—

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* Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 52. Read at the Pharmaceutical Meeting, May 21. From the *American Journal of Pharmacy*, June.

I. 0·100 gm. substance yielded 0·3235 gm. CO_2 and 0·106 gm. H_2O.

II. 0·141 gm. substance yielded 0·453 gm. CO_2 and 0·146 gm. H_2O.

Calculated for $C_{10}H_{16}$.		Found.	
		I.	II.
C . . .	88·23	88·22	87·62
H . . .	11·77	11·77	11·51
	100·00	99·99	99·13

Vapour Density:—

I. 0·1152 gm. sub. vaporized replaced 21 cc. air = 4·70.
II. 0·1012 „ „ „ „ 18·1 cc. „ = 4·73.
Calculated for $C_{10}HC_{6}$ = 4·71.

Fraction B. 158–161° C., *b. p.* 159° C.—This fraction of constant boiling possessed fragrant and terebinthinate odour, of sp. gr. 0·8616 at 16° C., and dextrorotary = + 54°.

Combustions as follows:—

I. 0·109 gm. subst. yielded 0·350 gm. CO_2 and 0·114 gm. H_2O.

II. 0·111 gm. subst. yielded 0·358 gm. CO_2 and 0·1175 gm. H_2O.

Calculated for $C_{10}H_{16}$.		Found.	
		I.	II.
C . . .	88·23	87·57	87·96
H . . .	11·77	11·62	11·76
	100·00	99·19	99·72

Vapour density:—

I. 0·1168 gm. subst. replaced 21 c.c. air = 4·76.
II. 0·1050 „ „ „ 18·7 c.c. air = 4·67.
Calculated for $C_{10}H_{16}$ = 4·71.

Fraction D. 167–169°, *b. p.* 168° C.—In somewhat larger quantity than Fraction B, of fragrant odour, colourless, sp. gr. 0·8678 at 16° C., and dextrorotary = + 56·9°.

Combustions as follows gave results for a hydrocarbon:—

I. 0·1185 gm. yielded 0·381 gm. CO_2 and 0·124 gm. H_2O.

II. 0·129 gm. yielded 0·415 gm. CO_2 and 0·1355 gm. H_2O.

Calculated for $C_{10}H_{16}$.		Found.	
		I.	II.
C . . .	88·23	87·68	87·74
H . . .	11·77	11·63	11·67
	100·00	99·31	99·41

Vapour density:—

I. 0·155 gm. subst. replaced 28 c.c. air = 4·72.
II. 0·172 „ „ „ 31·3 c.c. air = 4·68.
Calculated for $C_{10}H_{16}$ = 4·71.

Fraction E. 170–171° C., *b. p.* 171° C.—Of this fraction only a small quantity could be separated, but it consisted of a distinct fraction, with constant boiling point of 171° C. The specific gravity was found to be 0·8737 at 16° C., colourless, fragrant odour and dextrorotary = + 584°.

Combustions gave results as follows:—

I. 0·116 gm. subst. yielded 0·3745 gm. CO_2 and 0·1221 gm. H_2O.

II. 0·1341 gm. subst. yielded 0·4315 gm. CO_2 and 0·1409 gm. H_2O.

Calculated for $C_{10}H_{16}$.		Found.	
		I.	II.
C . . .	88·23	88·05	87·76
H . . .	11·77	11·69	11·67
	100·00	99·74	99·43

Vapour density:—

I. 0·1155 gm. subst. replaced 21 c.c. air = 4·67.
II. 0·1231 „ „ „ 22·5 c.c. air = 4·65.
Calculated for $C_{10}H_{16}$ = 4·71.

Fraction G. 175–177° C., *b. p.* 176° C.—This fraction was separated without much difficulty in large quantity and very constant. It was colourless, strong pleasant odour, resembling cajeput, of sp. gr. 0·8824 at 16° C., and strongly dextro-rotary = + 62·4°.

The following combustions and vapour densities give it the formula $C_{10}H_{18}O$:—

I. 0·1635 gm. subst. yielded 0·467 gm. CO_2 and 0·168 gm. H_2O.

II. 0·1684 gm. subst. yielded 0·4813 gm. CO_2 and 0·1733 gm. H_2O.

Calculated for $C_{10}H_{18}$.		Found.	
		I.	II.
C . . .	77·92	77·89	77·94
H . . .	11·69	11·42	11·44
O . . .	10·39	10·69	10 62
	100·00	100·00	100·00

Vapour density:—

I. 0·164 gm. subst. replaced 26·4 c.c. air = 5·28.
II. 0·1724 „ „ „ 27·4 c.c. air = 5·35.
Calculated $C_{10}H_{18}O$ = 5·33.

Fraction J. 180–182°, *b. p.* 180° C.—Fraction of oil boiling between 185–200° C., on repeated distillation over sodium, gave a small portion of quite constant boiling point, which was with much difficulty obtained quite pure. It had a fragrant odour, was colourless, with sp. gr. 0·8933 at 16° C., and of strong dextrorotary power = 64·8 C.

Combustions gave results as follows:—

1.—0·1400 gm. subst. yielded 0·4481 gm. CO_2 and 0·147 gm. H_2O.

II.—0·1475 gm. subst. yielded 0·4740 gm. CO_2 and 0·1540 gm. H_2O.

Calculated for $C_{10}H_{16}$.		Found.	
		I.	II.
C . . .	88·23	87·29	87·64
H. . . .	11·77	11·67	11·60
	100·00	98·96	99·24

Vapour density:—

I.—0·1434 gm. subst. replaced 25·5 c.c. air = 4·80.
II.—0·1282 „ „ „ 22·9 c.c. air = 4·78.
Calculated for $C_{10}H_{16}$ = 4·71.

Fraction L. 202–206° C., *b. p.* 204° C.—Between 200°–208° C., on repeated distillation, solid camphor separated, which formed in the receiver a semifluid mass. On separating the fluid portion and drying the crystals, they gave on analysis results for camphor. An alcoholic solution was found to possess dextrorotary power.

Results of combustion:—

I.—0·1975 gm. subst. yielded 0-5716 gm. CO_2 and 0·1930 gm. H_2O.

II.—0·205 gm. subst. yielded 0·590 gm. CO_2 and 0·1940 gm. H_2O.

Calculated for $C_{10}H_{16}O$.		Found.	
		I.	II.
C . . .	78·94	78·93	78·49
H . . .	10·53	10·85	10·51
O . . .	10·53	10·22	11·00
	100·00	100·00	100·00

Vapour density:—

1. 0·083 gm. subst. replaced 13·5 c.c. air = 5·28.
II. 0·115 „ „ „ 18·9 c.c. air = 5·23.
Calculated for $C_{10}H_{16}O$ = 5·26.

Fraction N. 212-214° C., *b. p.* 213° C.—The portion boiling at 208-220° C., on rectification, gave a fraction boiling at 212-214° C. Before it was rectified it was placed in a freezing mixture, the separated camphor removed, and on redistilling more camphor separated out in the receiver. This was the case invariably on redistilling the oil after the camphor had been removed. On separating the camphor as near as possible by the use of a freezing mixture, the fraction boiling at 212-214° C. gave the following results, corresponding to the formula $C_{10}H_{18}O_2$.

It was colourless, of mild camphor odour, sp. gr. 0·9802 at 16° C., and dextro-rotary = +53·4°.

Combustions:—

I. 0·1830 gm. subst. gave 0·4750 gm. CO_2 and 0·1717 gm. H_2O.

II. 0·1935 gm. subst. gave 0·5010 gm. CO_2 and 0·1840 gm. H_2O.

Calculated for $C_{10}H_{18}O_2$.		Found.	
		I.	II.
C . . .	70·59	70·78	70·61
H . . .	10·59	10·43	10·56
O . . .	18·82	18·79	18·83
	100·00	100·00	100·00

Vapour density:—

I. 0·1620 gm. subst. replaced 23·5 c.c. air = 5·92·
II. 0·1540 „ „ „ 22·5 c.c. air = 5·88.
Calculated for $C_{10}H_{18}O_2$ = 5·89.

Fraction P. 230-235° C., *b. p.* 232° C.

It was with great difficulty that a compound with constant boiling point was obtained, and when obtained, it was found still to exert a perceptible action on polarized light. As by simple fractionation the desired result could not be obtained, several litres were treated with an aqueous solution of potassium hydrate, and the light portion distilled off in a vacuum. From that remaining in the still, the aqueous solution of potassium hydrate was separated, and the oil distilled in vacuo. That portion which would have distilled at the ordinary pressure of 230°-250° C., was collected, and on repeated rectification at ordinary pressure, a fraction boiling between 230°-235° was obtained. It had the physical and chemical properties of safrol. It was colourless, highly refractive, with the characteristic sassafras odour, of sp. gr. 1·101 at 16° C., and almost inactive on polarized light = +1·8°.

Results of combustions as follows:—

I.—0·1862 gm. subst. yielded 0·507 gm. CO_2 and 0·1050 gm. H_2O.

II.—0·1921 gm. subst. yielded 0·5192 gm. CO_2 and 0·1130 gm. H_2O.

Calculated for $C_{10}H_{10}O_2$.		Found.	
		I.	II.
C . . .	74·07	74·26	73·71
H . . .	6·17	6·26	6·53
O . . .	19·76	19·48	19·76
	100·00	100·00	100·00

Vapour density:—

I.—0·1823 gm. subst. replaced 28 c.c. air = 5·59.
II.—0·1670 „ „ „ 25·8 c.c. „ = 5·56.
Calculated for $C_{10}H_{10}O_2$ = 5·61.

Fraction R. 245°-248° C., *b. p.* 247° C.

Three litres of the oil were treated with aqueous solution of moderately strong potassium hydrate, and subjected to distillation *in vacuo*, until the lighter boiling fractions were removed. The aqueous solution containing the eugenate of potassium was separated and decomposed by a mineral acid. The separated, dark, oily layer collected, dried and rectified *in vacuo*, gave a product with a boiling point at the ordinary pressure of 247° C. It had a yellowish colour, becoming darker on exposure to light, was strongly refractive, with a decided odour of cloves and a sharp burning taste.

It had a specific gravity of 1·057 at 16° C., and was almost inactive on polarized light = +1·4°.

Results of analysis gave the formula $C_{10}H_{12}O_2$.

I.—0·2258 gm. subst. gave 0·607 gm. CO_2 and 0·1475 gm. H_2O.

II.—0·1788 gm. subst. gave 0·4805 gm. CO_2 and 0·120 gm. H_2O.

Calculated for $C_{10}H_{12}O_2$.		Found.	
		I.	II.
C. . . .	73·17	73·31	73·29
H. . . .	7·32	7·26	7·45
O. . . .	19·51	19·43	19·26
	100·00	100·00	100·00

Vapour density:—

I.—0·2135 gm. subst. replaced 32 c.c. air = 5·74.
II.—0·1820 „ „ „ 27·2 „ „ = 5·76.
Calculated for $C_{10}H_{12}O_2$ = 5·68.

Fraction S. 250–280° C.—The treatment of the oil with potassium hydrate gave a larger quantity of this high boiling fraction than the direct distillation of the oil. It had a bluish green colour, which with No. I. oil was not permanent, but changed on several days standing to violet, afterwards to pink and then to light brown. The same fraction from No. II. oil was darker coloured and has not faded as yet. A three per cent. solution of the fraction boiling at 260° to 280° C., in glacial acetic acid, gave a fine violet colour on the addition of a few drops of concentrated sulphuric acid. According to Wallack this would indicate a sesquiterpene. The quantity, however, was too small to determine whether it was a definite compound or not.

From the above results we conclude that the following distinct and definite compounds exist in the sample, with a close approximation of the quantity of each:—

		Boiling point.	Per cent.	Formulæ.
(1)	From 145°–155° C.	150°	0·40	$C_{10}H_{16}$.
(2)	„ 158°–161° C.	159°	12·00	$C_{10}H_{16}$.
(3)	„ 167°–169° C.	168°	13·00	$C_{10}H_{16}$.
(4)	„ 170°–171° C.	171°	5·00	$C_{10}H_{16}$.
(5)	„ 175°–177° C.	176°	15·00	$C_{10}H_{18}O$.
(6)	„ 180°–182° C.	180°	4·00	$C_{10}H_{16}$.
(7)	„ 202°–206° C.	204°	10·00	$C_{10}H_{16}O$.
(8)	„ 212°–214° C.	213°	30·00	$C_{10}H_{18}O_2$.
(9)	„ 230°–235° C.	232°	7·00	$C_{10}H_{10}O_2$.
(10)	„ 245°–248° C.	247°	2·00	$C_{10}H_{12}O_2$.
(11)	„ 250°–280° C.	—	1·60	Green oil.

We do not consider that the above lighter fractions have been so satisfactorily identified, as to warrant naming them. The others have already been named by previous investigators, and were fully identified by us. It is possible that (6) consists of dipentene, since Wallach discovered considerable quantities of it in the camphor oil. (5) may be cineol, but we have been unable to get all the reactions necessary for its identification. The odour, however, is characteristic and strongly points to the possibility of cineol being present, but the polarization is decidedly different from that obtained from wormseed oil, which is inactive. Recently there has appeared a statement of the composition of camphor oil by Schimmel and Co.[*]

Our work, however, was nearly completed, as far as now published, when the above pamphlet was issued. The results in part agree, and we can only say that probably they are as similar as might be expected from different investigators on different samples of such a varied substance as this oil appears to be.

Another important paper on the composition of camphor oil was published in 1885, by Yoshida,[†] who found it to consist of terebinthene, citrene, camphor and camphorogenol. Had we used a sample of oil No. VI. for the basis of our work the results would probably have approached his. He in turn failed to find in his sample the compound noted by Oishi,[‡] who, in addition to camphor, found a hydrocarbon of the composition $C_{12}H_{20}$. We cannot but conclude that these two gentlemen experimented on the true oil, since they carried on their investigations near its source. Since it has become known that the high boiling fractions of the oil are so valuable, it will be safe to conclude that the colourless rectified oils of low specific gravity do not contain all the compounds which naturally belong in this complex substance.

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[*] *Berichte* von Schimmel and Co., Leipzig, April, 1889. See *Pharm. Journ.*, April 6, 1889, p. 804.

[†] *Journ. Chem. Soc.*, 47, 779.

[‡] *Journ. Soc. Chem. Industry*, 2, 353.

CHINESE METHOD OF PREPARING EXTRACT OF OPIUM.*

BY JOHN CALVERT.

Some years ago I had an excellent opportunity of observing the process of manufacturing this extract, as followed by the Chinese experts, who prepare the domestic article from Turkey opium in San Francisco. The details of the process are kept as a profound secret by them and their employers, the wealthy Chinese merchants, but owing to exceptional circumstances I was enabled to study the subject and become thoroughly conversant with every point. And I may as well state before proceeding further, that I am betraying no confidences, and I paid dearly for the information which I am about to place before you. I do not think that even now I should have been inclined to expose the details of a process which has a considerable commercial value, except for the reason that this occasion is a remarkable one in the history of American pharmacy.

I need not tell you how to prepare extract of opium. It is merely an aqueous infusion evaporated on a water-bath to a pilular consistence. An addition of 5 per cent. of glycerin is ordered in the last edition of the United States Pharmacopœia.

The Chinaman proceeds otherwise. His apparatus consists of two charcoal burning fire-clay furnaces, about fifteen inches high and of about the same width, open on three sides; some palm leaf or other cheap fans, for fanning himself and the fire; several brass pans, such as are here shown; a brass ladle and several tin ones; a large spoon for skimming; a gridiron; two pair of pincers for lifting the pans, and some thick woollen cloths to protect the hands; some fibre brushes, several buckets, basket strainers, muslin for straining, fibrous material for drawing off the liquor; some heavy sticks to be used as pestles; several spatulas about a foot long and three inches wide at lower end, and made of oak or ash, and a steel-bladed scraper.

One or two low stools complete the arrangements. The operator does not require any tables or benches, as all the work is done on or near the ground. The operation requires two days, but after the first day the two days' work goes on regularly, and a batch of extract is turned out by the same workman every evening.

The quantity of opium operated upon, so that a workman can do a fair day's work, is usually about 16 or 18 pounds. The balls are placed in tepid water, to soften the surface, and they are washed by hand to remove grit, leaves, and other foreign substances.

The material is then placed in one of the shallow concave brass pans, which is kept gently heated over the naked charcoal fire, and by means of the wooden pestle is kneaded into a soft paste. When homogeneous, the softened opium is uniformly spread over the inner surface of the pan, and patted down by the hand, so as to give it a smooth surface. The heat is continued until a greater part of the moisture has evaporated, and the opium has become so solid that the pan can be turned over. The direct heat of a very small fire is now allowed to act directly on the face of the opium by turning the pan upside down. This has to be carefully and skilfully done. As soon as the surface of the material has become sufficiently hardened it is deftly removed in thin layers, and this is continued until all the opium has been taken from the pan, except the dried portion, which remains attached to the bottom and sides of the vessel. This is scraped off.

The gridiron now comes into play. The crusts which were laid aside in the former operation are now put on the gridiron a few at a time, with the greatest care, to avoid breaking them, and are toasted over the charcoal at a low temperature until they have become perfectly crisp. The crusts are then placed in one of the brass pans, covered with warm water, and left standing until the next morning.

On resuming work the infusion is drawn off into buckets through baskets lined with muslin strainers.

The brass pan is slightly tilted, and by means of a knot of vegetable fibre the liquor is drawn off over the edge of the pan without loss. The roasted opium is drained, and a second quantity of warm water added, with as little breakage of the crust as possible, and the extraction is finished with a third lot of water. Only the first and second infusions are used for the extract: the washings and weak infusion are employed for the extraction of the next batch. There seems to be no precise rule as to the quantity of water for making the infusion—the crusts are merely covered.

The infusion is then mixed with some egg albumen, and a part of it is placed in the largest of the brass pans over the naked charcoal fire, and is heated, skimmed, and boiled constantly. The pan is not filled, but room is allowed for frothing, and fresh portions of warm infusion containing albumen are added from time to time as the bulk diminishes. During the boiling there are several matters to be attended to, such as keeping up the fire, or banking it up with ashes if too hot, prevention of boiling over by addition of small quantities of the infusion, or of water, and keeping the sides of the pan free from hardened extract. This is effected by water and the fibre scrubbing brushes. When all the infusion has been added, and the evaporation has proceeded as far as is considered to be necessary, the pan is removed from the fire, and the extract constantly stirred by means of a wooden spatula in a current of air produced by fanning until cool and uniformly mixed.

The yield of extract varies according to the kind and quality of opium, but I have not observed any very remarkable difference between the results of this and those of the ordinary pharmaceutical methods. Eighteen pounds of first quality Turkey opium generally yields about 10 pounds of this extract.

The greatest watchfulness is exercised over the roasting or toasting part of the process. Although a small exposed corner of the crusts may become charred occasionally, the object of this operation is to expose the opium to such a heat only as to render it porous, to do away with the quality of stickiness, which is said by some authors to be produced by an easily decomposed caoutchouc-like substance, and to allow the aqueous extractive matter to ooze out of the material without stirring.

Notwithstanding the constant repetition of cautions in all the text-books, dispensatories, and other pharmaceutical literature respecting the care to be observed about subjecting opium to heat, I do not find that there is any appreciable difference in the yield of morphia when opium has gone through this barbarous process.

Whatever changes may take place among the other proximate constituents is not known, but I am quite satisfied as to the fact that the natural morphia salts, protected by extractive, are not decomposed, or only to a very small extent, by such a heat as is necessary for the desired alteration of the valueless or inert matters contained in opium.

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* Read before the American Pharmaceutical Association at San Francisco. From the *National Druggist*. July 15.

The Pharmaceutical Journal.

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CINCHONA AND QUININE PRODUCTION IN INDIA.

IN a blue book just issued, giving various statistics to exhibit the material progress and condition of India during the year 1887-88, the section devoted to agriculture contains some information respecting cinchona cultivation and its results. It appears that the area then under cinchona in the Government plantations of the Darjeeling district in Bengal was 2208 acres, on which were growing 4,851,000 cinchona trees in permanent plantations. It is stated that more than one-half of these trees belonged to the calisaya or quinine yielding variety, and during the year 424,000 trees of this variety were planted out. The proportion of succirubra trees is also stated to be more than one-half of the above number, so that there is evidently some inaccuracy in one or other of these statements. The number of succirubra trees uprooted for their bark was 375,000. The total crop of bark obtained was 290,000 lbs. in a dry state. The whole of that supply, with the exception of 855 lbs., was made over to the factory, which manufactured from it 331 lbs. of quinine sulphate and 6916 lbs. of cinchona febrifuge. Taking the yield of quinine sulphate from succirubra bark at 1·5 per cent., the quantity consumed for producing the quantity above mentioned would be 22,066 lbs., leaving 267,079 lbs. for the cinchona febrifuge, the yield of which would thus amount to about 2·5 per cent. of the bark used. That would be but a poor yield for good succirubra bark, and if it represents the actual contents of alkaloid, the bark must have been of poor average quality. The cost of the plantations is stated to have been 76,700 rupees, but that was irrespective of interest on capital. The money yield of the factory at the rate of 14 rupees per pound for febrifuge and 20½ rupees per pound for quinine was during the year 137,510 rupees on the products issued to the Government department and to the public; but some part of that supply appears to have been drawn from the produce of the previous year, since it was larger than the total quantity of products manufactured, while there was also at the end of the year a stock of bark, more than half calisaya, amounting to 296,000 lbs. It is difficult, therefore, in the absence of further data to arrive at any estimate of the actual relation of the cost of production and return realised.

Mention is made of a new method of manufacturing quinine by steeping the powdered bark in cold oil as having been perfected during the year, and it is said to yield a "particularly good quinine," but no data are given by means of which an idea can be arrived at as to the cost of this method and its efficiency for the extraction of the alkaloid from the bark. It may, however, be pointed out that the price above quoted for quinine sulphate of 20½ rupees per pound would make the quinine about double the price that this article has been sold for in England and America during the last few months. That also is taking the rupee as being equal to only one shilling and sixpence, and so far there does not appear to be any great advantage in the production of quinine sulphate in India.

The area under cinchona in the Government plantations of the Nilgiri district in Madras is stated to be 908 acres, on which were growing 1,740,000 cinchona trees in permanent plantations. This is a smaller number by 198,000 than was returned in the report of the previous year, as part of one plantation had been abandoned and the trees uprooted. The crop for the year amounted to 93,000 lbs. of dry bark, of which 7000 lbs. was issued and the remainder stored, making the total quantity in stock at the end of the year 251,000 lbs. It is the intention to convert this bark into quinine sulphate and cinchona febrifuge, on the plan that has been adopted in the Bengal plantations, and buildings with machinery for that purpose are being erected. The outlay on the plantations during the year is stated to have been 72,160 rupees, but in respect to return, it is merely stated that the 7000 lbs. of bark issued was valued at 1200 rupees. Here again there are no data for any estimate of the relation between cost and return.

The area under cinchona on private plantations is returned at 1355 acres in Bengal, 6444 acres in Madras, and about 2000 acres in Coorg and Mysore. The export of cinchona bark from India has risen from 1,286,900 lbs. in 1886-87 to 1,449,313 lbs. in 1887-88, and to 3,074,098 lbs. in 1888-89.

NEWCASTLE INDUSTRIES.

THOUGH we have already devoted two articles to a *résumé* of the features of interest presented by Newcastle for the instruction and entertainment of visitors to the forthcoming meetings of the British Pharmaceutical Conference and British Association, we venture again to return to the subject in consequence of the receipt of an early copy of a most excellent handbook to the industries of the Tyne district, which has been prepared at the instance of the Local Committee of the British Association. It consists of a series of thirty-one papers by different authors who have been selected for the purpose as being men who have a knowledge of the subjects they write upon, and with the expectation that in coming years this little volume will prove a useful source of reference. The first chapters of the work are devoted to the agriculture of the district, its railways and harbours. These are illustrated with numerous maps and plans, and contain a large amount of valuable statistical information. Mining and quarrying, engineering and ship-building form the subjects of the next three chapters, after which the works of Sir W. G. Armstrong, Mitchell and Co. are specially dealt with. A short chapter on Electricity, by the Hon. C. A. Parsons, gives an interesting *résumé* of the progress of this science and its applications at the present time, showing how some of its most important developments had their origin at Newcastle and the extent to which the industries arising therefrom are carried on at that place. The metallurgical industries of the district are treated of by Messrs. Charles Lowthian Bell, Cookson, Gatheral, Patinson and Netto; Chemical manufactures by Mr. Stuart; Gas Works by Mr. Hardie; Printing and Paper-making by Messrs. Reid and Richardson. Other chapters describe the Flour Milling, Leather Manufacture, Tanning, Coach-building, Earthenware Manufacture, Photography and Carpet manufacture. Two articles on Cement manufacture, by Messrs. Watson and Spoor, are especially interesting as showing the great progress that has been made in that industry. Then come chapters on Rope-making, Brewing, and Tobacco manufacture, while lastly the decayed industries of flax-spinning, glass-making, fire-clay, hat-making and woollen mills are briefly mentioned as illustrations of the changes that have taken place in the industries of Newcastle and the neighbourhood. Everyone who desires to gain knowledge of the various industries carried on in the district will do well to furnish himself with this useful guide, and great credit is due to the Local Committee for having taken the trouble to provide for its production.

BRITISH PHARMACEUTICAL CONFERENCE.

By the courtesy of the Honorary Secretaries we are enabled to publish the following list of titles of papers which the authors propose to communicate to the British Pharmaceutical Conference during the meeting to be held at Newcastle-upon-Tyne next month :—

Papain as a Digestive Agent Compared with Commercial Pepsin. By A. Ball.

Infusion of Gentian. By W. Johnston.

Note on Tincture of Lemon Peel. By W. Johnston.

Exact Formulæ for the Official One Per Cent. Liquors. By C. A. Macpherson.

Liquor Morphinæ Meconatis. By C. A. Macpherson.

Note on Meconic Acid and the Detection of Opium in cases of Poisoning. By A. H. Allen, F.I.C., F.C.S.

Note on Vermin Killers containing Strychnine. By A. H. Allen, F.I.C., F.C.S.

Ipecacuanha Fluid Extract and Wine (Standardized). By J. O. Braithwaite and J. C. Umney.

Ipecacuanha Wine (British Pharmacopœia). By J. O. Braithwaite and J. C. Umney.

Short Note on the Preparation and Use of a Scale of mall Residues devised to Facilitate the Estimate of Progress in Washing Precipitates, etc. By B. S. Proctor, F.I.C.

Short Note on Tincture of Senna, B.P., intended to Indicate its Want of Medicinal Activity, and to open a Discussion on its Change or Deletion from the Pharmacopœia. By B. S. Proctor, F.I.C.

Note on Ferri et Ammonii Citras. The Presence of Sulphate, etc. By B. S. Proctor, F.I.C.

Casearia Esculenta. By Dr. P. S. Mootooswamy, F.L.S., Tanjore.

The Chemistry of Strophanthus. By Professor T. R. Fraser, F.R.S.

Note on a New Mode of Applying Chloride of Methyl. By W. Martindale, F.C.S.

Medical and Chemical Misconceptions about Lithia. By Louis Siebold, F.I.C., F.C.S.

Chemical Observations on the Root Bark of Euonymus. By W. A. H. Naylor, F.I.C., F.C.S.

Notes on Some New Gums. By T. Maben, F.C.S.

Easton's Syrup. By T. Maltby Clague.

Another death caused by the drinking of carbolic acid in mistake for whiskey from an unlabelled bottle is reported from Edinburgh. *Apropos* of this subject it may be mentioned that the Irish Privy Council has replied to a recommendation of the King and Queen's Colleges of Physicians that carbolic acid should be included in the poison schedule to the effect that it is unwilling to act until a similar step is taken in Great Britain. So that we have Dublin Castle waiting for Downing Street, and Downing Street waiting for a parliamentary lull, and meanwhile carbolic acid continues to claim its victims, and the recommendations of the two authorities appointed by statute to guard the public interests in respect to poisons are ignored.

* * *

The low prices now obtained for cinnamon bark in the market, consequent upon the largely increased exports from Ceylon, has led to the revival of a proposal that the growers should combine to stop the exportation of "chips" from the island, which amounts to about 500,000 lbs. annually. One half of this quantity is estimated to come from the estates of growers sufficiently wealthy to withstand the temporary strain until recouped by the increased returns on account of the quills, and in order to meet the difficulty of the poorer growers it is proposed to combine to buy the remainder at a fair price and use it for distillation purposes in the island. The pure oil obtained would, it is thought, take the place of the cinnamon leaf oil, which is produced to the extent of 80,000 to 100,000 ounces yearly. The leaf oil is seldom manufactured by the cinnamon growers themselves, but as a rule by persons who pay the proprietor of an estate fifty to one hundeed rupees a year for permission to use as many leaves as may be required for a still. This practice it is proposed to abolish, and as a consequence to suppress the distillation of cinnamon leaf oil.

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The *Lancet*, in commenting upon recent legislation in Yucatan, under which medical practitioners will be allowed to keep open pharmacies in that state without the necessity of keeping a qualified assistant, says, "Unfortunately, something like this is occasionally done in this country, where open surgeries are sometimes left in the charge of the proprietor's wife, or some much less competent and more irresponsible person."

British Medical Association.

SECTION OF PHARMACOLOGY AND THERAPEUTICS.

SOME PRACTICAL POINTS IN THE USE OF ANTACID REMEDIES IN DYSPEPSIA AND GRAVEL.[*]

BY SIR WILLIAM ROBERTS, M.D., F.R.S.

The application of chemical knowledge to the treatment of disease is both new and old. In the course of the discussion which is to be presently opened we shall perhaps hear something of the new and more recondite applications of chemistry to therapeutics. What I am going to say, on the contrary, will only deal with old chemistry and old applications; but I hope, nevertheless, to gather on these ancient paths some useful gleanings of a practical character.

There are, perhaps, in the whole range of therapeutics no simpler problems presented to us than those which have reference to the palliative treatment of acid dyspepsia, and the chemical prophylaxis of uric acid gravel. An excess of acid in the stomach is almost as easily neutralized as if it were contained in a bottle in the laboratory. And hyperacidity of the urine is scarcely less under our control, provided we employ a larger dose of the neutralizing agent. But although the objects in view are so simple, and the means of attaining them so well known, there are a number of practical points in carrying out the indicated lines of treatment which are neither simple or well known; and it is to some of these points that I propose to call your attention. For our present purpose alkalizing or antacid agents may be classed into those which are designed to take effect in the stomach, or gastric antacids—and those which are designed to take effect in the kidneys, or renal antacids. The gastric antacids in common use consist of the alkaline and earthy carbonates and lime water. Renal antacids include, in addition to these, the acetates and citrates of potash and soda, which are changed in the primæ viæ into carbonates of these bases.

GASTRIC ANTACIDS.

Gastric antacids are employed in two distinct classes of cases, namely, in acid dyspepsia, and secondly, in a variety of conditions characterized by great irritation of the stomach, often with vomiting, which we seek to allay by the administration of milk mixed with lime-water.

Antacids for Acid Dyspepsia.—You are all aware that sufferers from acid dyspepsia are in the habit of relieving their pains by the use of antacids. I have elsewhere pointed out that the most advantageous mode of administering antacids in these cases is in the guise of the lozenge. A lozenge, properly used, should be deliberately sucked, and not roughly chewed and swallowed. The process of sucking induces a plentiful flow of alkaline saliva, and the presence in the stomach of this bland demulcent secretion is soothing to the angry mucous membrane. The compilers of the British Pharmacopœia have provided us with two, and only two, antacid lozenges, namely, the troch. sod. bicarb. and the troch. bismuthi. The former contains 5 grains of bicarbonate of soda in each lozenge. It is an effective antacid, but it is not a favourable example of pharmaceutical art. It has a peculiarly nasty, soapy taste, which makes the sucking of it a penance; and this, I presume, is the reason why it has not become popular with dyspeptics. The bismuth lozenge is in every way a better article. It owes its antacid properties to 3½ grains of chalk and 2½ grains of carbonate of magnesia. These quantities are, in saturating power, equal to 10 grains of bicarbonate of soda. This is a full antacid dose, and the chalk and magnesia are practically tasteless, and this is a distinct advantage in regard to the active ingredients of a lozenge. The subnitrate of bismuth, to which this lozenge owes its name, has no antacid properties, and is probably inert. It imparts, however, a slight metallic taste, and communicates to the breath a somewhat disagreeable taint; so that its presence in the lozenge may, I think, be regarded rather as a tribute to the decaying art of polypharmacy than as a really useful addition. The bismuth lozenge has won its way into favour with dyspeptics by sheer merit, and inquiries which I have caused to be made among druggists and lozenge-makers show that the sale of this lozenge is steadily and largely increasing all over the country. A bismuth lozenge without the bismuth would be a nearly perfect antacid lozenge, and I would venture to suggest that some such lozenge should be introduced at the next revision of the British Pharmacopœia.[*]

Besides these officinal articles, there are largely sold in the shops a variety of lozenges and tablets for the use of dyspeptics. None that I have examined fulfil the conditions of a perfect antacid lozenge. The compressed tablets of carbonate of soda and the soda-mint tablets, although effective as antacids, are so unpalatable that they cannot be properly sucked without disgust, and, indeed, those who use them generally swallow them whole in haste—and thus miss the concurrent flow of saliva, which is distinctly helpful to dyspeptics. Some of the antacid lozenges sold in the shops are flavoured with pungent spices to conceal the taste of the soda. All such adjuncts are obviously a mistake. Pungent spices have a strong tendency to provoke acidity in the stomach; and, moreover, any pronounced flavour is objectionable in an article which is used frequently. The alkaline salts of the Vichy springs have been made into very agreeable lozenges—which are sold in this country in sealed boxes. They owe their antacid properties chiefly to carbonate of soda, but partly also to carbonate of potash and to the carbonates of lime and magnesia. They contain besides a small quantity of sodium chloride, which pleasantly sharpens their flavour. These lozenges have a comparatively feeble saturating power, but owing to their full sapid qualities, they provoke an abundant flow of alkaline saliva, and this renders them effective for the relief of gastric acidity. Were it not for their costliness, I believe these Vichy lozenges would soon get into favour with dyspeptics.

As to the comparative merits of the several antacids employed in acid dyspepsia, there is, perhaps, on the whole not much to choose. Certain differences may, however, be noted. The alkaline bicarbonates have a nauseous taste, and if taken in excess they leave an alkaline residuum in the stomach. This is at least abnormal, and perhaps embarrassing, in an organ which requires the presence of an acid to perform its functions. The earthy carbonates, on the other hand, are tasteless, and, owing to their insolubility, they cannot, when taken in excess, cause the neutral line to be over-passed. Perhaps the most advantageous course would be to vary and change the antacid from time to time.

The question may now be put—Is there any harm in the practice of habitually using antacids for the relief of acid dyspepsia? Do dyspeptics purchase present ease at the cost of some future detriment? My attention has been directed to this point for some years. I have, naturally, regarded a practice so artificial with considerable misgivings. But the more extended my experience has become the more I have been satisfied that, with due precautions, the practice is harmless—and I know of no valid evidence from any other quarter to justify a contrary conclusion. My own experience has been mostly gained from the use of the bismuth lozenges, which I have largely prescribed for a considerable length of time. I have, however, invariably enjoined the following strict rules in regard to their use:—They were not to be used at or near meal times—not sooner than three quarters of an hour or an hour after breakfast, nor sooner than an hour or an hour and a half after dinner; they were not to be used regularly and systematically, but only as the occasion arose, that is to say, when gastric pain was distinctly present, and was producing more discomfort than a man could be reasonably expected to bear who had the easy means of relief ready to his hands; lastly, the use of the lozenges was to be discontinued if their employment did not cut short the pain. This last injunction leads up to the remark that an antacid dose is sometimes a useful means of diagnosis in cases of gastralgia. It is often impossible to decide upon a patient's statements what may be the real nature of the pains complained of. In such a case, if an effective antacid dose fail to give relief it is sure evidence that the pains are not due to gastric acidity.

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[*] An Address delivered at the opening of the Section of Pharmacology and Therapeutics, at the Annual Meeting of the British Medical Association, held in Leeds, August.

[*] Messrs. Squire have at my suggestion carried out this proposal, and have prepared a simple antacid lozenge which contains the same antacid charge as the bismuth lozenge, but excludes the bismuth. It contains also 1 grain of sodium chloride, which sharpens its flavour, and thus promotes the flow of saliva.

Lime Water with Milk.—Lime water is used as an antacid in a very important and serious class of cases. It is a very general practice, as you know, when the stomach is intolerant of food, to administer milk with lime water—and often with the happiest results. But in many instances the symptoms are not allayed and the milk is vomited up in hard, sour curds. Failure in these cases is often solely due to the feeble antacid property of the lime water. The saturating power of lime water is really very low. Quicklime dissolves in water only to the extent of about half a grain to the fluid ounce—and this is only equivalent in saturating power to one grain of chalk and to a grain and a half of bicarbonate of soda. To reach an effective antacid dose lime water requires to be given in very large quantities—quantities which are altogether impracticable. Six ounces of lime water are only equal to a single ordinary antacid dose of chalk or bicarbonate of soda. I have repeatedly observed in cases of feeding with milk and lime water that failure was simply due to the feebleness of the antacid charge—and that when a solution of 5 to 10 grains per ounce of bicarbonate of soda was substituted for lime water as an admixture with milk a favourable result was at once obtained, and the vomiting of hard curds arrested.

A useful notion of the relative antacid potency of the several articles in common use as gastric antacids (as sold in the shops) may be obtained from an inspection of the following table:—Ten grains of bicarbonate of soda are taken as a standard antacid dose; and the quantities given of the other articles correspond in saturating value to this standard dose. The results were obtained by direct alkalimetrical determinations, and are here shown in round numbers:—

Table of Antacid Equivalents.

10 grains sod. bicarb. = 12 grains pot. bicarb.
„ „ = 6 „ creta præcipit.
„ „ = 6 „ carb. magnesia.
„ „ = 3 „ calcined magnesia.
„ „ = 6 fluid ounces lime water.
„ „ = 2 fluid drachms liq. potassæ.
„ „ = 1 bismuth lozenge B.P.
„ „ = 2½ Wyeth's soda-mint tablets.
„ „ = 5 Vichy lozenges.

RENAL ANTACIDS.

The use of alkalizing agents for the prevention of uric acid gravel stands on quite as rational a basis as the use of antacids for the relief of acid dyspepsia. It is chemically impossib for uric acid to be deposited in the free state from an alkaline urine; and as we have the means of harmlessly alkalizing the urine at will, we have in our hands, theoretically at least, the absolute power of preventing uric acid gravel. There are, however, a good many practical difficulties in the way. The disposition to uric acid gravel has a certain persistence. It may last intermittently, for weeks, months, and even years, and it would obviously be too great a strain on a treatment which is purely preventive to require that a patient should take antacid remedies in sufficient doses and at sufficiently frequent intervals to maintain the urine continuously alkaline for so long a period of time; nor is this necessary. A study of the normal oscillations of the urine at different periods of the day and night leads to the inference that the liability to uric acid gravel only assumes a morbid intensity during a limited portion of the twenty-four hours. The precipitation of uric acid in the kidneys can only take place when there is a concurrence of several favouring conditions. The flow of urine must be very slow, the secretion must be poor in saline constituents, it must be acid or even hyperacid in reaction, and it must be fairly rich in uric acid. Now these several conditions only coincide at one period of twenty-four hours, namely, during the hours of sleep. The time of sleep is a time of fasting, and therefore a time of hyperacidity of the urine; a time of bodily immobility and recumbency, and therefore a time when the renal stream approaches nearest to absolute stagnation. On the other hand, during the day and the waking hours the recurrence of the meals keep the urine rich in saline ingredients, and at a low degree of acidity, or even renders it for a while actually alkaline; the renal stream is comparatively full and rapid, and its descent from the kidneys is favoured by the force of gravity. During these hours, therefore, the risk of uric acic acid precipitation is reduced to a minimum, even in persons who show a distinct tendency that way; for, as I have repeatedly had occasion to observe, the urine of calculous subjects exhibits exactly the same cyclical diurnal variations as that of healthy persons, though not always to so pronounced a degree.

It follows from these considerations that if we safeguard the night the day may be generally left to take care of itself. This theoretical deduction is fully in accordance with experience in the treatment of uric acid gravel. In the milder cases a single full dose of the alkalizing agent taken at bedtime suffices to prevent the recurrence of the colicky pains and the discharge of uric acid concretions. For this purpose the citrates and acetates seem to be preferable to the bicarbonates. Their effect, I have reason to believe, is more protracted and covers a longer period of time than that of the bicarbonates. The citrate of potash is, on the whole, the best preparation to employ; it has very little taste, and it sits comfortably on the stomach. The dose for an adult should not be less than 40 to 60 grains dissolved in three or four ounces of water. In severer cases a single dose is insufficient, and the early morning urine will still exhibit a morbid disposition to precipitate uric acid. In such cases a second dose should be taken about the middle period of the hours of sleep. This is less difficult to manage with the subjects of gravel than in healthy persons. There is commonly in calculous subjects a certain restlessness, and a certain irritability of the urinary organs, which leads to an increased frequency of micturition, and such persons rarely pass the night without a call to empty the bladder. Advantage should therefore be taken of this break in the continuity of sleep to take the second antacid dose. In this way the entire night and early morning may be effectually guarded.

Cases of uric acid gravel, however, are not always to be got rid of on these easy terms. Now and then instances are met with in which the perversion is so great that the urine is disposed to deposit almost all the twenty-four hours round, and in which the normal alkaline tide, after meals, seems to be altogether abrogated. Under these circumstances additional doses of the antacid are required to afford the requisite protection. But, so far as I have seen, these extreme conditions only last a short time—a few days at most—and there is then a return to a less urgent state of things. It is, indeed, a marked character of uric acid gravel that it oscillates in intensity—it comes and goes in paroxysms—reminding one of the waviness of gouty phenomena. For this reason it is desirable to frequently note the state of the urine, and to ascertain its greater or less proneness to deposit uric acid, so that the administration of the antacid may be adjusted to the actual needs of the patient. There is no great difficulty about this. If a freshly voided specimen of the urine of fasting—say the urine of the early morning or the urine secreted just before dinner be set aside in a bottle, in a warm place, so as to prevent the separation of the amorphous urates, the imminence of precipitation can be easily observed. If precipitation be morbidly imminent crystals of urid acid will appear—perhaps at once, perhaps in an hour or in a couple of hours. If precipitation be not morbidly imminent crystals will not appear for several hours—perhaps not for two or three days. It is possible in this way to gauge pretty accurately the intensity of the morbid tendency, and to regulate thereby the amount and frequency of the antacid dose—or to decide on its discontinuance.

The essential thing in the prophylactic treatment of uric acid gravel is to guard the urine from precipitating within the precincts of the kidney. And we shall practically have attained our object if we succeed, not in altogether preventing precipitation, but in postponing it until the urine has quitted the kidneys. A postponement for a short time—even half an hour—may make all the difference between a precipitation which is fraught with pain and peril and a precipitation which is practically harmless. Now, the protective effect of the antacid extends in this respect a good deal beyond the point at which the urine is rendered actually alkaline. For although all acid urines of medium density precipitate uric acid sooner or later, the time of the occurrence of that precipitation is immensely influenced by the degree of acidity of the urine. Other things being equal, the more acid the urine the earlier is the precipitation, and the less acid the urine the longer is the precipitation postponed. An antacid effect, therefore, which is too feeble to render the urine actually alkaline may be quite sufficient to depress its acidity to such a degree as shall postpone the time of precipitation until the urine has escaped from the kidneys, and even from the bladder.

There are several important matters in connection with the preventive treatment of uric acid gravel which I am unable to touch upon, such as the regulation of the time and quality of the meals and the general mode of life, the use of other salines besides those which tend to diminish the acidity of the urine, the relations of uric acid to oxalate of lime, and so forth. To expand the subject in these directions would lead me too far. I could not pursue it without entering on some very intricate questions of urinary chemistry—the elucidation of which would require more time than I have now at my disposal—and some of which, moreover, are not yet ripe for profitable discussion. The conditions which determine the occurrence of urinary gravel are still imperfectly understood, and several of the problems connected therewith still await scientific study. The subject is one of great interest, both in regard to its therapeutical tissues and its physiological bearings, and I know of none more likely to yield valuable results to a skilled and patient inquirer.

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ROYAL INSTITUTION OF GREAT BRITAIN.

An Attempt to Apply to Chemistry one of the Principles of Newton's Natural Philosophy.*

BY D. MENDELÉEFF, LL.D.

Professor of Chemistry in the University of St. Petersburg.

(*Concluded from page* 140.)

The immediate object of this lecture is to show that, starting with Newton's third law of motion, it is possible to preserve to chemistry all the advantages arising from structural teaching, without being obliged to build up molecules in solid and motionless figures, or to apply to atoms definite limited valencies, directions of cohesion, or affinities. The wide extent of the subject obliges me to treat only a small portion of it, namely of *substitutions*, without specially considering combinations and decompositions, and, even then, limiting myself to the simplest examples, which however, will throw open prospects embracing all the natural complexity of chemical relations. For this reason, if it should prove possible to form groups similar, for example, to H_4 or CH_6 as the remnants of molecules CH_4 or C_2H_6 we shall not pause to consider them, because, as far as we know, they fall asunder into two parts, H_2+H_2 or CH_4+H_2, as soon as they are even temporarily formed, and are incapable of separate existence, and therefore can take no part in the elementary act of substitution. With respect to the simplest molecules which we shall select—that is to say, those of which the parts have no separate existence, and therefore cannot appear in substitutions—we shall consider them according to the periodic law, arranging them in direct dependence on the atomic weight of the elements.

Thus, for example, the molecules of the simplest hydrogen compounds—

HF	H_2O	H_3N	H_4C
hydrofluoric acid	water	ammonia	methane

correspond to elements the atomic weights of which decrease consecutively,

$$F=19, O=16, N=14, C=12.$$

Neither the arithmetical order (1, 2, 3, 4 atoms of hydrogen), nor the total information we possess respecting the elements will permit us to interpolate into this typical series one more additional element; and therefore we have here, for hydrogen compounds, a natural base upon which are built up those simple chemical combinations which we take as typical. But even they are competent to unite with each other, as we see, for instance, in the property which hydrofluoric acid has of forming a hydrate, that is, of combining with water; and the similar attribute of ammonia, resulting in the formation of a caustic alkali, NH_3H_2O, or NH_4OH.

Having made these indispensable preliminary observations, I may now attack the problem itself and attempt to explain the so-called structure or rather construction of molecules, that is to say, their constitution and transformations, without having recourse to the teaching of "structionists," but on Newton's dynamical principles.

Of Newton's three laws of motion, only the third can be applied directly to chemical molecules when regarded as systems of atoms among which it must be supposed that there exist common influences or forces, and resulting compounded relative motions. Chemical reactions of every kind are undoubtedly accomplished by changes in these internal movements, respecting the nature of which nothing is known at present, but the existence of which, the mass of evidence collected in modern times, forces us to acknowledge as forming part of the common motion of the universe, and as a fact further established by the circumstance that chemical reactions are always characterized by changes of volume or the relations between the atoms or the molecules. Newton's third law, which is applicable to every system, declares that "action is always associated with reaction, and is equal to it." The brevity and conciseness of this axiom was, however, qualified by Newton in a more expanded statement, "the action of bodies upon one another are always equal, and in opposite directions." This simple fact constitutes the point of departure for explaining dynamic equilibrium, that is to say, systems of conservancy. It is capable of satisfying even the dualists, and of explaining, without additional assumptions, the preservation of those chemical types which Dumas, Laurent, and Gerhardt created unit types, and those views of atomic combinations which the structionists express by atomicity or the valency of the elements, and, in connection with them, the various numbers of affinities. In reality if a system of atoms or a molecule be given, then in it, according to the third law of Newton, each portion of atoms acts on the remaining portion in the same manner, and with the same force as the second set of atoms acts on the first. We infer directly from this consideration that both sets of atoms, forming a molecule, are not only equivalent with regard to themselves, as they must be according to Dalton's law, but also that they may, if united, replace each other. Let there be a molecule containing atoms A B C, it is clear that, according to Newton's law, the action of A on B C must be equal to the action of B C on A, and if the first action is directed on B C, then the second must be directed on A, and consequently then, where A can exist in dynamic equilibrium, B C may take its place and act in a like manner. In the same way the action of C is equal to the action of A B. In one word every two sets of atoms forming a molecule are equivalent to each other, and may take each other's place in other molecules, or, having the power of balancing each other, the atoms or their complements are endowed with the power of replacing each other. Let us call this consequence of an evident axiom "the principle of substitution," and let us apply it to those typical forms of hydrogen compounds, which we have already discussed, and which on account of their simplicity and regularity, have served as starting points of chemical argument long before the appearance of the doctrine of structure.

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* Delivered Friday, May 31.

In the type of hydrofluoric acid, HF, or in systems of double stars, are included a multitude of the simplest molecules. It will be sufficient for our purpose to recall a few; for example the molecules of chlorine, Cl_2, and of hydrogen, H_2, and hydrochloric acid, HCl, which is familiar to all in aqueous solution as spirit of salt, and which has many points of resemblance with HF, HBr, HI. In these cases division into two parts can only be made in one way, and therefore the principles of substitution renders it probable that exchanges between the chlorine and the hydrogen can take place, if they are competent to unite with each other. There was a time when no chemist would even admit the idea of any such action; it was then thought that the power of combination indicated a polar difference of the molecules of combination, and this thought set aside all idea of the substitution of one component element by another.

Thanks to the observations and experiments of Dumas and Laurent fifty years ago, such fallacies were dispelled, and in this manner, the same principle of substitution was exhibited. Chlorine and bromine acting on many hydrogen compounds, occupy immediately the place of their hydrogen, and the displaced hydrogen, with another atom of chlorine or bromine, forms hydrochloric acid or bromide of hydrogen. Thus chlorine acts on this principle on gaseous hydrogen—reaction, under the influence of light, resulting in the formation of hydrochloric acid. Chlorine acting on the alkalis, constituted similarly to water, and even on water itself—only, however, under the influence of light and only partially because of the unstability of HClO—forms by this principle bleaching salts, which are the same as the alkalis, but with their hydrogen replaced by chlorine. In ammonia and in methane, chlorine can also replace the hydrogen. From ammonia is formed in this manner the so-called chloride of nitrogen, NCl_3, which decomposes very readily with violent explosion on account of the evolved gases, and falls asunder as chlorine and nitrogen. Out of marsh gas, or methane, CH_4, may be obtained consecutively, by this method, every possible substitution, of which chloroform, $CHCl_3$, is the best known, and chloro-carbonic acid, CCl_4, the most instructive. But by virtue of the fact that chlorine and bromine act, in the manner shown, on the simplest typical hydrogen compounds, their action on the more complicated ones may be assumed to be the same. This can be easily demonstrated. The hydrogen of benzole, C_6H_6, reacts feebly under the influence of light on liquid bromine, but Gustavson has shown that the addition of the smallest quantity of metallic aluminium causes energetic action, and the evolution of large volumes of bromide of hydrogen.

If we pass on to the second typical hydrogen compound, that is to say water, its molecule, HOH, may be split up in two ways: either into an atom of hydrogen, and a molecule of oxide of hydrogen, HO, or into oxygen, O, and two atoms of hydrogen, H, and therefore, according to the principle of substitution, it is evident that one atom of hydrogen can exchange with oxide of hydrogen, HO, and two atoms of hydrogen, H, with one atom of oxygen, O.

Both these forms of substitution will constitute methods of oxidation, that is to say, of the entrance of oxygen into the compound—a reaction which is so common in nature as well as in the arts, taking place at the expense of the oxygen of the air or by the aid of various oxidizing substances or bodies which part easily with their oxygen. There is no occasion to reckon up the unlimited number of cases of such oxidizing reactions. It is sufficient to state that in the first of these oxygen is directly transferred, and the position, the chemical function, which hydrogen originally occupied is, after the substitution, occupied by the hydroxyl. Thus ammonia, NH_3, yields hydroxylamine, $NH_2(OH)$, a substance which retains many of the properties of ammonia.

Methane and a number of other hydrocarbons yield, by substitution of the hydrogen by its oxide, methylic $CH_3(OH)$, and other alcohols. The substitution of one atom of oxygen for two atoms of hydrogen is equally common with hydrogen compounds. By this means alcoholic liquids containing ethyl alcohol, or spirits of wine, $C_2H_5(OH)$, are oxidized till they become vinegar or acetic acid, $C_2H_3(OH)$. In the same way caustic ammonia, or the combination of ammonia with water, NH_3H_2O, or $NH_4(OH)$, which contains a great deal of hydrogen, by oxidation exchanges four atoms of hydrogen for two atoms of oxygen, and become converted into nitric acid, $NO_2(OH)$. This process of conversion of ammonia salts into saltpetre goes on in the fields every summer, and with especial rapidity in tropical countries. The method by which this is accomplished, though complex, though involving the agency of all permeating micro-organisms, is, in substance, the same as that by which alcohol is converted into acetic acid, or glycol, $C_2H_4(OH)_2$, into oxalic acid, if we view the process of oxidation in the light of the Newtonian principles.

But while speaking of the application of the principle of substitution to water, we need not multiply instances, but must turn our attention to two special circumstances which are closely connected with the very mechanism of substitutions.

In the first place the replacement of two atoms of hydrogen by one atom of oxygen may take place in two ways, because the hydrogen molecule is composed of two atoms, and therefore, under the influence of oxygen, the molecule forming water may separate before the oxygen has time to take its place. It is for this reason that we find, during the conversion of alcohol into acetic acid, that there is an interval during which is formed aldehyde, C_2H_4O, which, as its very name implies, is "alcohol dehydrogenatum," or alcohol deprived of hydrogen. Hence aldehyde combined with hydrogen yields alcohol; and united to oxygen, acetic acid.

For the same reason there should be, and there actually are, intermediate products between ammonia and nitric acid, $NO_2(HO)$, containing either less hydrogen than ammonia, less oxygen than nitric acid, or less water than caustic ammonia. Accordingly we find, among the products of the de-oxidization of nitric acid and the oxidization of ammonia, not only hydroxylamine, but also nitrous oxide, nitrous and nitric anhydrides. Thus, the production of nitrous acid results from the removal of two atoms of hydrogen from caustic ammonia and the substitution of the oxygen for the hydrogen, $NO(OH)$; or by the substitution, in ammonia, of three atoms of hydrogen by hydroxyl, $N(OH)_3$, and by the removal of water; $N(OH)_3 - H_2O = NO(OH)$. The peculiarities and properties of nitrous acid, as, for instance, its action on ammonia and its conversion, by oxidation, into nitric acid, are thus clearly revealed.

On the other hand, in speaking of the principle of substitution as applied to water, it is necessary to observe that hydrogen and hydroxyl, H and OH, are not only competent to unite, but also to form combinations with themselves, and thus become H_2 and H_2O_2; and such are hydrogen and the peroxide thereof. In general, if a molecule AB exists, then molecules AA and BB can exist also. A direct reaction of this kind does not, however, take place in water, therefore undoubtedly, at the moment of formation, hydrogen reacts on the peroxide of hydrogen, as we can show, at once, by experiment; and further because the peroxide of hydrogen, H_2O_2, exhibits a structure containing a molecule of hydrogen, H_2, and one of oxygen, O_2, either of which is capable of separate existence. The fact, however, may now be taken as thoroughly established, that, at the moment of combustion of hydrogen, or of the hydrogen compounds, peroxide of hydrogen is always formed, and not only so, but in all probability its formation invariably precedes the formation of water. This was to be expected as a consequence of the law of Avogadro and Gerhardt, which leads us to expect this sequence in the case of equal interactions of volumes of vapours and gases; and in the peroxide of hydrogen we actually have such equal volumes of the elementary gases.

The instability of peroxide of hydrogen—that is to say, the ease with which it decomposes into water and oxygen, even at the mere contact of porous bodies—accounts for the circumstance that it does not form a permanent product of combustion, and is not produced during the decomposition of water. I may mention this additional consideration that, with respect to the peroxide of hydrogen, we may look for its effecting still further substitutions of hydrogen by means of which we may expect to obtain still more highly oxidized water-compounds, such as H_2O_3 and H_2O_4. These Schönbein and Bunsen have long been seeking, and Berthelot is investigating them at this moment. It is probable, however, that the reaction will stop at the last compound, because we find that, in a number of cases, the addition of four atoms of oxygen seems to form a limit. Thus, OsO_4, $KClO_4$, $KMnO_4$, K_2SO_4, Na_3PO_4, and such like, represent the highest grades of oxidation.*

As for the last forty years, from the times of Berzelius, Dumas, Liebig, Gerhardt, Williamson, Frankland, Kolbe, Kekulé, and Butlerow, most theoretical generalizations have centred round organic or carbon compounds, so we will, for the sake of brevity, leave out the discussion of ammonia derivatives, notwithstanding their simplicity in respect to the doctrine of substitutions: we will dwell more especially on its application to carbon compounds, starting from methane, CH_4, as the simplest of the hydrocarbons, containing in its molecule one atom of carbon. According to the principles enumerated we may derive from CH_4, every combination of the form CH_3X, CH_2X_2, CHX_3, and CX_4, in which X is an element, or radical, equivalent to hydrogen, that is to say, competent to take its place or to combine with it. Such are the chlorine substitutes mentioned already, such is wood-spirit, $CH_3(OH)$, in which X is represented by the residue of water, and such are numerous other carbon derivatives. If we continue, with the aid of hydroxyl, further substitutions of the hydrogen of methane we shall obtain successively $CH_2(OH)_2$, $CH(OH)_3$, and $C(OH)_4$. But if, in proceeding thus, we bear in mind that $CH_2(OH)_2$ contains two hydroxyls in the same form as peroxide of hydrogen, H_2O_2 or $(OH)_2$, contains them—and moreover not only in one molecule, but together, attached to one and the same atom of carbon—so here we must look for the same decomposition as that which we find in peroxide of hydrogen, and accompanied also by the formation of water as an independently existing molecule: therefore $CH_2(OH)_2$ should yield, as it actually does, immediately water and the oxide of methylene, CH_2O, which is methane with oxygen substituted for two atoms of hydrogen. Exactly in the same manner out of $CH(OH)_3$ are formed water and formic acid, $CHO(OH)$, and out of $C(OH)_4$ is produced water and carbonic acid, or directly carbonic anhydride, CO_2, which will therefore be nothing else than methane with the double replacement of pairs of hydrogen by oxygen. As nothing leads to the supposition that the four atoms of hydrogen in methane differ one from the other, so it does not matter by what means we obtain any one of the combinations indicated—they will be identical; that is to say, there will be no case of actual isomerism, although there may easily be such cases of isomerism as have been distinguished by the term metamerism.

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* Because more than four atoms of hydrogen never unite with one atom of the elements, and because the hydrogen compounds (*e.g.* HCl, H_2S, H_3P, H_4Si) always form their highest oxides with four atoms of oxygen, and as the highest forms of oxides (OsO_4, RO_4) also contain four of oxygen, and eight groups of the periodic system, corresponding to the highest basic oxides R_2O, RO, R_2O_3, RO_2, R_2O_5, RO_3, R_2O_7, and RO_4, imply the above relationship, and because of the nearest analogues among the elements—such as Mg, Zn, Cd, and Hg; or Cr, Mo, W and U; or Si, Ge, Sn, and Pt; or F, Cl, Br, and J and so forth—not more than four are known, it seems to me that in these relationships there lies a deep interest and meaning with regard to chemical mechanics. But because, to my imagination, the idea of unity of design in Nature, either acting in complex celestial systems or among chemical molecules, is very attractive, especially because the atomic teaching at once acquires its true meaning, I will recall the following facts relating to the solar system. There are eight major planets, of which the four inner ones are not only separated from the four outer by asteroids, but differ from them in many respects, as for example in the smallness of their diameters and their greater density. Saturn with his ring has eight satellites, Jupiter and Uranus have each four. It is evident that in the solar systems also we meet with these higher numbers four and eight which appear in the combination of chemical molecules.

Formic acid, for example, has two atoms of hydrogen, one attached to the carbon left from the methane, and the other attached to the oxygen which has entered in the form of hydroxyl, and if one of them be replaced by some substance X it is evident that we shall obtain bodies of the same composition, but of different construction, or of different orders of movement among the molecules, and therefore endowed with other properties and reactions. If X be methyl, CH_3, that is to say, a group capable of replacing hydrogen because it is actually contained with hydrogen in methane itself, then by substituting this group for the original hydrogen, we obtain acetic acid, $CCH_3O(OH)$, out of formic, and by substitution of the hydrogen in its oxide or hydroxyl we obtain methyl formiate, $CHO(OCH_3)$. These bodies differ so much from each other physically and chemically that, at first sight, it is hardly possible to admit that they contain the same atoms in identically the same proportions. Acetic acid, for example, boils at a higher temperature than water, and has a higher specific gravity than it, while its metamer, formo-methylic ether, is lighter than water, and boils at 30°, that is to say, it evaporates very easily.

Let us now turn to carbon compounds containing two atoms of carbon to the molecule, as in acetic acid, and proceed to evolve them from methane by the principle of substitution. This principle declares at once that methane can only be split up in the four following ways:—

1. Into a group CH_3 equivalent with H. Let us call changes of this nature methylation.

2. Into a group CH_2 and H_2. We will call this order of substitutions methylenation.

3. Into CH and H_3, which commutations we will call acetylenation.

4. Into C and H_4, which may be called carbonization.

It is evident that hydrocarbon compounds containing two atoms of carbon, can only proceed from methane, CH_4, which contains four atoms of hydrogen by the first three methods of substitution; carbonizing would yield free carbon if it could take place directly, and if the molecule of free carbon—which is in reality very complex, that is to say, strongly polyatomic, as I have long since been proving by various means—could contain only C_2 like the molecules O_2, H_2, N_2, and so on.

By methylation we should evidently obtain from marsh gas, ethane, $CH_3CH_3 = C_2H_6$.

By methylenation, that is by substituting group CH_2 for H_2, methane forms ethylene, $CH_2CH_2 = C_2H_4$.

By acetylenation, that is by substituting three atoms of hydrogen, H_3, in methane, by the remnant CH, we get acetylene $CHCH = C_2H_2$.

If we have applied the principles of Newton correctly, there should not be any other hydrocarbons containing two atoms of carbon in the molecule. All these combinations have long been known, and in each of them we can not only produce these substitutions, of which an example has been given in the case of methane, but also all the phases of other substitutions, as we shall find from a few more instances, by the aid of which I trust that I shall be able to show the great complexity of those derivatives which, on the principle of substitution, can be obtained from each hydrocarbon. Let us content ourselves wlth the case of ethane, CH_3CH_3, and the substitution of the hydrogen by hydroxyl. The following are the possible changes:—

1. $CH_3CH_2(OH)$: this is nothing more than spirit of wine, or ethyl alcohol, $C_2H_5(OH)$ or C_2H_6O.

2. $CH_2(OH)CH_2(OH)$: this is the glycol of Wurtz, which has shed so much light on the history of alcohol. Its isomer may be $CH_3CH(OH)_2$, but as we have seen in the case of $CH(OH)_2$, it decomposes giving off water, and forming aldehyde, CH_3CHO, a body capable of yielding alcohol by uniting with hydrogen and of yielding acetic acid by uniting with oxygen.

If glycol $CH_2(OH)CH_2(OH)$ loses its water, it may be seen at once that it will not now yield aldehyde, CH_3CHO, but its isomer $\underset{O}{CH_2CH_2}$, the oxide of ethylene. I have here indicated in a special manner the oxygen which has taken the place of two atoms of the hydrogen of ethane taken from different atoms of the carbon.

3. $CH_3C(OH)_3$ decomposed as $CH(OH)_2$, forming water and acetic acid $OH_3CO(OH)$. It is evident that this acid is nothing else than formic acid, $CHO(OH)$, with its hydrogen replaced by methyl. Without examining further the vast number of possible derivatives, I will direct your attention to the circumstance that in dissolving acetic acid in water we obtain the maximum contraction and the greatest viscosity when to the molecule $CH_3CO(OH)$ is added a molecule of water, which is the proportion which would form the hydrate $CH_3C(OH)_3$. It is probable that the doubling of the molecule of acetic acid at temperatures approaching its boiling point has some connection with this power of uniting with one molecule of water.

4. $CH_2(OH)C(OH)_3$ is evidently alcoholic acid, and indeed this compound, after losing water, answers to glycolic acid, $CH_2(OH)CO(OH)$. Without investigating all the possible isomers, we will note only that the hydrate $CH(OH)_2CH(OH)_2$ has the same composition as $CH_2(OH)C(OH)_3$, and although corresponding to glycol, and being a symmetrical substance, it becomes, on parting with its water, aldehyd of oxalic acid, or the glyoxal of Debus, CHOCHO.

5. $CH(OH)_2C(OH_3)$, from the tendency of all the preceding, corresponds to glyoxylic acid, aldehyde acid, $CHOCO(OH)$, because the group $CO(OH)$, or carboxyl, enters into the composition of organic acids, and the group CHO defines the aldehyde function.

6. $C(OH)_3C(OH)_3$, through the loss of $2H_2O$ yields the bibasic oxalic acid $CO(OH)CO(OH)$, which generally crystallises with $2H_2O$, following thus the normal type of hydration characteristic of ethane.*

Thus, by applying the principle of substitution, we can, in the simplest manner, derive not only every kind of hydrocarbon compound, such as the alcohols, the aldehyde alcohols, aldehydes, alcohol acids, and the acids, but also combinations analogous to hydrated crystals which usually are disregarded.

But even those unsaturated substances, of which ethylene, CH_2CH_2, and acetylene, CHCH, are types, may be evolved with equal simplicity. With respect to the phenomena of isomerism, there are many possibilities among the hydrocarbon compounds containing two atoms of carbon, and without going into details it will be sufficient to indicate that the following formulæ, though not identical, will be isomeric substantially among themselves:—CH_3CHX_2 and CH_2XCH_2X, although both contain $C_2H_4X_2$, or CH_2CX_2 and CHXCHX, although both contain $C_2H_2X_2$, if by X we indicate chlorine or generally an element capable of replacing one atom of hydrogen, or capable of uniting with it. To isomerism of this kind belongs the case of aldehyde and the oxide of ethylene, to which we have already referred, because both have the composition C_2H_4O.

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* One more isomer, $CH_2CH(OH)$, is possible, that is secondary vinyl alcohol, which is related to ethylene, CH_2CH_2, but derived by the principle of substitution from CH_4. Other isomers of the composition C_2H_4O, such, for example, as $CHCH_3$ (OH), are impossible, because it would correspond to the hydrocarbon $CHCH_3 = C_2H_4$, which is isomeric with ethylene, and it cannot be derived from methane. If such an isomer existed, it would be derived from CH_3, but such products are up to the present unknown. In such cases the insufficiency of the points of departure of the statical structural teaching is shown. It first admits constant atomicity and then rejects it, the facts serving to establish either one or the other view; and therefore, it seems to me, that we must come to the conclusion that the structural method of reasoning, having done a service to science, has outlived the age, and must be regenerated as, in their time, was the teaching of the electro-chemists, the radicalists, and the adherents of the doctrine of types. As we cannot now lean on the views above stated, it is time to abandon the structural theory. They will all be united in chemical mechanics, and the principle of substitution must be looked upon only as a preparation for the coming epoch in chemistry, where such cases as the isomerism of fumaric and maleic acids, when explained dynamically, as proposed by Le Bel and Van't Hoff, may yield points of departure.

What I have said appears to me sufficient to show that the principle of substitution adequately explains the composition, the isomerism and all the diversity of combination of the hydrocarbons, and I shall limit the further development of these views to preparing a complete list of every possible hydrocarbon compound containing three atoms of carbon in the molecules. There are eight in all, of which only five are known at present.[*]

Among those possible for C_3H_6 there should be two isomers, propylene and trimethylene, and they are both already known. For C_3H_4 there should be three isomers: allylene and allene are known, but the third has not yet been discovered; and for C_3H_2 there should be two isomers, though neither of them are known as yet. Their composition and structure is easily deduced from ethane, ethylene, and acetylene, by methylation, methylenation, by acetylenation and by carbonization.

1. $C_3H_8 = CH_3CH_2CH_3$ out of CH_3CH_3 by methylation. This hydrocarbon is named propane.

2. $C_3H_6 = CH_3CHCH_2$ out of CH_3CH_3 by methylenation. This substance is propylene.

3. $C_3H_6 = CH_2CH_2CH_2$ out of CH_3CH_3 by methylenation. This substance is trimethylene.

4. $C_3H_4 = CH_3CCH$ out of CH_3CH_3 by acetylenation or from CHCH by methylation. This hydrocarbon is named allylene.

5. $C_3H_4 = \underset{CH_2}{CHCH}$ out of CH_3CH_3 by acetylenation or from CH_3CH_3 by methylenation, because $\underset{CH}{CH_2CH} =$ CHCH. This body is as yet unknown.

CH_2

6. $C_3H_4 = CH_2CCH_2$ out of CH_3CH_3 by methylenation. This hydrocarbon is named allene, or iso-allylene.

7. $C_3H_2 = \underset{C}{CHCH}$ out of CH_3H_3 by symmetrical carbonization, or out of CH_3CH_3 by acetylenation. This compound is unknown.

8. $C_3H_2 = \underset{CH_2}{CC}$ out of CH_3CH_3 by carbonization, or out of CHCH by methylenation. This compound is unknown.

If we bear in mind that for each hydrocarbon serving as a type in the above tables there are a number of corresponding derivatives, and that every compound obtained may, by further methylation, methylenation, acetylenation, and carbonization, produce new hydrocarbons, and these may be followed by a numerous suite of derivatives and an immense number of isomeric bodies, it is possible to understand the limitless number of carbon compounds, although they all have the one substance, methane, for their origin. The number of substances is so enormous that it is no longer a question of enlarging the possibilities of discovery, but rather of finding some means of testing them, analogous to the well-known two which for a long time have served as gauges for all carbon compounds.

I refer to the law of even numbers and to that of limits, the first enunciated by Gerhardt forty years ago, with respect to hydrocarbons, namely, that their molecules always contain an even number of atoms of hydrogen. But by the method which I have used of deriving all the hydrocarbons from methane, CH_4, this law may be deduced as a direct consequence of the principle of substitutions. Accordingly, in methylation, CH_3 takes the place of H, and therefore CH_2 is added. In methylenation the number of atoms of hydrogen remains unchanged, and at each acetylenation it is reduced by two, and in carbonization by four atoms, that is to say, an even number of atoms of hydrogen is always added or removed. And because the fundamental hydrocarbon, methane, CH_4, contains an even number of atoms of hydrogen, therefore all its derivative hydrocarbons will also contain even numbers of hydrogen, and this constitutes the law of even numbered parts.

The principle of substitutions explains with equal simplicity the conception of limiting compositions of hydrocarbons, C_nH_{2n+2}, which I derived, in 1861,[*] in an empirical manner from accumulated materials available at that time, and on the basis of the limits to combinations worked out by Dr. Frankland for other elements.

Of all the various substitutions the highest proportion of hydrogen is yielded by methylation, because in that operation alone does the quantity of hydrogen increase; therefore, taking methane as a point of departure, if we imagine methylation effected $(n-1)$ we obtain hydrocarbon compounds containing times the highest quantities of hydrogen. It is evident that they will contain $CH_4+(n-1)\ CH_2$, or C_nH_{2n+2}, because methylation leads to the addition of CH_2 to the compound.

It will thus be seen that by the principle of substitution—that is to say, by the third law of Newton—we are able to deduce in the simplest manner, not only the individual composition, the isomerism, and relations of substances, but also the general laws which govern their most complex combinations, without having recourse either to statical constructions, to the definition of atomicities, to the exclusion of free affinities, or to the recognition of those single, double, or treble ties which are so indispensable to structurists in the explanation of the composition and construction of hydrocarbon compounds. And yet, by the application of the dynamic principles of Newton, we can attain to that chief and fundamental object—the comprehension of isomerism in hydrocarbon compounds, and the forecasting of the existence of combinations as yet unknown, by which the edifice raised by structural teaching is strengthened and supported. Besides, and I count this for a circumstance of special importance, the process which I advocate will make no difference in those special cases which have been already so well worked out, such as, for example, the isomerism of the hydrocarbons and alcohols, even to the extent of not interfering with the nomenclature which has been adopted, and the structural system will retain all the glory of having worked up, in a thoroughly scientific manner, the store of information which Gerhardt had accumulated about the middle of the fifties, and the still higher glory of establishing the rational synthesis of organic substances. Nothing will be lost to the structural doctrine, except its statical origin; and as soon as it will embrace the dynamic principles of Newton, and suffer itself to be guided by them, I believe that we shall attain, for chemistry, that unity of principle which is now wanting. Many an adept will be attracted to that brilliant and fascinating enterprise, the penetration into the unseen world of the kinetic relations of atoms, to the study of which the last twenty-five years have contributed so much labour and such high inventive faculties.

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[*] Conceding variable atomicity, the structurists must expect an incomparably larger number of isomers, and they cannot now decline to acknowledge the change of atomicity, were it only for the examples HgCl and $HgCl_2$, CO and CO_2, PCl_3 and PCl_5.

[*] 'Essai d'une théorie sur les limites des combinaisons organiques,' par D. Mendeléeff, 2/11 août 1861, 'Bulletin de l'Académie i. d. Sc. de St. Pétersbourg,' t. v.

D'Alembert found in mechanics, that if inertia be taken to represent force, dynamic equations may be applied to statical questions, which are thereby rendered more simple and more easily understood.

The structural doctrine in chemistry has unconsciously followed the same course, and therefore its terms are easily adopted; they may retain their present forms, provided that a truly dynamical, that is to say, Newtonian meaning be ascribed to them.

Before finishing my task and demonstrating the possibility of adapting structural doctrines to the dynamics of Newton, I consider it indispensable to touch on one question which naturally arises, and which I have heard discussed more than once. If bromine, the atom of which is eighty times heavier than that of hydrogen, takes the place of hydrogen, it would seem that the whole system of dynamic equilibrium must be destroyed.

Without entering into the minute analysis of this question, I think it will be sufficient to examine it by the light of two well-known phenomena, one of which will be found in the department of chemistry, and the other in that of celestial mechanics, and both will serve to demonstrate the existence of that unity in the plan of creation, which is a consequence of the Newtonian doctrines. Experiments demonstrate that when a heavy element is substituted for a light one, in a chemical compound—an atom of magnesium in the oxide of that metal, for example, by mercury, the atom of which is 8⅓ times heavier—the chief chemical characteristics or properties are generally though not always preserved.

The substitution of silver for hydrogen, than which it is 108 times heavier, does not affect all the properties of the substance, though it does some. Therefore chemical substitutions of this kind, the substitution of light by heavy atoms, need not necessarily entail changes in the original equilibrium; and this point is still further elucidated by the consideration that the periodic law indicates the degree of influence of an increment of weight in the atom as affecting the possible equilibria, and also what degree of increase in the weight of the atoms reproduces some, though not all, the properties of the substance.

This tendency to repetition, these periods, may be likened to those annual or diurnal periods with which we are so familiar on the earth. Days and years follow each other: but, as they do so, many things change; and in like manner chemical evolutions, changes in the masses of the elements, permit of much remaining undisturbed, though many properties undergo alteration. The system is maintained according to the laws of conservation in nature, but the motions are altered in consequence of the change of parts.

Next, let us take an astronomical case, such for example as the earth and the moon, and let us imagine that the mass of the latter is constantly increasing. The question is, What will then occur? The path of the moon in space is a wave-line similar to that which geometricians have named epicycloidal, or the locus of a point in a circle rolling round another circle. But in consequence of the influence of the moon, it is evident that the path of the earth itself cannot be a geometric ellipse, even supposing the sun to be immovably fixed; it must be an epicycloidal curve, though not very far removed from the true ellipse, that is to say, it will be impressed with but faint undulations. It is only the common centre of gravity of the earth and the moon which describes a true ellipse round the sun. If the moon were to increase, the relative undulations of the earth's path would increase in amplitude, those of the moon would also change, and when the mass of the moon had increased to an equality with that of the earth, the path would consist of epicycloidal curves crossing each other, and having opposite phases. But a similar relation exists between the sun and the earth because the former is also moving in space. We may apply these views to the world of atoms, and suppose that, in their movements, when heavy ones take the place of those that are lighter, similar changes take place provided that the system or the molecule is preserved throughout the change.

It seems probable that in the heavenly systems, during incalculable astronomical periods changes have taken place and are still going on similar to those which pass rapidly before our eyes during the chemical reaction of molecules, and the progress of molecular mechanics may—we hope will—in course of time, permit us to explain those changes in the stellar world which have more than once been noticed by astronomers, and which are now so carefully studied. A coming Newton will discover the laws of these changes. Those laws, when applied to chemistry, may exhibit peculiarities, but these will certainly be mere variations on the grand harmonious theme which reigns in nature. The discovery of the laws which produce this harmony in chemical evolutions will only be possible, it seems to me, under the banner of Newtonian dynamics which have so long waved over the domains of mechanics, astronomy, and physics. In calling chemists to take their stand under its peaceful and catholic shadow I imagine that I am aiding in establishing that scientific union which the managers of the Royal Institution wish to effect, who have shown their desire to do so by the flattering invitation which has given me—a Russian—the opportunity of laying before the countrymen of Newton an attempt to apply to chemistry one of his immortal principles.

Reviews.

PRACTICAL ORGANIC CHEMISTRY. By SAMUEL RIDEAL, D.Sc. (Lond.), F.I.C., F.C.S., F.G.S., Fellow of University College, London.*

This is a collection of the more important tests and reactions of the common organic compounds, more especially such as are of importance in medicine and pharmacy, and embracing all the substances mentioned in the syllabus of the science examinations of London University. The author has had experience in teaching this subject at University College, and has put his notes together in the form of a small handbook, which seems mainly adapted to the requirements of the student of medicine.

The organic acids occupy the first half of the book, each being briefly described as to properties, sources, formula, etc., and its tests then given, such as are most characteristic and distinctive being marked with an asterisk. In the case of substances included in the British Pharmacopœia, a list of their official compounds or preparations is also appended. About twenty of the more important acids are included, and are grouped according to the action of calcium chloride and ferric chloride. Most of the tests given are those ordinarily met with, but a few new ones are also introduced, *e.g.*, Saul's thymol reaction with tannic, gallic, and pyrogallic acids; there is also a *résumé* of what is known of the constitution and derivatives of uric acid.

The other substances dealt with are the carbohydrates, including dextrose, sucrose, lactose, starches, dextrin, gum arabic, and cellulose; the organic bases, including urea, quinine, cinchonidine, morphine, brucine, strychnine, atropine, cocaine, and coniine; albumen and gelatine, and the alcohols and ethers, chloroform, aldehyd, and glycerine.

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* London: H. K. Lewis. 16mo. i-viii., 1-160.

There are no exercises in the preparation of any of the compounds mentioned, but as a collection of the tests it is a very useful little book, although it would have been much improved by a more careful revision of the proofs, such statements being made as that "human urine contains about 21 per cent. of urea," and that the acaciæ gummi of the British Pharmacopœia should give no precipitate with ammonium oxalate, though the next paragraph says it is a salt of potassium and calcium.

URINES. DÉPOTS, SÉDIMENTS, CALCULS. Application de l'Analyse Urologique à la Séméiologie Médicale. Par E. GAUTRELET, Pharmacien de la 1re Classe, etc.*

Such is the title of the latest addition to modern French books upon urine. The author claims, and we think with justice, that some of the best work upon this subject has been done during recent years in his country. Certainly those who study urinary matters cannot afford to neglect the chemical work of Méhu or Yvon, or the medical writings of Lecorché, Talamon, Labadie-Lagrave, Bouchard, etc.

M. Gautrelet's volume opens with a thoughtful preface from the pen of Dr. Lecorché, a distinguished authority upon gout. He recognises in impressive terms the importance of correct analysis in the work of the physician, quoting, however, the cautionary dictum of Claude Bernard, that chemical analysis is useless unless considered in connection with the organic and physiological causes which affect the constitution of the liquid. Following Dr. Lecorché's preface, the author, in a short introduction, traces the plan of his work, and takes occasion to address a warning to those physicians who trust too much to a rapid examination of the urine done at the bedside of the patient. In certain acute cases, he admits, useful information is to be obtained from such *uroscopie clinique*, as he calls it; but in chronic diseases the information is incomplete or even not correct. Professor Félix Guyon's advice to his students is appropriately given, and we think it would be greatly to the advantage of successful diagnosis in this country if his words were taken more to heart by English practitioners. "The perfection to which modern science has been brought," said the Professor, in speaking of urinary analysis to his pupils, "gives still more value to the information yielded by a complete analysis. But it is rarely that the physician possesses a sufficient knowledge of chemistry to bring to a successful issue such an operation. It requires, moreover, the expenditure of so much time, and such minute and unremitting attention, which the practitioner could scarcely be expected to devote to it. You will act wisely in confiding such analyses to a professional chemist." This advice from an eminent authority may be clinched by the words of Dr. Lecorché. "The association of the physician with the chemist appears to me to be indispensable for a sound interpretation of the results furnished by elementary analysis." It is worthy of note that our author acknowledges the perfection to which purely clinical analysis has been brought by some practitioners, such as Gubler—and, he might have added, by Oliver in our own country.

The work proper is divided and sub-divided into sections and chapters. Two of the latter with half-a-dozen sub-sections are devoted to an exhaustive, though concisely written account of the anatomy and physiology of the urinary apparatus. These "prolegomena" are followed by a description of the composition and properties of normal urine. In this portion of the volume the writer does not disdain to enter into the most minute details. A good example, which reads curiously to English eyes, may be found on page 53, sub-section I., headed "Saveur." M. Gautrelet tells us that A. Gautier finds normal urine to be bitter, saline and acid in taste, Lereboullet describes it as bitter and slightly saline, L. Gautier calls it bitter, and at the same time saline, whilst Guérin finds it slightly salt and bitter. Our author thinks he can improve upon all this, and pronounces the liquid, with the emphasis of italics, to possess at first a fresh taste, almost immediately replaced by a freely saline, slightly acidulous flavour, and leaving a bitter *arrière-goût*!

The chapters on normal urine are followed by a "second part" devoted to a careful study of the characters and composition of the abnormal fluid. In the first part of his work the author endeavours to establish an exact prototype or truly normal urine, and any deviations from this standard he describes as abnormal. All other writers that we are acquainted with allow a considerable latitude, for instance, in the density of a normal urine, the average range being from about 1·012 or 1·015 to 1·025, or even 1·030. M. Gautrelet, however, considers all deviations from the specific gravity 1·017,8 at 15° C. as removing the liquid from the normal category. It follows from this that he recognizes two abnormal states, one pathological and the other physiological, but non-pathological. The laborious manner in which M. Gautrelet has established his standard reflects very considerable credit upon his intelligence and patience. The results he has obtained, too, we think, will tend to increase the accuracy of semeiological diagnosis. A very full account is given of the numerous rarer bodies that may occur in morbid urine, especial attention being devoted to an enumeration of the best tests by which they may be identified. This section, and that which follows upon the *technique* of urological analysis, show very clearly the author's intimate acquaintance with the capital work that has been done in France during recent years. The spectroscopic, polarimetric and microscopic sections are written with equal care, the latter being enriched by a number of very fairly executed woodcuts of crystals, etc., most of which have, however, already done duty in the French translation of Lionel Beale, published by Messrs. Baillière.

In the analytical portion proper the author is not quite so full as from other parts of the work might have been anticipated. He appears to consider, and perhaps with justice, that he is addressing an audience quite *au fait* with chemical manipulation. Like Méhu, and unlike Neubauer, he adopts the selective and not the encyclopedic principle in describing processes for identification or for estimation. Both these chemists, it will be remembered, gave the fullest details in their power of the reagents and the reactions. M. Gautrelet has a right, however, to claim indulgence, for we take it that the chief object of his work is diagnostic and not merely analytical. The methods described by our author are those which seemed to him to be the most satisfactory, and we see no reason, broadly speaking, to quarrel with his judgment. His article on the separation of the proteids is short, but good. Diabetic glucose he estimates, like many French medical analysts, by the polarimetric method. In this connection, a most interesting table will be found on page 231, showing the effects of the chief reagents upon those bodies which are liable to be confounded with glucose. The ammoniacal cupric test of Pavy, and the elegant bismuthous solution suggested as an improvement on Böttger by Nylander, are not described. Both these tests are now largely used in this country, the latter being chiefly valuable on account of the unmistakable character of the reaction, and of its freedom from reducing effect upon uric acid and creatinine. Following the example of many of his predecessors in this field, M. Gautrelet has devised a ureometer which has several special features. It is founded in principle upon that of Noël, but is intended for the azometric estimation not only of urea, but of uric acid and creatinine. Knop's hypobromite method is made use of, taking note of Méhu's suggestions. The addition of glycerin is recommended to destroy the foam which forms in the process on albuminous urines. In the section on uric acid no notice is taken of the elaborate process of Salkowski, or of the modification by Haycraft, which has been so much used and criticised in this country and in Germany.

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* Paris: J. B. Baillière et Fils, 1889. Pp. i.-viii., 1-452.

The very large third part is devoted to a consideration of urological semeiology, and has the sub-divisions, physiology, diathesis, chronic diseases (copiously illustrated by interesting charts of the composition of the urine) and acute diseases. The whole section possesses more immediate value for the physician than for the chemist. It contains a good deal of original work, and deserves study by those who are consulted by medical men upon obscure points in pathological chemistry. The work is concluded by a useful bibliography which is not, however, quite perfect, and by a table of contents and an index that are fairly complete. The book throughout is written in the clear, terse, scientific style which the language of *nos chers voisins* so admirably suits. The paper and printing are good, although, as might be expected in the first edition of so technical a work, the volume contains a not inconsiderable number of trifling typographical errors—none, as far as we have observed, of serious moment. The woodcuts are generally pretty fairly done, and will be found useful by the student.

In conclusion, we think the book is a decided contribution to the now fairly extensive literature of the subject; and we rise from its perusal with a sense of satisfaction that so capable a work should have emanated from the pen of a pharmacist.

BOOKS RECEIVED.

Official Handbook to the Industries. British Association, Newcastle-upon-Tyne Meeting, 1889. Newcastle: A. Reed, Sons and Co.

A Practical Treatise on Materia Medica and Therapeutics. By Robert Bartholow, M.A., M.D., LL.D., etc. Seventh edition, revised and enlarged. London: H. K. Lewis. 1889. From the Publisher.

Ueber Capillar-Analyse und ihre verschiedenen Anwendungen, sowie uber das Emporsteigen der Farbstoffe in den Pflanzen. By Prof. Dr. F. Goppelsroeder. From the Author.

Farbelectrochemische Mittheilungen. By Prof. Dr. Goppelsroeder. From the Author.

Obituary.

Notice has been received of the death of the following:—

On the 30th of July, Mr. Alexander Hutton, Chemist and Druggist, High Street, Portobello, N.B. Aged 59 years.

On the 8th of August, Mr. John Jones, Chemist and Druggist, Leeswood, near Mold, Flintshire. Aged 51 years.

On the 11th of August, Helen Montgomery, Chemist and Druggist, Dumbarton Road, Glasgow. Aged 62 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Evening Classes.

Sir,—I can heartily endorse what "A Registered Student" writes in last week's Journal as to the desirability of the Society's laboratory and lecture rooms being open to students a few evenings a week, say from October to May.

It is a *sine quâ non* for all but a very few to obtain something of systematic training, or rather of guidance into the way of preparing for qualification. And the majority of those who cannot give up six or twelve months entirely to study find their way into the various private schools of pharmacy, some of which are from time to time spoken of in unflattering terms, but which nevertheless supply a demand for evening classes that undoubtedly exists.

Now everyone acknowledges that the tuition of pharmacy and its scientific by-paths at Bloomsbury Square is conducted by the most accomplished professors; and I am certain a large number of students would prefer imbibing knowledge there to seeking it in other schools, were an evening course open to them. It is more than probable, also, that not a few Minor men would push their studies further if this advantage were offered, the sentiment breathed at the Society's School being, so far as outsiders can perceive, the very antithesis of "cram." So that the opening of its doors to other than day students would induce a more widely-developed aspiration to the higher paths of pharmaceutical and chemical science.

London. E. P.

Sir,—As another "Registered Apprentice," I trust last week's letter with regard to evening classes at the "Square" will receive due consideration by the Council.

Ludgate Circus. Apprentice.

Pharmaceutical Society of Ireland.

Sir,—I am perhaps rather ate in drawing attention to the letter of R. J. Downes, which appeared in the Journal of June 8. I think many of our members would be glad to see a "Benevolent Fund" instituted in connection with our Society. I would suggest that Mr. Brunker should take the initiative in this matter, and let his name be associated with the movement, and in this way let us, the members of the Pharmaceutical Society of Ireland, express our appreciation of his labours and sacrifices on behalf of the Society.

Cork. John Blair.

C. Crook.—*Circæa lutetiana* and *Mentha sativa.*

W. J. Shepperd.—(1) *Argania sideroxylon*: expressed for oil in Morocco. (2) *Hypericum androsæmum.* (3) *Inula dysenterica.* (4) *Mentha aquatica.* (5) *Eupatorium cannabinum.* (6) *Betonica officinalis.*

J. H. Heap.—(1) In one case by election after examination, in the other by election upon nomination of Fellows: for fuller details apply to the Secretaries of the respective societies. (2) If the act is performed by a person whose name is not on the Medical Register nor on the Register of Chemists and Druggists it would be illegal.

T. J.—Apparently *Plantago major*, but a leaf should be sent. This particular form of monstrosity is not common.

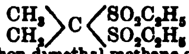
Apprentice.—The Preliminary examination is held four times in each year, on the second Tuesday in January, April, July and October. A list of the examination centres may be obtained on application to the Secretary, 17, Bloomsbury Square, W.C.

Inquirer.—According to the 24th section of the Weights and Measures Act it is illegal for a person to have in his possession for use in trade any weight or measure that is not of the denomination of some Board of Trade standard.

"THE MONTH."

Under the name "chloralamide" another compound has been added to the number of new hypnotics. **Chloral-amide.** It is described as the product of the direct combination of chloral anhydride and formamide in molecular quantities, and is represented by the formula $CCl_3H\left\langle\begin{matrix}OH\\NHCHO.\end{matrix}\right.$ Accepting this statement as being correct the name has been subjected to some criticism, and it has been suggested that according to analogy the compound would have been more properly named "chloralformamide." Chloralamide forms shining white crystals, soluble in 9 parts of water and in 1½ parts of 96 per cent. alcohol, melting at 115° C., and splitting up on being distilled into the two original constituents (*Pharm. Centralh.*, Aug. 15, p. 494). A similar decomposition takes place when the aqueous solution is heated to a temperature above 60° C.; below 49° C. it will remain unaltered. A solution is not altered by the addition of silver nitrate or by dilute acid, but it is rapidly decomposed by caustic alkalies, and very slowly by alkaline carbonates and bicarbonates. It should therefore not be dispensed in an alkaline liquid, the best medium probably being one that is slightly acid. The taste is said to be "mild, slightly bitter, and not caustic." Chloralamide has been reported upon, among others, by Dr. Hagen and Dr. Hüfler, who give the results of its administration to twenty-eight persons at Erlangen, to whom 118 doses in all were given (*Mün. med. Wochensch.*, July 23, p. 513). Distinct hypnotic effects were always obtained in twenty-six cases, in sixteen of which its action seemed to present advantages over that of other hypnotics, while in the remainder it was about the same. In comparing the new compound with chloral hydrate the preference is given to chloralamide, on the grounds that its taste is more pleasant, its hypnotic action is more powerful, and the disturbances following its use are smaller, slight pain and fullness of the head being observed on only eight occasions. In many cases a dose of 2 grams was sufficient, especially for women, but in more severe cases 3 grams proved more suitable. It was administered in wafers or dissolved in wine, without any difference in its action being noticed.

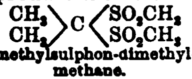
During the past few weeks a considerable amount of space in this Journal has been given up to the **Physiological Action of Disulphones.** publication of Dr. Lauder Brunton's Croonian lectures on the relation of chemical constitution to physiological action, the justification being that some acquaintance with the advance of knowledge in this direction is now almost indispensable to the pharmacist. Another interesting contribution, though more limited in its scope, has appeared in the *Zeitschrift für physiologische Chemie* (July 29, p. 75), consisting of a report on the physiological action of the disulphones, to which group the new hypnotic sulphonal belongs. Several of the compounds examined had not been prepared before, and it must suffice to say in general terms that some of them that passed through the system unaltered into the urine were inert, while of those that underwent decomposition only the compounds containing ethyl groups were physiologically active, the activity increasing directly with the number of ethyl groups. This is instructively shown by the behaviour of the compounds most nearly allied to sulphonal, or diethylsulphon-dimethyl-methane. In this compound two of the four hydrogens of methane are replaced by methyl groups in direct combination with the carbon, and the other two by two sulphon groups each directly linked with the carbon on one side and with an ethyl group on the other side.



$$\left.\begin{matrix}CH_3\\CH_3\end{matrix}\right\rangle C\left\langle\begin{matrix}SO_2C_2H_5\\SO_2C_2H_5\end{matrix}\right.$$

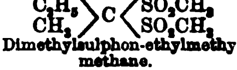
Diethylsulphon-dimethyl-methane or Sulphonal.

When methyl groups took the place of the two ethyl groups in this compound, the product, dimethylsulphondimethylmethane, was physiologically inactive, whilst a corresponding compound containing one ethyl group, dimethylsulphon-ethylmethylmethane, required to be given in twice the quantity to produce the same effect as sulphonal.



$$\left.\begin{matrix}CH_3\\CH_3\end{matrix}\right\rangle C\left\langle\begin{matrix}SO_2CH_3\\SO_2CH_3\end{matrix}\right.$$

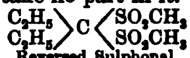
Dimethylsulphon-dimethyl-methane.



$$\left.\begin{matrix}C_2H_5\\CH_3\end{matrix}\right\rangle C\left\langle\begin{matrix}SO_2CH_3\\SO_2CH_3\end{matrix}\right.$$

Dimethylsulphon-ethylmethyl-methane.

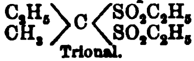
An isomer of sulphonal, in which the two ethyl groups were in direct combination with the carbon and the two methyl groups were linked to the sulphon groups, or "reversed sulphonal," corresponded almost exactly with sulphonal in its physiological action, indicating apparently that the sulphon groups take no part in it.



$$\left.\begin{matrix}C_2H_5\\C_2H_5\end{matrix}\right\rangle C\left\langle\begin{matrix}SO_2CH_3\\SO_2CH_3\end{matrix}\right.$$

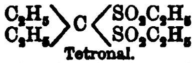
Reversed Sulphonal.

Lastly, diethylsulphon-methylethyl-methane, or "trional," containing one methyl and three ethyl groups, was found to be a distinctly stronger hypnotic than sulphonal, while diethylsulphon-diethylmethane, or "tetronal," was more powerful still, requiring only half the quantity to produce the same effect as sulphonal.



$$\left.\begin{matrix}C_2H_5\\CH_3\end{matrix}\right\rangle C\left\langle\begin{matrix}SO_2C_2H_5\\SO_2C_2H_5\end{matrix}\right.$$

Trional.



$$\left.\begin{matrix}C_2H_5\\C_2H_5\end{matrix}\right\rangle C\left\langle\begin{matrix}SO_2C_2H_5\\SO_2C_2H_5\end{matrix}\right.$$

Tetronal.

Trional is described as occurring in shining tables, melting at 76° C., soluble in 320 parts of water at ordinary temperature and freely in alcohol and in ether, the aqueous solution having a distinctly bitter taste. Tetronal occurs in shining tables and prisms, melting at 85° C., soluble in 450 parts of cold water, freely in alcohol, and moderately in ether. It has a camphor-like and bitter taste.

An interesting contribution to the knowledge of sulphites and thiosulphates has been contributed **Sulphites and Thiosulphates.** by Herr Schwicker (*Berichte*, xxii., 1728). If it be assumed that sulphurous acid is asymmetrically constituted, corresponding to the formula $H\cdot\overset{VI}{S}O_2\cdot HO$, isomeric double salts with potassium and sodium would be possible, having the formulæ $KSO_2\cdot ONa$ and $NaSO_2\cdot OK$. The first of these would contain the potassium directly combined with the sulphur; and in the second the position would be reversed and the sodium be linked directly with the sulphur. In confirmation that such compounds are possible, it has been found that when a concentrated solution of potassium hydrosulphite (HSO_3K) is saturated with the corresponding quantity of sodium carbonate and the mixture placed over sulphuric acid, hard yellowish crystals separate after a time, having the composition $NaKSO_3+2H_2O$. But when the solution of the double salt is obtained by neutralizing sodium hydrosulphite with potassium carbonate, small yellowish indistinct crystals separate having the composition $NaKSO_3 + H_2O$. In treating such a double salt with ethyl iodide to form an ethylsulphonate it might be expected that in the ethylsulphonic acid formed the ethyl would be directly combined with the sulphur, displacing the metal that previously occupied that position, so that if the assumption were correct that the two sodium-potassium compounds described were isomeric in the manner indicated, one of them should yield potassium ethylsulphonate and the other sodium ethylsulphonate, according to the equations—

$$Na \cdot SO_2 \cdot OK + C_2H_5I = C_2H_5 \cdot SO_2 \cdot OK + NaI.$$
$$K \cdot SO_2 \cdot ONa + C_2H_5I = C_2H_5 \cdot SO_2 \cdot ONa + KI.$$

By experiment it has been ascertained that, ignoring some bye-reactions, this is practically what takes place. It appears further that these sodium-potassium sulphites can be converted into corresponding isomeric thiosulphates, from one of which ethyl bromide displaces sodium to form potassium ethylthiosulphate, and from the other potassium to form sodium ethylthiosulphate.

Antipyrin and Iodine.

When iodine in dilute solution is added to solution of antipyrin drop by drop, and the mixture shaken, the precipitate formed at first disappears, leaving the liquid colourless until a certain quantity has been added, when the precipitate remains permanently. According to M. Manseau (*Bull. Soc. Pharm. Bord.*, May, p. 148), this point is reached with Knorr's antipyrin when decinormal solution of iodine has been added in the proportion of 6·8 c.c. (=0·08636 gram iodine) to the gram. Almost identical results were obtained with analgésine of French manufacture from different sources; but one sample, of "foreign origin," inferior in appearance and less soluble in water, only absorbed 0·07241 gram of iodine to the gram before the precipitate became persistent. M. Manseau therefore suggests that this reaction affords to the pharmacist a ready means of testing the quality of the substance supplied to him under the name "antipyrin" or "analgésine." The reactions with chlorine and bromine are exactly of the same order and quite as distinct, but the titration solutions are not so easily preserved of uniform strength. The reaction is said also to constitute a delicate test for the presence of antipyrin in urine, the transient character of the precipitate distinguishing it from the precipitates due to iodine compounds with alkaloids, and the formation of an abundant dull red precipitate when the iodine solution is added in the presence of nitric acid distinguishing it from the turbidity characteristic of ferments.

Cinnamyl-cocaine.

The amorphous alkaloid obtained as a bye-product in the manufacture of cocaine has not yet been thoroughly examined. A short time since Professor Liebermann separated from the portion not readily attacked by potassium permanganate a base that he named "isatropylcocaine," but from the less stable portion no pure compound has hitherto been isolated. The occurrence of cinnamic acid in the decomposition products of this mixture of bases was considered to indicate the probable presence of cinnamylcocaine and that compound has also been prepared synthetically. It is now announced by Dr. Giesel that he has separated cinnamylcocaine from the less stable portion of the raw bases in considerable quantity and readily crystallizable (*Pharm. Zeit.*, Aug. 24, p. 516). The properties of the natural cinnamylcocaine are said to correspond with those of the synthetically prepared compound so far as they have been at present investigated. The characters specially distinguishing it from cocaine are its higher melting point (121° C.) and its decomposition by permanganate, with formation of bitter almond oil; the decomposition with hydrochloric acid takes place quantitatively into ecgonine and cinnamic acid. As this observation therefore establishes the presence in cocoa leaves of a second crystallizable alkaloid, which in virtue of its properties might easily occur as an impurity in commercial cocaine, it may be useful to remember that cinnamylcocaine in consequence of its instability would be readily detected by the permanganate test, whilst the isatropylcocaine, which is not so easily attacked by permanganate, would hardly be found in a well-crystallized preparation. Reference will also be found on another page to the occurrence of a second crystallizable alkaloid in coca leaves.

Erroneous Colour Test for Cocaine.

In a recent communication to the *Pharmaceutische Zeitung* (Aug. 3, p. 471) Herr Goeldner stated that if cocaine hydrochlorate were added to a solution of resorcin in strong sulphuric acid the liquid quickly assumed a magnificent cornflower blue colour, which upon the addition of soda solution was changed to a clear rose colour. This reaction he therefore proposed as a test for the identification of cocaine, using about 0·01 gram of resorcin, 6 or 7 drops of sulphuric acid and 0·02 gram of cocaine hydrochlorate. Other experimenters, however, failed to produce the reaction, and it soon became apparent that for some reason it was limited to Merck's cocaine. It now appears that it is dependent upon the presence of traces of nitric acid. This is admitted in a communication from Merck, who writes (*Pharm. Zeit.*, Aug. 24, p. 515) "Herr Goeldner has in fact discovered a new identity reaction, though not one through which cocaine can be recognized, but a reaction for the detection of minimum traces of nitric acid, which in delicacy exceeds the ferrous sulphate and indigo reactions.

Quinine Arsenate.

Among the quinine salts now pretty frequently prescribed in granules in France is the arsenate, but in the absence of an official formula some uncertainty exists as to the compound that should be used. An examination by Messrs. Champigny and Choay of six samples obtained from different sources showed that the quinine varied from 58 to 74 per cent., the arsenic acid from 21·8 to 35·7 per cent., and the water from 2·5 to 9·9 per cent. (*Journ. Pharm. Chim.*, Aug. 1, p. 99). Experiments were therefore made with salts prepared in different ways, and containing one or two molecules of quinine to the molecule of arsenic acid, as to which was most suitable for its stability and in other respects, and preference is given to a salt represented by the formula $C_{20}H_{24}N_2O_2 \cdot AsH_3O_4 \cdot 2H_2O$. It contains 66 per cent. of quinine, and is obtained in silky needles by dissolving equivalent quantities of quinine hydrochlorate and monopotassic arsenate in hot water, mixing the solutions and boiling, and after cooling, filtering, washing and drying the precipitate, and recrystallizing from dilute alcohol. If instead of monopotassic arsenate the official disodic arsenate be used, a fairly stable salt is obtained, which is represented by the formula $3C_{20}H_{24}N_2O_2{\cdot}2AsH_3O_4{\cdot}24H_2O$, which also contains 66 per cent. of quinine.

Pichi.

The Chilian drug "pichi" (*Fabiana imbricata*) has been the subject of chemical investigation by different persons, but with somewhat discordant results. According to Dr. Rodriguez, who first called attention to it as a remedy in disorders of the liver and urinary organs (*Pharm. Journ.*, [3], xvi., 542), the leaves and twigs yielded a crystalline fluorescent substance resembling æsculin, together with paviin and fraxin, two other constituents of horse-chestnut bark, a resin and an essential oil. In addition, Dr. Lyons subsequently reported the presence of a bitter alkaloid that he named "fabianine," yielding crystalline salts, and a crystalline neutral body rich in carbon (*Pharm. Journ.*, [3], xvi., 722). Then the drug was examined by Messrs. Nivière and Liotard, who failed to find any traces of an alkaloid or of the neutral crystalline compound, and attributed any therapeutic action it might exercise to the crystalline fluorescent glucoside principle (*Pharm. Journ.*, [3], xviii., 460). More recently (*Amer. Journ. Pharm.*, Aug., p. 405) it has been examined by Messrs. Trimble and Schroeter, using the wood and bark, and they have also failed to detect an alkaloid, but confirm the presence of a fluorescent glucosidal principle, as well as of a crystalline neutral resin soluble in ether, strong alcohol and chloroform, and insoluble in water, which they represent as of no medicinal value, and as having a composition agreeing with the formula $(C_{18}H_{21}O_2)x$.

Xanthoxylon Senegalense.

Messrs. Giacosa and Soare report upon a chemical investigation of the bark of the root of *Xanthoxylon Senegalense*, or "artar root" (*Chem. Zeit. Rep.*, Aug. 10, p. 220). The bark, which is described as being 2 to 10 mm. thick, red-brown with bright yellow spots when from young roots, or yellow and greyish-yellow from older ones, with a peculiar aromatic odour, and a taste at first aromatic and then acrid and pungent, yielded a fixed oil, a crystalline substance melting at 120°., and three alkaloids. The principal alkaloid, which is named "artarine," and represented by the formula $C_{21}H_{23}NO_4$, was obtained as an amorphous reddish-grey powder, melting with decomposition at 240° C., insoluble in water and benzol, difficultly soluble in chloroform and soluble in boiling 98 per cent. alcohol, ether and acetone. It forms salts of a golden yellow colour, the hydrochlorate being slightly soluble in water, and precipitated from an alcoholic solution by ether. The second alkaloid was obtained in minute quantity as a white powder, forming a pale yellow crystalline hydrochlorate soluble with difficulty in water and alcohol. The third alkaloid, occurring in blood-red needles, soluble in water, was not found in all the samples of bark examined. The neutral crystalline substance, separated from a ligroin extract of the bark, was colourless and tasteless, had the composition $C_{10}H_{10}O_3$ or $C_{14}H_{14}O_4$, and resembled cubebin in many reactions, but did not like it yield acetic and protocatechuic acids when fused with caustic potash. Lastly, another nitrogenous substance was obtained, which crystallized in pale yellow needles, but was not alkaline in reaction.

Hippomane Mancinella.

The euphorbiaceous manchineel or manzanillo tree (*Hippomane Mancinella*), which in the West Indies and South America has a reputation approaching that of the upas in eastern Asia, was not long since the subject of an investigation by A. Betancourt. According to him the acrid juice, which is used as an arrow poison, behaves when given internally as a drastic purgative, with a characteristic diuretic uniform action. It is said to be tasteless, and when administered in small doses to produce neither vomiting nor pain. But a dose of about thirty drops causes a burning sensation in the mouth and stomach, followed by diarrhœa, cramps, profuse sweating, cold in the extremities, and under certain conditions death. As an antidote alcohol is recommended (*Apot.-Zeit.*, Aug. 24, p. 892).

Testing of Essential Oils.

Recently it has been suggested that some of the methods adopted in the analysis of fats might be advantageously applied to the examination of essential oils, and attempts have been made to utilize the acid, ether, saponification and iodine numbers for this purpose. Messrs. Benedikt and Grüssner now propose to add to these the "methyl number," representing the amount of alkyl iodide formed when an essential oil is boiled with hydriodic acid, calculated always as methyl (*Chem. Zeit.*, Aug. 21, p. 1088). A considerable number of the oils examined gave negative results, but it is claimed that the figures obtained warrant the expectation that the method would be useful in such cases as indicating the relative amount of eugenol in the oils of cloves, clove stalks, cinnamon and cinnamon leaves, of anethol in oils of anise, star anise and fennel, and of apiol in oil of parsley.

Action of Chloral Hydrate on Glass.

An interesting observation of the action of chloral hydrate upon a blue glass bottle is reported by Herr Reuter (*Pharm. Centralh.*, Aug. 8, p. 477). The bottle was one in which chloral hydrate had been kept for a long time, and when it came into the possession of Herr Reuter it still contained a small quantity, of which the crystals lying next to the glass were then coloured intensely blue. Upon dissolving these crystals in water and filtering, the blue colour was removed, being due to a substance insoluble in water, but upon adding the residue to some chloral hydrate melted in a water bath it again dissolved and formed a clear blue solution. Further examination of the blue substance showed that it contained traces of nickel, derived, no doubt, from the smalt used as a pigment to colour the glass from which the bottle was made. The chloral hydrate after the removal of the blue substance corresponded to the requirements of the German Pharmacopœia, and when dissolved in ether-alcohol only separated a minute quantity of a white flocculent precipitate that was identified as formate. In this case attention was directed to the occurrence by the colour imparted to the chloral hydrate, but with a white glass this indication would be wanting, and Herr Reuter suggests further investigation as to the conditions under which glass is attacked by chloral hydrate, and whether the therapeutic properties of the latter are ever affected by the contamination.

Some time ago an article went the rounds of the press relating to "eucalyptus honey," said to be secreted by a species of "black bees" in Tas-

Eucalyptus Honey.

mania, and to possess important therapeutic properties (*Pharm. Journ.*, [3], xvii., 1016). After an interval of some months a communication was received from Tasmania, where the honey was alleged to be produced, challenging the existence of the "black bees," and disputing other details of the story (*Pharm. Journ.*, [3], xviii., 252). Apparently ignorant of, or perhaps ignoring the reclamation, M. Maquenne has been engaged in a serious investigation of a sample of "eucalyptus honey," with a view to determining whether it contained a special sugar, and what was the nature of the terpenic carbides and resins said to be present in it. In publishing his results (*Ann. Chim. Phys.*, [6], xvii., 495), M. Maquenne has prefixed to his paper a *résumé* of the original narrative, as if he accepted its statements as correct. Nevertheless, the terms of his conclusions are somewhat equivocal, being to the effect that "eucalyptus honey (*miel eucalypté*) is a mixture of dextrose and levulose, very near to ordinary inverted sugar, to which are added (*auxquels s'ajoutent*) a small quantity of aromatic products and a trace of gummy matter insoluble in alcohol."

Copaiba in Surgery.

In a communication to the *Boston Medical and Surgical Journal* (Aug. 8, p. 130) Dr. Beach points out that the long-continued use of copaiba as an internal remedy would appear to have gradually caused its value in surgical dressings to be lost sight of. Being impressed, while reading a description of "Medical, Surgical and Anatomical Cases," published by Lawrence Heister in London so far back as 1751, with the importance attached by the author to the use of balsam of copaiba on his dressings, Dr. Beach was induced to test the drug for this purpose in the Massachusetts General Hospital. The unusually rapid growth of "a handsome bed of rosy granulations, ready for the grafting process," was so clearly attributable to its effect, that he continued to use it, and it is now the accepted dressing for granulating surfaces in all the wards of the hospital. It is used with cotton waste, instead of charpie, the porous nature of the dressing favouring the ready absorption of any discharge and its disinfection by the copaiba, the odour of which covers the sour smell of any decomposed pus. On the supposition that the value of copaiba as a dressing might depend upon copaivic acid contained in it, Dr. Beach experimented with that substance separately, but with a negative result.

Fever Ptomaines.

In a report on the relation of the ptomaines or animal alkaloids to some of the infectious fevers, Mr. A. P. Luff publishes the results of a research having for its object to ascertain whether any ptomaines occur in the urine of typhoid and scarlet fever patients (*Brit. Med. Journ.*, July 27, p. 193). The method adopted was to agitate a quantity of urine, previously rendered alkaline by the addition of solution of sodium carbonate, with half its bulk of ether, then, after standing, removing the ethereal solution, filtering and shaking it with solution of tartaric acid, which upon settling carried down with it any animal alkaloid present in the form of a soluble tartrate. This tartaric acid solution was separated from the ether, rendered alkaline with sodium carbonate, and again agitated with half its bulk of ether, the ether being afterwards separated and evaporated, and the residue dried over sulphuric acid. When normal urine was examined in this way no alkaloid was detected; it was therefore assumed that when an alkaloidal substance was obtained by this process from urine of a patient suffering from one of the infectious fevers, it would have been one produced within the system during the course of the fever, care being taken to work only upon urine collected from patients who neither previously nor at the time were taking any alkaloidal or antipyretic medicine. From the urine of a female typhoid patient, collected while the fever was at its height and her temperature ranged from 102·5° to 104° F., Mr. Luff obtained a small quantity of a white crystalline substance, which exhibited all the characters of an animal alkaloid, but which when converted into hydrochlorate gave reactions not corresponding with those given by any previously known animal alkaloid. The urine from a male typhoid patient, passed during the twenty-second and twenty-third days and with the temperature ranging from 99·5° F. to subnormal, gave negative results. Urine collected from scarlet fever patients during the height of the fever yielded a small but appreciable quantity of a white crystalline substance, soluble in water and faintly alkaline, which gave with reagents precipitates that also differed from those given by any other known animal alkaloid.

Senna Pods.

The therapeutic action of senna pods, as differing widely from that of senna leaves, is the subject of an interesting note by Dr. A. W. Macfarlane (*Lancet*, July 27, p. 164). An infusion of senna pods presents the advantage of being almost free from taste and devoid of the characteristic odour and flavour of the leaves. According to Dr. Macfarlane it appears to increase activity in the muscular movements of the whole gastro-intestinal canal, acting quite as much on the colon and rectum as on the small intestine. It is slower in its action than an infusion of the leaves, but equally certain; an ordinary dose producing one motion, seldom more, of soft consistence, in from eight to ten hours, without exciting congestion of the pelvic vessels, increasing hæmorrhagic or menstrual discharges, or causing griping or flatulence. When administered regularly for several nights it promotes natural evacuation of the bowels, so that the quantity taken has to be decreased and eventually stopped. It has been found useful in cases of hæmorrhoids and in constipation of children as well as of the aged. The dose recommended for an adult is from six to twelve pods, and for the young and very aged, from three to six pods, infused in a claret-glassful of cold water for six or eight hours. A liquid extract has also been used with advantage, the dose being from half a drachm to a drachm in a wine-glassful of cold water at bedtime. The fact that the senna "legumes are much milder in their operation than the leaflets," is mentioned by Pereira, while in the 'Pharmacographia' it is stated that "the Arabian and medieval physicians of Europe used both the pods and the leaves, preferring however the former," and that "the pods (folliculi sennæ) are still employed in some countries."

Lobeline.

At the recent Brazilian Congress of Medicine and Surgery held at Rio Janeiro, Dr. Silva Nunes related his experience with the alkaloid lobeline in asthma. He began with one-sixth of a grain given at long intervals, and gradually increased the quantity until six grains were given without producing any toxic effects. Administered subcutaneously it does not produce any local difficulties, and where an immediate action is desirable Dr. Nunes recommends this form of administration. He concludes that lobeline does not possess emetic or nauseating properties, and does not produce the toxic effects attributed to it in the doses he recommends, viz., ¾ to 6 grains daily for adults and ⅙ to ¾ grain for children. He states that the cases of asthma treated by him with lobeline have remained permanently cured. He believes that its use is indicated in other convulsive affections, such as tetanus. If Dr. Nunes' results were obtained with the alkaloid in white powder described by Messrs. Lloyd, it would appear that this alkaloid represents a part only of the active properties of the drug.

Kola Nuts.

Surgeon R. H. Firth reports in the *Practitioner* (July, p. 27) the results of a careful study made with the view of ascertaining if the claims made for kola nuts as an efficient substitute for tea and coffee for army purposes were well founded. He has arrived at the conclusion that made into an infusion like tea it is an efficient substitute, particularly for those affected with diarrhœa, by reason of its astringency, but that its alleged antagonistic action to alcoholic sequelæ is not capable of proof. He remarks also that continual mastication of the fresh nut is the best method of using it, and points out that care should be taken that neither *Garcinia Kola* nor the seeds of *Sterculia cordifolia*, which contain no caffeine, should be substituted for it.

Nitrobenzol.

Mr. R. Prosser White has directed attention in the *Practitioner* to the poisonous symptoms experienced by the workmen employed in the chemical factories where nitrobenzol is made. It causes marked anæmia, especially of the mucous membranes, the skin assumes a dirty leaden-blue colour; there is great heaviness and drowsiness, the hands and feet easily become chilled and the extremities cold; the men have an unsteady gait as if drunk, and if they fall cannot pick themselves up, and altogether there is great loss of energy and depression of vitality. The urine becomes darkened and smoke-coloured, or even port wine coloured, and smells slightly of bitter almonds. It is obvious, therefore, that it is important in the interests of toxicologists and medical jurisprudence that these symptoms (which are given in much fuller detail in the *Practitioner*) should be well known, since stupefaction arising from nitrobenzol poisoning might easily be mistaken for drunkenness. In view also of the sale of nitrobenzol under the name of artificial essential oil of almonds and its use as a cheap flavouring agent, the poisonous character of this body cannot be too widely known.

Polygala butyracea.

The African oil seeds used by the natives of the Timné (coast) and of the Korauko (interior) country near Sierra Leone, have been examined by Messrs. Heckel and Schlagdenhauffen, who have also described the plant yielding the seeds under the name of *Polygala butyracea*. The plant is a shrub about 6 or 7 feet high, with linear lanceolate, sessile, distant hairy leaves. It differs from *P. rariflora* in having larger leaves, persistent bracts, and in the shape of the posterior petals, which are straight, elongated, distorted and recurved at the apex. From *P. multiflora*, which has also persistent bracts, it differs in the hairs not being arranged in longitudinal lines on the stem, in the longer leaves, shorter racemes, and in the pedicels shorter than the outer sepals, in the narrower petals, ciliated keel and smooth capsule. The author is, however, ignorant whether the two species alluded to, which are also natives of the country around Sierra Leone, have oily seeds. The seeds of *P. butyracea*, which, as well as the plant, are called in the Timné dialect "maloukang," and "ankalaki" in that of Korauko, are employed by the natives to afford an edible fat. This forms a yellowish buttery mass of an agreeable nutty flavour, which softens at 28° to 30° C., and begins to melt at 35° C., not fusing completely until a temperature of 52° is reached. After melting it remains fluid for some time, and does not begin to solidify until the temperature falls to 33°. Its sp. gr. is 0·904 at a temperature of 35° to 38° C. This fat is contained both in the albumen and cotyledons, but aleurone grains were not detected. The fat was found to consist of 30·5 per cent. of olein, 57·54 per cent. of palmitin, 4·795 per cent of free palmitic acid, and 6·165 per cent. of myristin. Traces of formic and acetic acid were also detected. These seeds appear to be very similar if not identical with those exhibited under the name of malukeh seeds in the Sierra Leone Court at the late Colonial and Indian Exhibition.

Cascara Sagrada.

The temporary scarcity of cascara sagrada appears to be now over, plenty of bark of fair quality being offered in the American market. Dr. Squibb (*Ephemeris*, July, p. 1244) remarks that even when good bark was scarce it could have been bought at 85-90 cents per lb., and that the bark chipped or steamed off at improper seasons was always present in the New York market in abundance at 40-60 cents per lb. Now there are large quantities from Washington Territory and Oregon, as well as from California, offered at 18-20 cents per lb. From specimens of the plant recently sent to this country as that of *Rhamnus Purshiana*, there is reason to suppose that the bark of *R. californica* is also collected under the name of cascara sagrada. Dr. Squibb believes that the bark of *Rhamnus Frangula* is likely to prove a better agent and to prove far more uniform in quality than that of *R. Purshiana*, since it is always obtainable in quantity, being a bye product in the manufacture of gunpowder, the wood being used under the name of dogwood for charcoal. Indeed, it has been the gossip in the New York market that preparations of *R. Frangula* have been offered there as tasteless cascara.

Galactane.

The new vegetable introduced a few years ago by M. Pailleuse under the name "crosnes," and of which the tuberous root-stocks are the edible portions, has recently been described and figured in the *Revue des Sciences Naturelles Appliquées*. An analysis of the roots has been made which shows them to contain 16·5 per cent. of a newly-discovered carbohydrate, a substance allied to dextrin and intermediate between sugar and starch (*Gard. Chron.*, Aug. 10, p. 164), to which the name of "galactane" has been given.

At the recent Congress at Paris specimens of exalgine were exhibited in two forms; the one in

Exhibits at the Paris Congress.

flat prisms like those of bicarbonate of potassium, and the other in needles resembling those of strychnine. The former is said to be crystallized from toluol and the latter from water or spirit. A series of interesting chemicals were shown by the Pharmacie Centrale of Paris, including digitin, digitalin in yellowish powder, digitaline in crystalline powder, quassiin, both amorphous and crystallized. Specimens of adeleine, breine, bryonin, breic and bryonic acids, hydroquinine, dihydroquinine and derivatives of cinchonine, quinidine and cinchonidine, obtained by hydrogenation in acid solution; also emetine, pseudoemetine and ipecacuanhic acid, were shown by Dr. Petresco, of Roumania. There were also specimens of amorphous strophanthin from *S. Kombé* and crystalline strophanthin from the glabrous strophanthus seeds of the Gaboon, and pods and seeds of both species; as well as a large series of new drugs, including many of those most recently introduced. These specimens, which had been carefully mounted and labelled under Dr. R. Blondel's superintendence, were presented by the exhibitors, and are intended to form a nucleus for a materia medica museum for the Therapeutical Society of Paris, which doubtless will rapidly assume considerable importance, since under the auspices of the Ministry of Commerce Dr. R. Blondel will receive specimens of all the drugs shown in the Paris Exhibition for an official report which he is commissioned to make. Dr. Blondel was one of the secretaries of the Congress of Therapeutics and Materia Medica, and it was through his courtesy that the reporter for this Journal was enabled to give summaries of several papers which were taken as read at the Congress, before they were actually published in detail in France.

CINNAMYLCOCAINE IN COCA LEAVES.

BY B. H. PAUL, PH.D., AND A. J. COWNLEY.

In testing coca leaves it has generally been assumed that if the alkaloid obtained was crystallizable from petroleum spirit it could be regarded as cocaine. We have long seen reason to doubt the justice of that assumption, and have met with several samples of coca leaves which would have been valued much too highly if the crystallizable character of the alkaloid from petroleum spirit had been taken as a measure of the amount of cocaine. Quite recently we have examined a sample which gave a large yield of alkaloid, upwards of 1·75 per cent., but containing very little cocaine, though the amount of alkaloid crystallizable from petroleum spirit was nearly ·5 per cent. Upon examination this crystallizable alkaloid was found to give reactions indicating that it was in reality cinnamylcocaine. Thus, for instance, on oxidation with potassium permanganate it gave off abundance of bitter almond oil. Liebermann's conjecture that this base might occur naturally in coca leaves appears therefore to be correct, and this circumstance will have to be taken into account in the examination of coca leaves. The mere fact of the alkaloid obtained being crystallizable from petroleum spirit certainly cannot be relied upon as evidence that it is true cocaine.

Analytical Laboratory,
13, *Fenchurch Avenue, E.C.*

THE OILS OF WINTERGREEN AND BIRCH.[*]

BY HENRY TRIMBLE AND HERMANN J. M. SCHROETER.

The history of these two oils has recently been written by Dr. E. R. Squibb,[†] and the papers there referred to from the first in 1842 by Professor Proctor to the last in 1884, by Mr. H. P. Pettigrew, can all be found in the *American Journal of Pharmacy*.

From a perusal of the papers by these two authors and that of Cahours[‡] one finds that the oils are similar in physical properties, that they are largely composed of methyl salicylate, that one of them, oil of wintergreen, contains approximately 10 per cent. of a terpene according to Cahours, but only 0·3 per cent. according to Pettigrew, and according to the latter that the oil of birch is composed of methyl salicylate only, but according to Proctor that the two oils are identical. On account of the variance of these authorities, and recent statements about the "Artificial Oil of Wintergreen," we have been led to investigate anew the chemical composition of the oils, and in that way compare them. It is the exception when a product, as simple as oil of birch is described by Pettigrew to be, is produced in nature; such substances are more frequently found to be made up of a series of compounds. With this principle clearly in view, we procured four samples, two of each oil.

Sample I., wintergreen oil, was obtained through the kindness of Mr. C. M. Driggs, of White Haven, Penna., whose acquaintance with the distillers of that district enabled him to vouch for the genuineness of a sample of each.

Sample II., oil of birch, from the same source.

Sample III., oil of wintergreen, from Mr. Underhill, of New Hampshire.

Sample IV., oil of birch, this and sample III. had been a number of years in the collection of Professor J. M. Maisch, and were kindly given by him for this investigation. At least one of them, the wintergreen, was examined by Mr. Pettigrew.

Physical Properties.—The following tabular statement of the specific gravities and boiling points shows a remarkable similarity among the samples in this respect.

Sample	Boiling Point, C.	Specific Gravity at 15° C.
I. Wintergreen .	216°	1·1838
II. Birch . . .	217°	1·1840
III. Wintergreen .	216°	1·1845
IV. Birch . . .	217°	1·1840

Since these data have shown considerable variation at the hands of different investigators, we used every precaution to arrive at correct results, and from them one cannot but conclude that these figures could be of no practical value in distinguishing the oils.

Chemical Composition.—Two methods of saponifying these oils have been proposed, one by boiling for some hours with excess of concentrated potassium hydrate solution, which will be designated the *hot process*, and the other, proposed by Professor J. U. Lloyd,[§] by pouring the oil, slowly, with constant stirring, into a concentrated solution of potassium hydrate heated to 82° C.

It was noticed by Procter that when the oil of wintergreen was dissolved in potassium hydrate solution in the cold it formed a solid mass, from which the oil separated unchanged on the addition of hydrochloric acid. We found no separation of the oil after heating to 82° C. as directed by Lloyd, although several trials were made with both methods, and we finally adopted a modification of Lloyd's formula, using about one-half the potassium hydrate recommended in it, attaching the flask to an upright condenser and heating on a water-bath for one-half hour.

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[*] Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 57. From the *Amer. Journ. Pharm.*, August.

[†] *Ephemeris*, October, 1887, p. 951.

[‡] *Ann. Chim. et Physique*, [3], x., p. 327.

[§] U. S. Dispensatory, 16th edition, p. 100.

By this method we saponified about 800 grams of each oil. Both oils after saponification possessed a characteristic fragrant odour, entirely distinct from that of the oil. The clear solutions were agitated with purified petroleum ether, b.p. 25° to 45° C., and the process repeated with three portions on each. The aqueous solutions, after final separation from the petroleum ether, were almost free from odour, and were set aside for treatment with acid.

The Hydrocarbons.—The different portions of petroleum ether were mixed, keeping those from the two oils separate, the solvent in part recovered by distillation, and the residues set aside to evaporate spontaneously. When the solutions had been reduced to a small bulk, they were transferred to small tared bottles, and, with stoppers removed, were heated for some hours in a water-bath to constant weight.

The yield was { from oil of wintergreen, 0·3 per cent.
„ „ birch 0·447 „

Another portion of each oil was saponified by the *hot process*, in which the flasks containing the mixtures were attached to upright condensers and heated for several hours on sand-baths. The saponified oils were then distilled as long as oily drops separated from the distillates, and each of these distillates agitated with ether. The ethereal solutions were treated as the above petroleum ether extractions and the yield found to be { from oil of wintergreen, 0·22 per cent.
„ „ birch, 0·084 „

These residues, with those from the petroleum ether, correspond to the hydrocarbon noticed by Cahours in oil of wintergreen, and named by him *gaultherilene*.

The products from the two oils were similar in odour. They both solidified on standing for a day or two, or at once on cooling. That from wintergreen commenced to melt at 10° C. and was clear at 15° C., but the hydrocarbon from birch did not commence to melt below 18° C. and was clear at a few degrees above that temperature. The variation in yield may now be accounted for by supposing that the hydrocarbon in oil of birch exists in greater quantity, as shown by our method of extracting it, but in the *hot process*, in which distillation was used in the separation of the hydrocarbon, a part of that from the birch, probably not being so volatile, was left behind in the distillation.

Even with the comparatively large amounts of oils used the quantities of the hydrocarbons were necessarily limited, therefore they were reserved for a determination of their chemical composition, rather than risk the liability of loss in determining the specific gravity and boiling point.

It may be said, however, that both were lighter than water, and had boiling points near 200° C. No residues remained on the further application of heat. Portions of each were dissolved in alcohol and the absence of traces of salicylic acid determined by ferric chloride.

Composition.—The hydrocarbon obtained by our method from oil of wintergreen, Sample I., was submitted to combustion with the following results:

0·0981 gram substance gave 0·3122 CO_2 and 0·1048 H_2O.

	Found.	Calculated for $C_{15}H_{24}$.
C .	86·79 per cent.	88·23 per cent.
H .	11·87 „	11·77 „
	98·66	100·00

Vapour Density.—0·090 gram substance displaced 11·6 c.c. air.

Found 6·73
Calculated for $C_{15}H_{24}$ 7·07

The combustion was repeated with a larger amount of substance, with almost identical results, and another determination of the vapour density of a sample from the same oil by the *hot process* gave 6·90.

The hydrocarbon from oil of birch, sample II., gave the following results on combustion. 0·1142 gram substance gave 0·366 CO_2 and 0·1201 H_2O.

C	87·41 per cent.
H	11·69 „
	99·10

Vapour Density.—0·1121 gram substance displaced 14 c.c. air.

Found 6·95
Calculated for $C_{15}H_{24}$ 7·07

Some of these determinations were duplicated without perceptible variation from the above.

The results point to the existence of gaultherilene in both oils, and that it is a sesquiterpene of the formula $C_{15}H_{24}$. The only doubt we feel, in concluding this, is the possibility of the vapour density being a coincidence, since the hydrocarbon may be composed of two or even more compounds, because it appears to be made up of a solid and a liquid portion.

The Acids.—We next directed our attention to the alkaline solutions which were set aside for treatment with acid, and submitted them separately to the following treatment.

On the addition of chemically pure hydrochloric acid in slight excess, salicylic acid separated. This precipitate was collected on a muslin strainer, washed with a little cold water, pressed, washed, pressed again and recrystallized from boiling water. The washings were concentrated, the acid as far as possible recovered, purified, mixed with the pressed lot and the whole dried at 60° C.

The dry mass was pulverized to reduce its bulk and then macerated successively with three portions of petroleum ether. The latter was partly recovered by distillation and the residue allowed to stand and become cool, when a crop of crystals of salicylic acid separated. After removing these the liquid was allowed to evaporate spontaneously; the crystalline residue from the evaporation, although small in amount, was purified by crystallizing several times from boiling water and petroleum ether, when the crystals became pearly in character, and gave the odour of benzoic acid when dissolved in boiling water. On the addition of ferric chloride solution only faint evidence of salicylic acid was obtained. The crystals from oil of wintergreen by this process melted at 125° C., and those similarly obtained from oil of birch melted at 124° C. It may be recalled that benzoic acid melts at 121·4° C.

The crystals from oil of wintergreen yielded the following results on combustion:—

0·0712 gram substance gave 0·1771 CO_2 and 0·0311 H_2O.

	Found.	Calculated for benzoic acid.	Calculated for salicylic acid.
C .	67·84 p. c.	68·85 p. c.	60·87 p. c.
H .	4·85 „	4·92 „	4·34 „
O .	27·31 „	26·23 „	34·79 „
	100·00	100·00	100·00

Vapour Density.—0·0671 gram substance displaced 13·3 c.c. air.

Found 4·36
Calculated for benzoic acid 4·23
„ „ salicylic acid 4·78

The crystals similarly obtained from oil of birch gave on combustion the following results:—

0·0812 gram substance gave 0·2035 CO_2 and 0·035 H_2O.

C	68·35 per cent.
H	4·79 „
O	26·86 „
	100·00

Vapour Density.—0·0811 gram substance displaced 16·3 c.c. air.

Found 4·30
Calculated for benzoic acid 4·23

The Alcohols.—The original liquid after separation of salicylic acid was repeatedly distilled, and the first portion saved each time in order to recover the alcohol. This was finally macerated with and distilled from four lots of calcium oxide.

The alcohol from wintergreen had the sp. gr. 0·801 and boiled at 67° to 73° C. The alcohol from birch had the sp. gr. 0·8017 and boiled at 67° to 73° C. When submitted to the iodoform test, both quickly gave the characteristic odour, and, after standing, deposited yellow crystals of iodoform, indicating the presence of small quantities of ethyl alcohol.

Artificial Oil of Wintergreen.—This preparation has been manufactured and offered for sale by a few firms in recent years. So long as it is sold for what it really is, no objection can be attached to the sale of it. But the temptation to replace the true oils by the artificial product will grow stronger as the price of the latter becomes lower, and no doubt it is used to mix with them at the present time.

In view of the fact that the oil of birch has in part displaced that of wintergreen, Dr. Squibb[*] nearly two years ago made some remarks about the similarity of the three, suggesting that oil of birch should be called by its correct name, and that the Pharmacopœia by its present definition is lending its authority to perpetuate the error. These statements have since called forth from others the recommendation that the artificial oil should be made officinal at the next revision of the Pharmacopœia. How far this would be undesirable may appear on examining the following analysis of a representative sample of the commercial artificial product, and reflecting on the present difference between this and either of the natural oils, and the still greater difference that would naturally follow the recommendation of the artificial methyl salicylate by the U.S. Pharmacopœia. If it is not a pure compound now, when it is competing for recognition, what would it degenerate to if it should become established by the recommendation of the Pharmacopœia?

The sample examined by us had a boiling point of 217° C., and a sp. gr. of 1·1833 at 15° C. Immediately on the addition of potassium hydrate the characteristic wintergreen odour disappeared, and a disagreeable phenol-like odour was noticed. Petroleum ether removed nothing from this alkaline solution. On adding chemically pure hydrochloric acid a very bulky precipitate separated. This was collected, pressed, purified and dried, as in the case of the acids from the oils, when it was found to be about four times as bulky as they. In weight, however, it was the same. Its melting point was 150° C. Pure salicylic acid melts at 156° C. The powdered acid was heated with petroleum ether, and the solution, after removing the first crop of crystals, was allowed to evaporate spontaneously.

The residue from this evaporation was much larger than that obtained from the oils, and, after purification, was found to melt at 122° C., or only six-tenths of a degree above benzoic acid. The crystals gave off the characteristic odour of benzoic acid when warmed and when dissolved in hot water, and otherwise corresponded with that acid.

0·1012 gram substance gave 0·2548 CO_2 and 0·0443 H_2O.

	Found.	Calculated for benzoic acid.
C . .	68·67 per cent.	68·85 per cent.
H . .	4·87 „	4·92 „
O . .	26·46 „	26·23 „
	——100·00	——100·00

Vapour Density.—0·062 gram substance displaced 12·5 c.c. air.

Found 4·29
Calculated for benzoic acid 4·23

Both the combustion and the vapour density determination were repeated without important variation. We made no exact determination of the proportion of benzoic acid present, but it was not far from 15 per cent. of the total acid precipitated. In the acid precipitated from the oils it was not more than 1 per cent. Great loss necessarily occurred in the process of purification.

Summary I.—Previous investigators have found oil of wintergreen to consist of methyl salicylate and a hydrocarbon, called gaultherilene; and oil of birch to be composed of methyl salicylate alone.

II. We find in addition to methyl salicylate, in both a hydrocarbon of the formula $C_{15}H_{24}$, and small quantities of benzoic acid and ethyl alcohol. The amount of the hydrocarbon is from 0·3 to 0·447 per cent., and it becomes solid on standing a short time or on cooling. It is probably made up of a solid and a liquid portion.

III. The oils are physically and chemically identical, the only difference detected being in the melting point of the hydrocarbons. That from wintergreen melted at from 10° to 15° C., and that from birch at 18° C. This may depend on the time of collecting the plants or on the age of the oils.

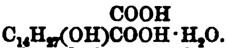
IV. A representative sample of artificial oil of wintergreen possessed the physical properties, but not the chemical composition of the natural oils, nor was it pure methyl salicylate.

V. The artificial product, when unmixed with the natural oils, may be identified by the addition of excess of potassium hydrate, when all odour of wintergreen will disappear.

VI. It would be undesirable, in the next U.S. Pharmacopœia, to replace the almost pure natural oils by an impure methyl salicylate of variable and uncertain composition. No reasonable objection can be offered to the designation by the Pharmacopœia, as oil of wintergreen, the product from either of the natural sources.

AGARIC ACID.[*]

Since the recommendation in 1882 by Dr. J. M. Young of the use of agaracine for suppressing perspiration, it has been subjected to numerous chemical investigations. In 1883, E. Jahns, in addition to other substances, separated a body from white agaric (*Polyporus officinale*), which proved to be identical with the crystalline agaric acid obtained by Fleury in 1870, and with the agaracine of Schoonbrodt. This body is a dibasic, triatomic acid, homologous to malic acid. Its formula is—



$$C_{14}H_{27}\overset{COOH}{(OH)}COOH\cdot H_2O.$$

Schmieder confirmed these results, and Hofmeister proved that, of the numerous bodies contained in agaric, it was only this agaric acid, or agaracinic acid, which possessed the power of reducing perspiration. In spite of these conclusions, the substances sold in the shops under the names of agaracine or agaric acid are by no means simple bodies. Thus, Hofmeister found that the agaracine of commerce contained agaricol, a substance which was totally inactive, and was to be regarded as a contamination, while the agaric acid contained a mixture of the so-called "red rosin," was the probable cause of the cathartic action of agaric. Pure agaric acid is a white, glistening, light crystalline powder, which under the microscope is found to consist of quadrangular tabular crystals, and when recrystallized out of absolute alcohol, forms groups of needles or rosettes. The melting-point is 138° C.

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[*] *Ephemeris*, October, 1887, p. 954.

[*] From the *Therapeutic Gazette*, August 15.

The free acid is only slightly soluble in cold water, but readily soluble in boiling water, and on cooling is redeposited in a crystalline form. All the salts of this acid in combination with alkalies are readily soluble, but the combinations with the heavy metals, on the other hand, are insoluble. Hofmeister has recently subjected the pure agaric acid to accurate physiological investigation, and his results are reported in the *Therapeutische Monatshefte* for June, 1889. From the similarity of action of agaric acid and atropine on the sweat secretion, it is of interest to determine as to whether this similarity is restricted to this single point, or whether the parallelism extends to other actions.

Of Dr. Hofmeister's results, the following deserve attention from their general interest. In the first place, he found that if agaric acid should perhaps not be included among the list of actively poisonous substances, it was not to be regarded as inert.

Applied locally, marked irritation is produced, which in subcutaneous injection produces marked inflammation, extending to suppuration. An internal administration of doses from 17½ to 15 grains produces vomiting and diarrhœa. In cold-blooded animals it produces gradually increasing paralysis and reduction of activity of the heart. Agaric acid is, however, not capable of antagonizing the action of muscarine,—that is, it will not, like atropine, start the heart of a frog which has been arrested through the action of muscarine. In warm-blooded animals, from the slow absorption, internal administration of the pure acid does not produce any very marked results. In subcutaneous or intravenous injections of the soluble sodium salt, the action is principally exerted on the pneumogastric and vaso-motor centres of the medulla; both centres are at first excited, and then paralysed. As a consequence, there is at first slowing of the pulse and increase of blood-pressure, followed by fall of the latter. Death follows after convulsions, from arrest of respiration; but in animals in which artificial respiration is maintained, death is not prevented, but is then attributable to great reduction of blood-pressure. Unlike atropine, agaric acid possesses no mydriatic action, but when the sodium salt is instilled into the conjunctiva severe irritation is produced, and, indeed, slight contraction of the pupil results, which may, however, be overcome through the use of atropine. The influence of agaracine on the sweat secretion is not central, but depends upon direct action on the secreting apparatus. Irritation of the sciatic nerve in animals under the influence of agaracine does not produce any secretion of sweat, although pilocarpine is even now active. Therefore, the similarity between atropine and agaric acid is confined to the influence of these two drugs on the sweat-glands. The degree of action is, however, different. Thus, Brobsting estimated that the influence of agaricine on the perspiration is twenty times less than that of atropine, and Hofmeister concludes that even this estimation is still too favourable for the agaric acid.

Hofmeister's investigations would seem to indicate that for therapeutic purposes the pure agaric acid alone should be employed, and that when this substance is given internally there need be no fear of vomiting or diarrhœa. In Professor Kahler's clinic doses of ¾ to 2 grains were given repeatedly without any symptoms of poisoning, with the exception of transient nausea. Doses of from ⅙ to ½ grain were exceptionally well borne; and since the power of reducing perspiration only occurs after several hours after the administration, and then persists for twenty-four hours, the employment of repeated small doses is greatly to be preferred to the administration of a single large dose. The subcutaneous injection of the soluble sodium salt is to be avoided, as tending to produce severe local irritation. In this connection we may recall that Dr. Pope, in the *Therapeutic Gazette* for June 15, 1888, noted that doses of ⅙ of a grain in the majority of cases completely controlled the night-sweats of phthisis, even after atropine had failed. Dr. Radcliff also likewise reported in the same number of the *Gazette* several cases of night-sweats which were relieved through the use of this remedy.

SULPHUR IN JAPAN.*

What prevents Japan, and more particularly the Hokkaido, from taking a second place to, or rivalling with, Sicily as a sulphur producing country, are the absence of facilities for increasing the output of sulphur, and for shipping it. At present there is only one place in the Hokkaido where sulphur is worked on any scale, and that is Atosanobori, near Kushiro, on the south-east coast of this island. In last year's trade report various improvements in that district are mentioned, and I may here add a few observations on the quantity of this mineral supposed to exist at that spot, and the present cost of working it. This information I have derived from a practical source, and the figures mentioned may be taken as approximately correct.

At Atosanobori the mine is really a hill or small mountain, part of an extinct volcano. The sulphur covers a considerable portion of the slopes of the hill and of the sides of the old crater. Supposing the ore to be only 4 or 5 feet thick on the surface, there must be at this place over 1,000,000 tons of high class ore. Recent borings (by Japanese) give the thickness of ore as 30′ 00″ in some places, but it is probable, however, that the richness of the ore decreases with the depth below the surface. It would be quite safe to count upon at least 5,000,000 tons of good ore. At present the ore yields over 50 per cent. of pure sulphur, a small portion of it being almost pure. The residue for refining kettles would well repay a second treatment, as it appears to contain a considerable percentage of sulphur, as much as 15 per cent. probably, or about the average yield of the whole of the Sicilian sulphur ore.

The present output from Atosanobori does not exceed 10,000 tons of sulphur per annum (output about 9,000 tons in 1888). The cost of the sulphur free on board at Kushiro would be about $10 (£1 10*s.* 10*d*).

The advantage that Atosanobori possesses over the Sicilian source of supply is the very much greater richness of the ore, and the fact that the deposit is concentrated at one spot; and for these reasons the cost of mining, refining, and transport should be very much less in the former case than in the latter. On the other hand, Sicily has a material advantage in the lower freights to the Liverpool and New York markets. Notwithstanding this, however, the balance is considerably in favour of the Hokkaido source of supply if well worked.

From a recent report, it appears that the annual production of Sicilian sulphur amounts to about 400,000 tons. This quantity far exceeds any possible output in the near future from the Hokkaido mines, but there is no reason why the more easily worked Zezo sulphur, though in comparatively small quantities, should not also find a ready market in Australia, England and America. Its cost, however, should not exceed more than about half its present cost of £1 10*s.* 10*d.* per ton. Judicious outlay of capital and good management would bring about this result of so much importance to this island. About 9,800 tons were shipped during last year from Kushiro to Hakodate, and about 2,800 tons from Kushiro to Yokohama direct; 1,280 tons went from this port to Yokohama in Japanese steamers. Thus about 4,080 tons were shipped from the Hokkaido to Yokohama presumably because there were no vessels to take the sulphur direct to the ports of delivery. Of the 9,800 tons shipped to Hakodate, 3,609 tons went to San Francisco, and with the amount shipped to Yokohama, about half of the 9,800 tons was lying in Hakodate at the end of last year awaiting shipment. These details show more especially the absence of shipping facilities from this port.

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* From a report on the trade of Hakodate, by Mr Acting Consul Bonar.

Besides Atosanobori there exist in the Hokkaido sulphur deposits at Esau, Kobuye, Iwanai, Itashikeoni on the main island, and Kunashiri, on the island of Etorup. At all these places this mineral has been worked at some time or other, but apparently in such a fitful way as to present no results worth mentioning. I have heard, however, that steps are being taken to work both the Iwanai and Kunishiri mines energetically, and brimstone from the latter mine has been bought at £1 6*s.* 2*d.*, and quoted as low as £1 2*s.* 4*d.* At Iwanai, as at Atosanobori, coal is found in considerable quantities close to the sulphur deposits.

THE VANILLA TRADE OF BORDEAUX.*

One of the most delicate articles of trade upon the Bordeaux market is vanilla, which is imported into France from various countries producing this plant. Vanilla, says Consul Roosevelt of Bordeaux, belongs to the family of orchids, and was first found in the forests of Mexico. It is a plant furnished with thick oblong green leaves; the vine sometimes attains a height of 45 feet. The principal centre of production of vanilla is the littoral of Vera Cruz, and it is also found on the west slope of the Cordilleras, in Java, Mauritius, Seychelles, Tahiti, Cochin China, India, and in some of the islands of the West Indies. The vine in cultivation begins to bear the third year after planting, and continues to bear for thirty years. Each vine annually produces from forty to fifty-five capsules or seed pods. The harvest commences in the month of April and lasts until June; the pods are gathered before arriving at complete maturity. There are two different methods in vogue for preparing vanilla for the market. The first consists in harvesting the capsules after they have lost their green tint. Woollen sheets are spread upon the ground, and when thoroughly heated by the sun, the pods are spread upon the sheets and exposed to the sun for a certain period. The pods are then put into boxes covered by a cloth, and again exposed to the sun. The fruit should become a coffee colour twelve or fifteen hours after this last exposure. If, however, this colour is not obtained, the vanilla is again submitted to the heat of the sun. This process occupies about two months, at the expiration of which the vanilla is packed in tin boxes containing about fifty pods each.

The second process consists in tying together about a thousand pods, and plunging them into boiling water to bleach them, after which they are exposed to the sun for several hours, and then coated with oil or wrapped in oil cotton to prevent the pod from bursting. During the drying, the pod exudes a sticky liquid, which is expedited in flowing by gentle pressure of the pods two or three times a day. In preparing the capsule for market it loses about one quarter its original size. Vanilla is classified in four qualities. The pods of the *primeira*, or first quality, are from seven to nine inches in length, and proportionally large; they possess in greater abundance the characteristic and agreeable perfume which gives to the product its greatest value. The *chica punia* is less fine than the preceding. The *sacoate* and *basura* are the smallest. The vanilla vine is at times covered with an efflorescence of a silvery brilliance, producing an essential salt similar to that found in the pod, and which is diffused on the outside of the capsule. This is called vanilla rime, and is in great demand on the Bordeaux market. The quantity of vanilla produced in the French colonies in 1886 was as follows:—Island of Réunion, 598,227 kilograms (kilogram = 2·204 lbs. avoirdupois); Guadeloupe, 37,430 kilograms; St. Marie, Madagascar, 12,743 kilograms; Island of Mayotte, 5,461 kilograms; and Tahiti, 13,586 kilograms. Until 1845, the exportation of vanilla from the Island of Réunion was only about six or seven pounds annually, but by degrees the industry increased until at the present time, owing to the excellent quality and quantity produced, Réunion is an important rival and competitor with Mexico.

RADIATING POWER OF FLAMES.*

At a recent meeting of the Berlin Physical Society, Dr. R. Von Helmholtz communicated the results of his experiments on the radiating power of flames. The problem which he had set before himself was to determine the relationship between the radiant energy of flames and the amount of gas consumed for their production. The latter was measured by the fall of the gasometre globe which contained the gas, the former by means of a bolometre, for each of whose scale divisions the equivalent value in heat units had been carefully determined by three different methods. The radiating energy of the flames depended upon a number of conditions which were each severally investigated: as, for instance, the size and shape of the flames, the amount of foreign gases introduced, and the ratio of the amount of oxygen to the amount of gases with which it was mixed. For the purposes of comparative measurements, a moderately high flame was chosen, which produced no smoke and was 6 mm. thick. Luminous flames radiated more energy than non-luminous, and it was proved by an extended series of careful quantitative experiments that the radiating power of the flames was not dependent upon their temperature. From this it follows that Kirchoff's law does not hold good for flames—a result which is, however, quite in accordance with the limitations he put to his law for those cases in which heat is directly converted into radiating energy. In the case of flames it must be borne in mind that chemical affinity comes additionally into play; the speaker entered fully into the influence of this upon the radiation of energy, and endeavoured to make it clear by means of an extremely interesting hypothesis. After this he stated the numerical data which he had obtained for both luminous and non-luminous flames, produced with a series of gases—hydrogen, carbonic oxide, methane, coal gas, methyl alcohol, etc. Starting as a basis with Julius' statement that the products of combustion are the only criteria of the amount of radiation, and hence calculating the radiating energy of the flames, he obtained values which corresponded very closely in most cases with those actually observed. Finally he calculated the total useful effect which can be obtained as radiant energy from the gases which are being consumed in the production of the flame. From this he arrived at the interesting result that it is far more economical to use the gases for driving a dynamo which supplies incandescent lamps, and to utilize the energy radiated from the latter, than to burn the gases and utilize the energy which is radiated out from their non-luminous flames.

POISONOUS CONSTITUENT OF LACTARIUS PIPERATUS.

MM. Chodat and Chuit have succeeded in obtaining from this poisonous laticiferous fungus which is not uncommon in oak and beech woods in autumn a substance with a very acrid taste to which they give the name of *piperone*. It is soluble in alcohol, ether and chloroform, and melts at 100° C. The substance appears to have distinctly toxic properties.

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* From the *Journal of the Society of Arts*, August.

* From the *Scientific American*, August 17, 1889.

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REPORT OF THE INLAND REVENUE COMMISSIONERS.

AMONG the numerous papers presented to Parliament in the course of a session, the annual report of the Commissioners of Inland Revenue is one of those usually containing information of special interest to the chemist and druggist, whose multifarious business covers many of the articles referred to in it. In the thirty-second report, dealing with the year ending March 31 last, one of the principal items is spirit, which yielded £12,879,153 out of £25,474,403 collected by the excise, the British spirit charged with duty in the United Kingdom amounting to 27,273,186 gallons. This showed a decrease of £149,000 as compared with the previous year, but it is believed that the falling off in the quantity of British spirit brought to charge in England is connected with the increased entry of plain foreign spirit, principally German, for consumption and methylation. It is estimated, however, that the average consumption of British spirit as a beverage in the United Kingdom has again decreased, the quantity per head being given as 0·693 gallon, while in the previous year it was 0·704 gallon. One noticeable fact is that the quantity of spirit in bond has considerably increased,—from 76,511,109 gallons in 1888 to 81,088,758 gallons in 1889,—but this increase is believed to be mainly due to the augmented demand for matured spirit. For this reason, among others, there has been a slight increase in the quantity of spirit produced, notwithstanding the falling off in the duty paid. The number of distilleries at work during the year ending September 30, 1888, was in England, 10, in Scotland, 127, and in Ireland, 29; and it is estimated that they used as material 838,037 quarters of malt, 1,021,381 quarters of unmalted grain, 210,621 cwts. of molasses, 38,317 cwts. of sugar, and 10,374 cwts. of "jawarree." This jawarree is an Indian grain that appears for the first time as a serious item in these records. The quantity of spirit exported during the year ending March 31 last was 3,470,244 gallons, being an increase on the previous year, while on the other hand duty was paid in the same twelvemonths upon 1,686,501 proof gallons of plain foreign spirit entered for consumption. The returns relating to methylated spirit show that its employment in the arts and manufactures is steadily increasing, the quantity received into warehouse for methylation in the twelve months having been 2,960,904 gallons, or an increase of 193,412 gallons. There is a slight decrease in the number of detections of illicit distillation, of which Ireland is credited with the lion's share,—1739 out of 1781; but one infraction of the law in this direction, discovered at Birmingham, was on an extensive scale, for which penalties amounting to £5000 were imposed. Another large item in the excise returns is the duty on beer, the net receipts reaching £8,938,438, being the largest amount received in any year since the imposition of the duty in 1880. The total quantity of beer on which duty was paid was 28,644,798 barrels, but out of this 537,168 barrels were exported on drawback. Imported beer only amounted to 26,267 barrels and spruce beer to 1765 barrels.

The report includes the usual interesting table of the estimated consumption in the year 1888 of spirit, wine, beer, tea, coffee and cocoa per head of the population, the calculation being based upon an estimated population of 37,453,574. From this table it appears that although, as already mentioned, there was during the year 1888 a slight fall in respect to British spirit,—from 0·704 to 0·693 gallon per head,—an increase in the quantity of foreign and colonial spirit consumed from 0·220 to 0·243 gallon per head raised the gross total of spirit drunk from 0·920 to 0·936 gallon per head. Foreign wine shows a falling off absolutely and relatively, the figures being 13,417,272 gallons against 13,593,999 gallons in 1887, and 0·358 gallon per head against 0·366 gallon. Beer production, notwithstanding the increase previously mentioned, has hardly kept pace with the growth of the population, the fall being from 0·747 barrel per head in 1887 to 0·744 barrel in 1888. Turning now to the non-alcoholic beverages it may be said at once that each of these shows an increase in consumption. The quantity of tea used was 185,416,238 lbs., or 4·950 lbs. per head of the population, against 183,561,835 lbs., or 4·948 lbs. per head, in the previous year. Coffee partly recovered from the heavy fall in consumption in 1887, the figures for 1888 being 30,551,634 lbs., or 0·815 lb. per head. In connection with this article it may be mentioned that there was again a marked decrease in the quantity of chicory charged with duty, as well as in the number of coffee mixture labels issued, and an opinion is expressed by the department that the reduction in revenue in this direction is attributable to the growing unpopularity of coffee mixtures and substitutes for coffee. Cocoa is the item that continues to show the greatest increase, the quantity used in 1888 amounting to 18,215,019 lbs., or 0·486 lb. per head, against 16,100,473 lbs., or 0·434 lb. in 1887.

The increase under the head of receipts for patent medicine stamps is again very large, the total amount being no less than £202,305, or £10,900 more than in the previous year. In addition 22,285 patent medicine vendors' licences were issued, or an increase of 685, bringing in a sum of £5,571. England is answerable for 20,720 of these licences and Scotland for the remaining 1565, Ireland escaping the impost altogether. Methylated spirit retailers' licences numbered 9238 and brought in £4741, and 906 licences to chemists to use stills represented £464. Lastly, the certificates of registration of alkali and other works fell from 3579 to 3250.

THE LABORATORY AT SOMERSET HOUSE.

The report by the Principal of the Laboratory at Somerset House, which is appended to the report of the Inland Revenue Commissioners just issued, shows that Dr. Bell and his assistants have again had a busy year. The number of samples analysed in the year ending March 31 is stated as 44,996, or 5722 more than in the previous year. This increase is attributed principally to the carrying out of the Act limiting the amount of water allowed in manufactured tobacco, and also to the additional facilities recently afforded to wholesale druggists for the exportation on drawback of medicinal tinctures of British make. The extent to which this latter regulation is appreciated by the wholesale trade is shown by the fact that although it had only been in existence four months at the date of the report no less than 662 samples had been examined, and it is believed that the step taken will result in an important development of British trade. In enforcing the limit of moisture in tobacco 15,788 samples were examined, besides 166 for other adulterations. Among the latter were several samples containing coca leaves, taken from a seizure of foreign cut tobacco and cigarettes in London, which had been imported apparently in ignorance that the law does not permit the sale under any conditions in this country of tobacco when mixed with the leaves of any other plant. The beer industry, as usual, contributed a large number of samples, both in the form of wort taken from the brewers and finished beer taken from publicans. Many of the latter showed that the bulk from which they had been taken had been tampered with, either by dilution with water or weaker beer, or by the addition of sugar, proving that considerable sophistication of beer is still carried on, especially in London. Herb and ginger beer also were examined to ascertain whether the spirit present exceeded the amount that could be sold without a licence, and in 55 out of 191 samples it was found that the amount of proof spirit exceeded 3 per cent., and it ranged even as high as 9·7 per cent. In 276 cases members of the staff had to attend to give evidence in support of prosecutions for defrauding the revenue, in 261 of which convictions were obtained and penalties amounting to £3125 awarded. One of the cases dismissed arose out of the sale of meat and malt wine without a licence, but it is pointed out that other magistrates have taken a different view of the law and that the Recorder of Bradford has held on appeal that such wine is not entitled to exemption from licence duty.

Among the important duties performed by the chemists at Somerset House is their action as referees in cases of disputed analyses in prosecutions under the Sale of Food and Drugs Act. There were 54 samples referred in the year, 32 being milk and the others consisting of butter, lard, spirits and pepper. In 39 cases the certificate of the local analyst was confirmed, and in the others the evidence was deemed insufficient to support the allegations made. In five cases where the local analysts had reported the presence in samples of lard of 15 to 30 per cent. of vegetable oil and beef stearin their certificates were confirmed, the vegetable oil being as a rule that derived from cotton seed. One sample of pepper contained 15 per cent. of starch.

A large number of samples are also analysed every year for the Board of Trade, India Office, and Admiralty Department, this work constituting a valuable check upon contractors. Thus out of 15 samples of vinegar examined for the Admiralty only 7 were approved, 4 not being genuine, 2 below strength and 2 not only weak, but containing salicylic acid. The India Office, however, appears to be as badly served as any. For instance, the "zinc white," "red lead" and "lemon chrome" supplied to it were found to contain from 15 to 26 per cent. of heavy spar or sulphate of barium; litharge contained 19 per cent. of impurities, and chloride of tin 60 per cent. of sulphate of magnesium. Eosin, intended for red ink, was adulterated with 28·5 per cent. of peroxide of iron, and a sample of "essence of beef" consisted of 95·6 per cent. of water and only 4·4 per cent. of solid matter.

NEW INTERPRETATION ACT.

The Interpretation Act which during the week has gone through its final parliamentary stages, and now awaits the royal assent, has for its object to consolidate certain enactments relating to the meaning of words in Acts of Parliament and to carry further the policy of Brougham's Act by enacting general rules as to construction to be observed in the absence of provisions to the contrary. In it the word "person," which has been such a stumbling-block in the administration of the Pharmacy Act, is referred to in two places. In the second section it is provided that "in the construction of every enactment relating to an offence punishable on indictment or on summary conviction, whether contained in an Act passed before or after the commencement of this Act, the expression 'person' shall, unless the contrary intention appears, include a body corporate." This provision, being retrospective in its action, would therefore appear to be applicable to corporations in respect to offences mentioned in the seventeenth section of the Pharmacy Act, 1868. In the twentieth section it is provided that "in every Act passed after the commencement of this Act, the expression 'person' shall, unless the contrary appears, include any body of persons corporate or incorporate."

BRITISH PHARMACEUTICAL CONFERENCE.

We have been informed by the London Honorary Secretary of the Conference that the following papers have been promised for the Newcastle meeting, in addition to those of which the titles were published last week :—

Paper on Strophanthus Plants. By T. Christy, F.L.S.

Wild Cherry Bark and its Preparations. By L. W. Hawkins.

Note on the effect of using Nitrous Vitriol in the Manufacture of certain Aerated Waters. By T. Pattinson, F.I.C., F.C.S.

Negative Evidence of Lead in Drinking Water. By R. Reynolds, F.I.C., F.C.S.

Note on Hyphosphorous Acid as a Solvent for Strychnine and Morphine. By H. W. Jones, F.C.S.

Extract of Stramonium. By A. W. Gerrard, F.C.S.

American Pharmaceutical Association.

Active Constituents of Rhamnus Purshiana. (*Cascara Sagrada.*)*

BY AUG. C. ZEIG, PH.C.

Rhamnus Purshiana is a native of California, or more properly speaking, of the Pacific slope. Its name was given in honour of Frederick Pursh, the renowned Prussian botanist, who in 1814 gave it a full description which fixed its place in botany, his investigation having been made upon specimens obtained directly from the habitat.

This drug was first brought to notice by Dr. Bundy, and was called "cascara sagrada" by the early Mexican settlers in California, the term meaning holy bark. It is now principally known in the Western States as chittem bark.

A good deal has been said of late in the various journals of pharmacy concerning this drug, as well as some of its galenical preparations. The high price which it has commanded in the drug market the past year induced a great rush in gathering the same, and has had a great tendency to bring on the market a drug much inferior in quality, by having been gathered out of season, and again it has had a tendency to bring on the market a substitute or adulterant (a species of of alder, as F. A. Beckett says), which, although quite similar to cascara in appearance and taste, is of no value whatever as an aperient, for it does not contain the active constituents present in cascara sagrada.

As to the chemical constituents of *Rhamnus Purshiana*, I shall call attention to what investigators have contributed to our knowledge through their reports in the various journals of pharmacy. Professor A. B. Prescott gives in the *American Journal of Pharmacy* for 1879 (see list of references at the close of the article), the results of his investigations, both microscopic and otherwise, among which he reports the presence of three resins,—a brown, a yellow and a red resin,—a crystallizable body, three vegetable acids, as tannic, oxalic and mallic acid, both a fat and a volatile oil, wax and starch. In addition to this, Professor Wenzell states in the *Pharmaceutical Journal* of 1886, that he has obtained a substance, which he describes as being of a deep orange-red colour, namely a glucoside. Messrs. Meier and Webber report in the *American Journal of Pharmacy* of last year, as the result of their investigation, the presence of a vegetable ferment, glucose and traces of ammonia, while Dr. Eccles reports, in the *Druggists' Circular* for 1888, having discovered the presence of an alkaloid which he states he has separated from the fluid extract and precipitated with Mayer's reagent.

Its extensive use in practice, especially in the form of the fluid extract, has amply confirmed that the drug possesses decided laxative properties. Furthermore it is set forth by some and denied by others that it also possesses tonic properties. To which of these constituents just enumerated could the laxative and tonic powers of cascara be due?

Messrs. Parke, Davis and Co. were kind enough to send me a sample of the drug, and I undertook to estimate the quantity of each of the different resins present and by physiological experiment ascertain as to which is the most active. Furthermore I undertook to make out a working formula for obtaining the resin in a concentrated form.

The method suggested by Mr. Wise, in the *Western Druggist*, was first employed for the separation of the three resins. A fluid extract was prepared using strong alcohol as a menstruum. To this fluid extract was added an equal volume of ether, the mixture agitated and allowed to stand for twenty-four hours.

The ethereal liquid was then decanted and strained, the precipitate washed, dried and weighed. The product consisted of a red resin, soluble in alcohol and insoluble in ether. The amount of this resin obtained from 114 gms. of drug was 6·15 grams, which by physiological experiment appeared to be quite inert.

The ethereal liquid was next evaporated to a somewhat syrupy consistence, 70 per cent. alcohol was added, and the whole allowed to stand for some time. The alcoholic solution was then strained and the precipitate washed and dried. This precipitate consisted of a yellowish brown resin, odorless, but having a slight bitter taste. The quantity obtained from 114 gms. of drug was 1·23 grams. By physiological experiment this portion showed itself quite inert.

The strained alcoholic solution obtained as stated in last paragraph was then evaporated to dry syrupy consistence, and slowly decanted into water acidulated with hydrochloric acid. The liquid was now strained, the precipitate washed and dried. This consisted of a third resin, of a dark brown colour, giving an intense purple with potassium hydrate, having a somewhat bitter taste, and an odour much like the odour of the drug. Physiological experiment showed that it is the most active resin of the drug.

The next thing in view was to obtain some cheap and practical formula for obtaining this resin in a concentrated form. The method suggested by Mr. Wise for separating the resins is open to but one especial objection, namely, that of being too expensive a method, as it employs the use of a large quantity of ether as a precipitant. Various other precipitants were tried instead of ether, but without success. Finally I found that by using dilute alcohol as a menstruum in percolating the drug, very little of the inert resin is dissolved, and the use of ether as a precipitant may be avoided. As a formula for obtaining the active resin I would recommend the following :—

Rhamnus Purshiana, No. 40 powder	8 ounces.
Dilute alcohol,	
Water	each q. s.
Hydrochloric acid	2 fl. drachms.

Moisten the powder with 8 fluid ounces of dilute alcohol, and pack it firmly in the cylindrical percolator, add enough dilute alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator close the lower orifice, and having closely covered the percolator, macerate for 24 hours. Then allow the percolation to proceed, gradually adding dilute alcohol until 12 fluid ounces of percolate are obtained, or until it produces but a slight turbidity when dropped into acidulated water.

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* Read before the Pharmaceutical Association at the San Francisco meeting, June, 1889. Reprinted from the *Pharmaceutical Era*, August, 1889.

Evaporate off the dilute alcohol upon a water-bath until the percolate is reduced to a syrupy consistence, and pour it slowly with constant stirring into 8 fluid ounces of water containing the hydrochloric acid. Let stand until the precipitate has subsided, then decant the supernatant liquid and wash the precipitate three times by decantation with fresh portions of cold water. Spread it on a strainer, and having pressed out the liquid, dry the resin by exposure to air at a gentle heat. This resin dissolves in potassium hydrate, giving an intense purple colour, which disappears upon acidulating with hydrochloric acid, when the resin is again precipitated, and may in this manner be obtained devoid of bitterness. Five grains of this resin, a bitter resin, had a marked laxative effect upon an adult.

Now as to the glucoside mentioned, which, according to Messrs. Meier and Webber seems to be peculiar to *Rhamnus Purshiana*, as these authors were unable to determine its presence in *Rhamnus Frangula* as found in the market, it may be regarded as one of the important constituents of the drug and the source of an intensely bitter principle (Meier and Webber), to which no doubt the tonic property is due. It may, according to the above authors, be obtained in quite a pure state for examination by making an aqueous percolate of the drug and precipitating with a solution of subacetate of lead. The excess of lead may be removed by passing hydrogen sulphide into the solution, precipitating the lead as a sulphide, and filtering. This filtrate shows decided chemical change when boiled with sulphuric or hydrochloric acid, giving off a peculiar odour. When examined with the aid of a microscope there is visible an oily and a resinous substance with small crystals distributed through it. This resinous substance appears to be soluble in alcohol or potassium hydrate, and insoluble in water. With potassium hydrate it turns a reddish brown. As the glucoside is capable of decomposition when treated with acids in a test tube, it would likewise be capable of decomposition in the gastric juice of the stomach (Meier and Webber), which contains two-tenths of 1 per cent. of hydrochloric acid.

The resins, as has been stated before, may be obtained devoid of bitterness, while the glucoside is in itself not bitter (Meier and Webber), but is the source of the bitter principle when treated with acids, therefore it appears possible that there may be made a preparation of cascara sagrada quite tasteless, yet containing all the active constitutents to which both laxative and tonic properties are due.

The following is a list of references on the constituents of *Rhamnus Purshiana* (Cascara Sagrada).

Prescott, 1879: 'New Preparations,' Detroit, iii., 27; *Am. Journ. Pharm.*, li., 165; *Archiv. der Pharm.*, [3], xv., 547.

Wenzell, 1886: *Pharm. Rundschau*, iv., 79; *Proc. Am. Pharm. Assoc.*, xxxiv., 462.

Limousin, 1886: *Pharm. Journ. Trans.*, [3], xv., 615.

Wise, H., 1885: *Western Druggist*, vii., 125.

Eccles, R. G., 1888: *Druggists' Circular*, page 54, March. '*Proc. Am. Pharm. Assoc.*,' xxxvi., 402.

Schwabe, P., 1888: *Archiv der Pharm.*

Meier and Webber, 1888: *Am. Journ. Pharm.*, lx., 87; *Proc. Am. Pharm. Assoc.*, xxxvi., 400.

Fuge, H. D., 1889: *Pharm. Journ. Trans.*, [3], xviii., 736 (galenicals.)

Notes on Salicylic Acid, its Isomers and Homologues.[*]

BY BERNHARD C. HESSE, PH.C.

The object is to ascertain some ready and practical method for the determination of the isomers and homologues of salicylic acid present in this article when made from carbolic acid.

Synopsis.

I. Estimation of the CO_2 evolved when the acids are heated—

1. With lime;
2. With concentrated HCl; and
3. With concentrated H_3PO_4.

II. Determining the amount of U. S. P. HCl required to discharge the colour produced by Fe_2Cl_6.

III. Determining the amount of NH_3 required to neutralize the acids.

IV. By the use of $CuSO_4$ solution—

1. In the presence of alkali hydrates;
2. With the use of HCl to destroy the green colour produced in solution of salicylates.

V. Comparison of these methods as well as others on a commercial sample, with interpretations.

VI. Tabular view of the leading features of the six acids liable to be in salicylic acid when made from carbolic acid.

VII. References and literature.

I. Estimation of the CO_2 evolved when the acids are heated

(1) With lime.

This depends on the fact that when salicylic acid and its homologues are heated with lime, they yield their corresponding phenols and CO_2.

The object was to decompose salicylic acid by means of lime and heat; then to estimate the amount of CO_2 retained by the lime. This was attempted but once, when its defects became so obvious that it was given up.

These defects were as follows: first, that the amount of CO_2 previously combined with the lime was very considerable and variable; second, that the absorption of CO_2 by the lime would be very variable, and dependent in a great measure on circumstances and conditions. One estimation was made which gave altogether too high results.

(2) When heated with concentrated hydrochloric acid.

This depends on the fact that when salicylic acid, its isomers, and its homologues, are heated with HCl they yield their corresponding phenols and CO_2. The temperatures of decomposition are for

Orthohydroxybenzoic acid	140° to 145° C.
Metahydroxybenzoic acid	a very high heat
Parahydroxybenzoic acid	135° to 145° C.
Cresotic acid 1:2:3	210° C.
Cresotic acid 1:2:4	170° C.
Cresotic acid 1:2:5	180° to 185° C.

The operation was as follows:—Place a weighed quantity of salicylic acid in a flask with an excess of concentrated HCl. Connect this flask with another smaller flask containing H_2SO_4, which is to take up moisture and phenol.

The tube from the first flask is to be about one-quarter inch above the surface of the H_2SO_4. This flask is then connected with a $CaCl_2$ tube containing concentrated H_2SO_4 to take up any phenol which may have escaped the H_2SO_4 in the flask. This $CaCl_2$ tube was connected with a U tube containing granulated $CaCl_2$, and this with another $CaCl_2$ tube containing in one arm $CaCl_2$, and in the other $CuSO_4$ (anhydrous) and pumice stone. Then came the potash bulbs followed by a $CaCl_2$ tube containing soda-lime and $CaCl_2$, and finally a bottle aspirator. But it was found that HCl could not be used, because it was all dissipated before even 80° C. was reached.

(3) Concentrated H_3PO was next employed with satisfactory results. This acid decomposes salicylic acid at 120° C., but no statement could be found as to its action on the isomers and homologues. It was found that the decomposing flask could be heated

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[*] Read before the American Pharmaceutical Association at the San Francisco meeting, June, 1889. Reprinted from the *Pharmaceutical Era*, August, 1889.

very well in a copper water bath lined with pieces of asbestos felt. In the following table are expressed the theoretical amounts of CO_2 which different mixtures of salicylic and cresotic acids should yield when decomposed into phenol and CO_2.

Per cent. of salicylic acid.	Per cent. of hydroxytoluic acid.	Wt. of CO_2 from 1 gram of the mixture.	Wt. of CO_2 from 15 grams of the mixture.	Per cent. of salicylic acid.	Per cent. of hydroxytoluic Acid.	Wt. of CO_2 from 1 gram of the mixture.	Wt. of CO_2 from 15 grams of the mixture.
100	0	0·3196	4·7940	45	55	0·3031	4·5465
95	5	0·3181	4·7715	40	60	0·3016	4·5240
90	10	0·3166	4·7490	35	65	0·3001	4·5015
85	15	0·3151	4·7265	30	70	0·2986	4·4790
80	20	0·3136	4·7040	25	75	0·2971	4·4565
75	25	0·3121	4·6815	20	80	0·2956	4·4340
70	30	0·3106	4·6590	15	85	0·2941	4·4115
65	35	0·3091	4·6365	10	90	0·2926	4·3890
60	40	0·3076	4·6140	5	95	0·2911	4·3665
55	45	0·3061	4·5915	0	100	0·2901	4·3515
50	50	0·3046	4·5690				

On trying this method with a salicylic acid made from oil of wintergreen by saponifying with KOH, decomposing the soap with HCl and recrystallizing three times from hot water and twice from alcohol, but without treatment with animal charcoal, the following results were obtained:—

Amount of acids taken in grams.	CO_2 obtained.	CO_2 obtained figured to the amount from 1 gram.	Difference plus or minus from 0·3196	Per cent. of CO_2 obtained 0·3196 = 100 per cent.	Interpretation of results according to table above.
I. 1·0195	0·3048	0·30168	—0·0083	94·406	60 per cent. cresotic acid.
II. 0·4275	0·2135	0·49473	+0·17518	154·8	—
III. 0·312	0·1130	0·3621	+0·0425	113·29	—
IV. 0·9922	0·3005	0·3028	−0·0168	94·74	Between 55 and 60 per cent. of cresotic acid.
V. 1·0000	0·3008	0·3030	—0·0166	94·806	Ditto.

From the above table it will be seen that experiments I., IV. and V. are about 6 per cent. too low and that among themselves they agree quite closely. This low yield of CO_2 can only be explained by the fact that the acid used was in very large crystals, which may have mechanically retained some impurities which simple recrystallization could not remove. Experiments II. and III. are very much too high. This may be explained by the fact that the apparatus "sucked back," during the operation, drawing some sulphuric acid from the drying flask into the decomposing flask. The sulphuric acid charred some of the salicylic acid and the resulting carbon reduced the sulphuric acid to SO_2, which was absorbed in the KOH bulbs and weighed as CO_2. Attention has been called to this point in 1880 by B. Vangel.*

In the interpretation of the results in the above table it was assumed that the isomers and homologues would also be decomposed at 180° to 200° C., to which temperatures the flask was heated. When this was tried on a commercial sample yielding by acidimetry, as proposed by Mr. E. E. Ewell, figures corresponding to 35 or 40 per cent. of cresotic acids, 191·4 milligrams of CO_2 were obtained from one gram of the sample.

This is too low even though the acid be pure hydroxytoluic acid. But if this CO_2 is now calculated into salicylic acid 600·28 mgms. will be obtained as the amount of salicylic acid in one gram of the acid taken. This corresponds to 60·028 per cent. almost in accordance with the results obtained by acidimetry. Attention is called to the statement of B. Vangel,* that when salicylic acid is heated with syrupy H_3PO_4, it decomposes at 120°; at 159° a portion of the undecomposed acid sublimes. It was found that a very large amount of crystals had sublimed to the top of the flask, when 88° had been reached. In two other cases sublimation was observed at 42° C. and 55° C. In the first case the phosphoric acid was poured so as to have the salicylic acid on its surface as much as possible, and in the second case the acids were well intermixed.

It was also found that when a commercial acid was subjected to heat in a drying-oven, sublimation began at about 73° C., and when 90° C. had been reached the sublimate had become very large in quantity. These results practically confirm those of Mr. Ewell.† It is perhaps worthy of notice that the sulphuric acid retained all the phenol, and only once in thirteen instances did any phenol get into the KOH bulbs, as was attested by bromine water after the excess of alkali had been neutralized.

II. Determining the amount of U. S. P. HCl. required to discharge the colour produced by Fe_2Cl_6.

When salicylic acid is treated with Fe_2Cl_6 a purple colour results, which is discharged by HCl, $HC_2H_3O_2$, and other acids. On these facts experiments were made to base some method of estimating the amount of salicylic acid present in mixtures of its isomers and homologues. These acids react with Fe_2Cl_6, as follows:—

Ortho-hydroxybenzoic acid .	a violet colour.
Meta-hydroxybenzoic acid .	no colour.
Para-hydroxybenzoic acid .	yellow precipitate.
Cresotic acid 1 : 2 : 3 . . .	intense violet.
Cresotic acid 1 : 2 : 4 . . .	intense violet.
Cresotic acid 1 : 2 : 5 . . .	blue violet.

Experiments were made as follows:—

A solution of salicylic acid, containing 2 mgms. of acid to each c.c. was made up; also a solution of Fe_2Cl_6 containing 66·6 per cent. of Fe_2Cl_6 and some U. S. P. HCl., sp gr. 1·16 and containing 31·9 per cent. of absolute HCl.

Ten c.c. of the salicylic acid solution were placed in a flask and five drops of Fe_2Cl_6 solution added; HCl was then run in from a burette until the liquid became a clear yellow colour. The following results were obtained:—

With 5 c.c. of salicylic solution 0·7 c.c. HCl were used.
„ 10 c.c. „ „ 1·4 c.c. „ „ „
„ 15 c.c. „ „ 2·1 c.c. „ „ „

Then an unknown number of c.c. of the salicylic solution was taken and titrated in the same manner. The results are as follows:—

Given.	Found.
6·0 c.c.	6·07 c.c.
4·0 c.c.	4·01 c.c.
3·5 c.c.	3 58 c.c.
9·5 c.c.	9·56 c.c.

These results are all a little too high, but if duplicates could have been worked they might have been a little closer. Then experiments were made to ascertain what influence a change in the relation between the amount of salicylic acid present and the liquid volume would have. In this case the liquid volume remained constant, namely, 10 c.c.; the amount of Fe_2Cl_6 remained constant also, namely 5 drops. In the table annexed are given the results of these experiments. In the ratio between salicylic acid and HCl, salicylic acid is taken as unity:—

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* *Berichte*, xiii., 356.

* *Berichte*, xiii., 356.

† *Pharm. Journ.*, [3], xix., 328.

Milligrams of salicylic acid taken.	One-tenth c.c. of U. S. P. HCl used	Ratio between salicylic acid taken and HCl required.	Milligrams of salicylic acid taken.	One-tenth c.c. of U. S. P. HCl required.	Ratio between the salicylic acid taken and the HCl.
1	4	1:4·0	11	10	1:0·909
2	5	1:2·5	12	10	1:0·833
3	6	1:2·0	13	11	1:0·846
4	7	1:1·75	14	11	1:0·785
5	8	1:1·60	15	12	1:0·800
6	8	1:1·33	16	12	1:0·750
7	9	1:1·28	17	12	1:0·705
8	9	1:1·12	18	13	1:0·722
9	10	1:1·11	19	13	1:0·684
10	10	1:1·00	20	14	1:0·700

It will be seen that liquid volume is a very important factor.

It seems as though the homologues affected this reaction somewhat. An acid of the market, yielding both by acidimetry and CO_2 estimation figures corresponding to 60 per cent. of salicylic acid, and 40 per cent. of homologues, yielded with this Fe_2Cl_6 method results corresponding to pure salicylic acid, namely 1·4 c.c. of HCl were required to discharge the violet colour produced by Fe_2Cl_6 in 10 c.c. of a solution containing 20 milligrams of the acid. This shows that work must be done on the homologues and isomers before this method can be of any use.

III. *Determining the amount of NH_3 required to neutralize the acids.*

When dry, salicylic acid absorbs one molecule of NH_3, while its isomers and nitrosalicylic acid absorb two molecules. Experiments were made to see if the commercial acid would absorb an excess of NH_3. The results showed that it did not. In these experiments the acid was dissolved in the ammonia-water and so was not dry. But the absence of isomers was proved by the complete solubility of one gram of the acid in 53 c.c. of chloroform.

This method may be of some use but needs more detailed work.

IV. *The use of $CuSO_4$ solution.*

(1) *In alkaline mixture.*

When one molecule of salicylic acid is treated with two of NaOH, it will prevent the precipitation of one-half molecule of CuO.*

For this a solution of NaOH containing 80 mgms. to the c.c. was made up, also one of $CuSO_4$, 5 H_2O containing 124·6 mgms. to the c.c.

The operation was as follows:

Weigh out 138 mgms. of salicylic acid and dissolve in one c.c. of NaOH solution; then add from a burette the $CuSO_4$ solution. If the acid used be pure salicylic acid (or any aromatic ortho-acid), no precipitate should be observed. This operation was tried three successive times on pure acid and the same results obtained each time. Then the commercial acid was subjected to the same treatment. Permanent precipitation was observed when but 0·5 c.c. of $CuSO_4$ solution had been added. A full c.c. of $CuSO_4$ solution, however, was added, and the precipitate filtered out and estimated by KCN.

On two different trials this precipitate equalled 52·04 per cent. and 51·9 respectively of $CuSO_4$, 5 H_2O taken. It would seem remarkable that 40 per cent. of impurity should precipitate 52 per cent. of the $CuSO_4$ taken, and 60 per cent. of salicylic acid should hold only 48 per cent. of $Cu(OH)_2$ in solution. This is deserving of further investigation.

(2) *Use of HCl to destroy the green colour produced by $CuSO_4$ in solutions of salicylates.*

This depends on the fact that when an aqueous solution of a salicylate is treated with $CuSO_4$ solution an intense emerald green colour is produced which is discharged by ammonia and strong acids.*

Not much work could be done on this, but it was ascertained that 0·2 c.c. of HCl (U. S. P.) discharged the green colour in 10 c.c. of 0·02 per cent. of solution of salicylic acid and of the commercial acid, but that liquid volume did not interfere.

V. *Comparison of Methods.*

The following is a tabular arrangement of the results obtained by different methods, when applied to the same commercial sample of salicylic acid:

Acidimetry.	CO_2 estimation.	Fe_2Cl_6 method.	Absorption of NH_3.	$CuSO_4$ in alkaline solution.	HCl to decolorise green colour of $CuSO_4$ in salicylate.
One gram of acid required 699·8 c.c. of $\frac{n}{10}$ KOH, an average of 3 titrations.	One gram of acid yielded enough CO_2 for 617 mgms of salicylic acid.	10 c.c. of a solution containing 20 mgms. of salicylic acid required 1·4 + c.c. of U. S. P. HCl to discharge the violet colour caused by Fe_2Cl_6.	The same amount required as with pure acid.	Yielded a ppt. when but ½ mol. of $CuSO_4$ had been added. When 124·5 mgms. of $CuSO_4$ had been added the ppt. equalled 52 per cent. of the $CuSO_4$ taken.	Same am't of HCl required as for a pure acid.
Indicates 35 to 40 per cent. hydroxytoluic acid.	Indicates 38·3 per cent. acid other than salicylic.	Indicates a pure acid!	Indicates a pure acid!	Indicates the presence of acids other than ortho acids.	Indicates a pure acid!

From the above it would seem that the method by acidimetry furnished a ready and quite accurate method for the estimation of homologous acids, as is confirmed by the estimation of CO_2. Also that the precipitation of $Cu(OH)_2$ from carefully standardised solutions is a quite ready and reliable method for the detection of acids *other* than ortho, since the property of preventing the precipitation of $Cu(OH)_2$ by fixed alkali hydrates seems to belong to the aromatic *ortho* acids in general and not to salicylic acid in particular.

The discharge of the colours, caused in solutions of salicylic acid by Fe_2Cl_6, and of salicylates by $CuSO_4$, by HCl, is not trustworthy without further detailed work on the isomers and the homologues and their behaviour towards these reagents both when free and mixed with salicylic acid.

The method by acidimetry might well be considered for a pharmacopœial requirement for controlling the quantities of homologous acids present in salicylic acid, and with further detailed work the use of $CuSO_4$ solution might be advantageously added.

The estimation of CO_2 is too cumbrous for ordinary purposes, but might serve as a control analysis. In this method it is well that the decomposing flask be tall, so that any acid that sublimes may be condensed rather than drawn outside of the flask into the rest of the apparatus, and thus lost for estimation and vitiating the results. The temperature most to be recommended is between 120° and 130° C.

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* Berichte, ix., 342.

* Schulz, *Zeits. anal. Chemie.*, xix.

6. *Tabular View of Isomers and Homologues.*

	Crystalline forms.	Solubility in 100 pts. of water at 0° C.	Solubility in 100 pts. of water at 15° C.	Solubility in 100 pts. of water at 100° C.	Solubility in alcohol.	Solubility in ether.	Solubility in chloroform.	Melting points.	Reaction with Fe_2Cl_6.	Heated in a sealed tube with concentrated HCl.	Heated with concentrated H_3PO_4.	When treated with fixed alkali hydrate and $CuSO_4$ sol.	When heated with CaO.	Vaporising.
Ortho-hydroxybenzoic acid.	Fine needles from water; monoclinic prisms from alcohol.	0·092 part.	0·225 part.	7·925 part.	Soluble in 2·4 pts.	100 pts. dissolve 50·47 pts.	Very soluble.	155° to 156° C., *Journ. Chem. Soc.*, xl., 11.	Violet colour.	Yields CO_2 and phenol at 140° to 150°.	Yields CO_2 phenol at 120°.	Blue-green colour preceded by a precipitate soluble in an excess of the acid.	Yields CO_2 and phenol.	With steam. Liebermann and Dehust, *Ber.*, xii., 1291.
Meta-hydroxybenzoic acid.	Needles collected in little warts.	0·377 part.	At 18° C. 0·925 part.	Very soluble.	—	—	Almost insoluble. Kolbe, 1874; *Jour. pr. Chem.* (2), x., 102.	200° C.; Rechenberg, *Journ. pr. Chemie* (2), xxii., 243; *Journ. Chem. Soc.*, xl., 11.	No colour.	Decomposes only at a high temperature.	—	Immediate precipitation.	—	Not with steam. Liebermann and Dehust, *Ber.*, xii., 1291.
Para-hydroxybenzoic acid.	Small monoclinic prisms from water; larger ones from alcohol	0·172 part.	0·798 part. Saytzeff, *Ann. Chem. Pharm.*, 127, p. 129.	Very soluble, Saytzeff. *Ann. Chem. Pharm.*, 127, p. 129.	Easily soluble, Saytzeff, *Ann. Chem. Pharm.*, 127, p. 129.	Easily soluble, Saytzeff, *Ann. Chem. Pharm.*, 127, p. 129.	Almost insoluble. Kolbe, 1874; *Journ. pr. Chem.* (2), x., 102.	210° C.; Rechenberg, *Journ. pr. Chemie* (2). xxii., 243; *Journ. Chem. Soc.*, xl., 11.	Dirty yellow precipitate.	Yields CO_2 and phenol at 135° to 140°.	—	Immediate precipitation.	—	Not with steam. Liebermann and Dehust, *Ber.*, xii., 1291.
Hydroxytoluic acid, CO_2H; $OH : CH_3$, 1 : 2 : 3.	Long flat needles from water.	—	Sparingly soluble.	—	—	—	Easily soluble in the cold.	163° to 164° C., Beilstein, 1458; 160°, Prescott, 443; 165°, Weith, *Ber.*, ix., 842; Jacobsen, *Ber.*, xvi., 1963; *Journ. Chem. Soc.*, xliv., 1124.	Intense violet.	Yields CO_2 and ortho-cresol at at 210°.	—	—	—	With steam.
Hydroxytoluic acid, CO_2H; $OH : CH_3$, 1 : 1 : 4.	Needles from water; monoclinic prisms from alcohol.	—	Sparingly soluble.	Quite readily soluble. O. Jacobsen, *Ber.*, xiv., 41.	Readily soluble. O. Jacobsen, *Ber.*, xiv., 41.	Readily soluble. O. Jacobsen, *Ber.*, xiv. 41.	Sparingly soluble. O. Jacobsen, *Ber.*, xiv., 41.	177° C., Beilstein, 1459;—178°. Prescott, 443;—172°. Weith, *Ber.*, ix., 842. Jacobsen, *Ber.*, xiv., 41; 963; *Journ. Chem. Soc.*, xl., 599; xlvi., 745.	Intense violet. Beilstein, 1459; Prescott, 443. Precipitation, O. Jacobsen, *Ber.*, xiv., 41.	Yields CO_2 and meta-cresol at 170°.	—	—	—	With steam.
Hydroxytoluic acid, CO_2H; $OH : CH_3$, 1 : 2 : 5.	Very long needles from water.	—	Sparingly soluble.	Readily soluble.	Easily soluble.	Readily soluble.	Readily soluble.	151° C., Beilstein, 1458; Prescott, 443;—177° to 178°. Weith, *Ber.*, ix., 842; Homann and Schott, *Ber.*, xi., 778; xii., 1840; *Journ. Chem. Soc.*, xxxiv., 877; Schall, *Ber.*, xii., 820; *Journ. Chem. Soc.*, xxxvi., 794.	Intense blue-violet	Yields CO_2 and p. cresol at 180° to 185°.	—	—	Ortho-cresol and CO_2 are formed.	With steam.

Society of Chemical Industry.

A SHORT ACCOUNT OF THE OPIUM INDUSTRY IN THE N.W. PROVINCES AND OUDH.*

BY P. A. WEIR, M.B.

At the request of the Secretary I have compiled, for the information of the Section, the following notes, the greater part of the material of which already exists on record, for the most part, however, in the official publications of the Governments of Bengal and of India, which are not perhaps within reach of many in this country.

The opium poppy is a native of Asia Minor, but having been so long and generally cultivated in Europe and parts of Asia, it is now naturalized less or more in many different countries. The precise date of its introduction to India is unknown, but it can be traced as far back as the sixteenth century, during the latter half of which the produce of the opium monopoly in the sarkars of Allahabad and in Ghazipur was 1000 chests, according to the A'in Akhbár of Abul Fazúl. It had attained considerable importance by 1786, at which time Lord Cornwallis wrote a minute respecting the best method of deriving a revenue from opium. It has now been long extensively cultivated in the Upper Gangetic plain, in Behar, Bundelkhand, and Malwa. "The area under poppy cultivation in the N.W. Provinces and Oudh is scattered over thirty-eight of the forty-nine revenue districts in these provinces, and occupies more than ¼ million acres, and necessitates the employment of no less than 2½ millions persons in the fields." For the Chinese market the opium of the Behar and Benares agencies is commercially the best, as being the most approved by the Chinese, although *officinally* it is inferior to the Smyrna drug.

The cultivation of opium in India in British territory is a Government monopoly, existing for the benefit of the Imperial revenue. The Opium Department is for convenience administered, under the Lieutenant-Governor of Bengal, by the Board of Revenue of the Lower Provinces. Subordinate to the Board are the two opium agents, each of whom is in charge of one of the two opium agencies. One of these is the Behar agency, with its headquarters at Patna, and situated entirely in the Lower Provinces. The other is the Benares opium agency, situated in the N.W. Provinces and Oudh, and having its headquarters at Ghazipur, on the Ganges, about 40 miles from Benares. In each agency there are under the agent two sets of officials, the district officers concerned with the production of the raw material, and the factory staff occupied in its manufacture.

The system of cultivation at present in force in British territory is briefly as follows:—No poppy is allowed to be grown save with the permission of Government. Government grants this permission to suitable cultivators on condition that only a certain definitely agreed on area of land shall be sown by each with poppy, and that the entire produce shall be made over at the proper time to the agents of Government in exchange for its value in cash calculated at the rate (at present) of Rs. 5 per ser of 70° consistence. (70° consistence opium is opium of which 100 grms., when dried at 100° C., yield 70 grms. residue. Opium of this consistence is called standard opium.) Permits or licenses to grow poppy are issued in the period from August to October, at which time the district officers meet the would-be cultivators or their agents and settle more or less directly with each the area he is to be allowed to cultivate. The experience of many seasons, as recorded in the books of his office for each locality, enables a district officer to estimate very closely the average quantity of standard opium that the particular area licensed to any cultivator is likely to produce. In this way the district officer is able to keep within the limits of the quantity his district has been called on to supply, which quantity in turn is based on the indent sent down by Government to the agent, and by him apportioned among the districts under his charge. At the time of settlement the district officer makes to the cultivator a cash advance of a certain percentage of the value of the out-turn of standard opium that the area he has undertaken to cultivate is estimated to produce. For such advances, and for similar advances towards the purchase of bullocks, the sinking of wells, etc., and aggregating over 200 lakhs of rupees (nominal £2,000,000 sterling) per annum, no interest is charged by Government, the cultivator enjoying the use of the money free. The advances are in due course recovered in the shape mainly of produce, the balances being paid up in cash, and outstandings of any size are little known.

Having settled with the district officer, and been licensed to sow a certain area, the cultivator returns home and prepares his land, and makes other necessary arrangements, and in due course, about November, he commences to sow his seed. During the growth of the plant, the industrious cultivator takes care to attend to its proper tillage, watering it at the proper times, and keeping the ground free from weeds.

During this season the district officer with his staff goes on tour throughout the area under his charge—which may measure many hundred square miles—in order to measure the ground cultivated by each licensee for the purpose of seeing that he has sown up to his engagements (on which his advances were calculated), and not in excess of his engagements (as this would throw out the arrangements for complying exactly with the indent set down by Government); to see that the cultivation is being carried on in a proper manner (the plant being watered as required, and the soil kept clear of weeds), and that no other crops are being simultaneously cultivated in the poppy field; to give, if necessary, a further cash advance on account of the value of the estimated out-turn; to see that no illicit poppy cultivation is being practised, which would lead to smuggling, and to the defrauding of the Excise revenue; and to report, periodically, to the agent on the general prospects of the crop.

About the beginning of February the plants begin to flower. At this time is begun in certain districts the preparation of "leaf." "Leaf" is the technical name for the material used at the factory to form the shell of the opium cake in course of provision for the China market. About the close of the third day of the flower's expansion the petals are in such a stage of maturity that they are ready to drop off the top of the seed-vessel at a touch; at this stage the cultivators go through the fields in the afternoon, and collect the petals or carry them home. In the evening, after she has baked her husband's bannock, the cultivator's wife takes two or three handfuls of the petals and throws them on the top of the hot griddle-iron, and as the gummy juice of the petals exudes by the heat, she presses the petals down by a damp cloth which she skillfully manipulates, until what with the steam from the cloth and the gum in the leaves, the petals become agglutinated, and ultimately take the pancake-like form of the so-called "leaf." The leaves are carefully dried, and are in due course brought by the cultivator to the district officer, who receives them on behalf of Government, and pays for them according to their quality, at from Rs. 10 to 5 a per maund (of $82\frac{2}{7}$ lbs.), and forwards them to the factory at the headquarters of the agency for disposal.

The annual consumption of "leaf" in the preparation of the shells of the provision of opium for the

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[*] Read at a meeting of the Glasgow and Scottish Section. From the Journal of the *Society of Chemical Industry.*

China market is very large—amounting to from 16 to 20,000 maunds — representing the petals of over 5000,000,000 flowers, according to Scott's calculations.

In the course of from seven to ten days from the fall of the flower leaves, the capsules are sufficiently mature for the extraction of the drug, becoming plump and firm, and coated with a fine whitish bloom.

The incisions are now commenced, and are carried on regularly every third day, and according to the condition of the plant, and the time of the collection, the number of lancings required to extract all the juice varies from one to five or six, and perhaps seven in isolated cases. The lancing is carried on in the afternoon, and consists of three or four vertical incisions performed at one operation by three or four primitive lancets tied together with cotton thread. The juice exudes slowly, and is milky-white at first, the outer part of the tear gradually changing to a pinky salmon colour. Next morning the tears that have exuded are scraped off by an iron trowel-shaped scraper and put into a metal dish, from which at the cultivator's house they are transferred to unglazed earthen vessels set atilt to allow excess of watery matter and pasewa to drain off. The aggregate of the drug belonging to a cultivator is kept in a shady place in his house, and carefully treated so as not to injure the grain, but to allow the consistence to rise evenly until it has reached the desired degree. The opium is then brought to the district officer at the appointed time and place, and he receives it over by weight on behalf of Government, and transmits it to the factory in jars containing one maund (82 2/7 lbs.) each, paying to the cultivator a further advance on its value according to his estimate of its assay. The annual amount of opium delivered in the two agencies amounts to perhaps 107,000 maunds at 70° (equal to about 3900 tons, and for which the cultivator would receive Rs. 2,14,00,000, nominally 2¼ million pounds sterling).

After the collection of the opium has ceased the plants are allowed to remain standing in the fields till the capsules are quite ripe; these are then collected, and the plant leaves when dry are, in certain districts, gathered and sent into the factory under the name of *trash*, to be used as dunnage in packing the provision opium for China. Trash is paid for in the Benares agency at about 10 annas per maund. The annual outturn of trash in the two agencies is more than 28,000 maunds.

The opium on arrival at the factory is, after weighment, examined jar by jar by the opium examiner, who certifies to its quality and purity. It then has its consistence determined for each jar by assay on the steam table, and according to its consistence it is stored away in one or other of the extensive ranging store vats in the malkhana or storehouse, some of which hold 3000 maunds. The final payments to the cultivators are made according to the value of the opium as determined by its consistence on assay at the factory.

When a sufficient quantity of suitable opium has been received into the factory, the manufacture of the provision of opium for the China market is commenced. The provision is caked at the consistence of 70°, to this end quantities of opium of consistences above and below 70° are alligated or mixed together in certain proportions so that the mean consistence of the mixture may fall within the limits allowed. Before issue from the caking vats the opium in them is assayed for consistence to ensure that it does not fall below the caking standard laid down by Government.

For *each* "cake" there are served out the equivalent of a certain weight of standard opium for the central mass, together with a certain measure of "*lewa*," the equivalent of a fixed weight of standard opium. Lewa is a paste made of opium broken up in water, and is of 52·5° consistence. For each cake is also issued a certain weight of leaf, which is previously damped to make it flexible and non-friable.

In a hemispherical brass cup of about six inches in diameter, the cakemaker pastes layer after layer of pieces of leaf which he gums together with lewa until the thickness of the hemisphere of shell in the cup in ½ inch, and over the edges of the mould he allows the free ends of the pieces of leaf in the cup to hang. The opium is then deposited in the centre of the hemisphere of shell in the cup, and over it the overhanging leaves are brought and carefully imbricated and pasted down with lewa, and bound together by fresh portions of leaf, and finally over all one of the finest leaves is pasted on and a complete sphere results. This is turned out of the cup and covered halfway up with "trash," which prevents it sticking to the inside of the porous earthenware cup into which the cake is now put. The cup and cake are put on a shelf in a well-ventilated warehouse. Caking goes on from May till July at the rate of about 20,000 cakes per diem. The cakes remain on the racks till they are fit for packing, and each cake is periodically turned about in the cup so that it shall dry regularly and evenly, and preserve its spherical shape.

Packing begins about the middle of November. Previous to the commencement of the season's packing the chief civil officer or magistrate of the district visits the factory and selects at random out of the whole stock of provision in the factory six cakes for analysis; two are retained at the factory, two sent to the sister factory, and two go to the chemical examiner to Government at Calcutta. The results of the analysis of each of these three sets of two cakes (in terms of their morphia, narcotine, and smokeable extract) are put on the table at the first sale of the season's opium, for the information of the merchants.

Packing is carried on in fine weather only, and is not practicable in damp, cloudy or rainy weather. 20,000 cakes are packed daily in 500 chests, 40 cakes in a chest, the dunnage used being the "trash" already described. 500 chests a day are daily dispatched from the factory en route for Calcutta, where they are stored in large warehouses under the charge of the Board of Revenue, by whom a certain number are exposed for sale each month on account of the Imperial Government.

The opium intended for Indian consumption is not made up into balls of 70° consistence; it is exposed in the sun in shallow trays until it has become inspissated to a consistence of 90°, at which point it is melted into cubical cakes of 1 ser, each of which is smeared with poppy oil and packed in two layers of bamboo paper. The cakes are then packed in sixties in mango-wood chests, which are distributed as required to the different treasuries of the N. W. Provinces and Oudh and Central Provinces.

Opium, which on examination at either factory is found to be adulterated or otherwise unfit for manufacture, is confiscated, and the morphia and codeia in it are recovered in the laboratory department of the Ghazipur factory. Narcotine used also to be recovered; the demand for it has, however, now almost entirely increased, and it is no longer prepared at Ghazipur.

"The cultivation of the poppy is popular amongst our cultivators . . . . . the certainty of receiving a fixed price for their opium, the payment of advances without interest at periods at which the Asámis are generally hard pressed for funds; the obtaining high prices both for the poppy petals and leaves; the getting of advances free of interest for wells and frequently for the purchase of bullocks; and the remission of all the advances outstanding if their crop has been destroyed by hail; these advantages and large profits derived from opium attach the Asámis to the cultivation and make it popular. Hindoos of all castes, from Brahmins down to Chamars, and Mahomedans, too, cultivate poppy, but the Koeri caste are our best cultivators."—(Turnbull.)

In one year, for an actual cultivation area of 899,287 bighas (562,054 imp. acres), cultivated by 1,448,508 Asámis, the out-turn of opium at 70° consistence was 107,577 maunds (3952 tons), for which were paid to the cultivators in hard cash Rs. 2,15,15,400 (2¼ million pounds sterling nominal), besides which 19,872 maunds of leaf and 28,773 maunds of trash were supplied and paid for.

In the same year there were turned out (from confiscated useless opium)—

	Lb.
Codeia	34
Morphia acetate	34
„ hydrate	282
„ sulphate	17

Parliamentary and Law Proceedings.

A Fatal Mistake: Warning to Grocers.

At Manchester the Deputy City Coroner (Mr. S. Smelt) held an inquest on Monday on the body of Ernest Lee, aged three months. On Monday afternoon last Kate Lambert, aunt of the deceased, went to the shop of Messrs. D. Melia and Co., grocers, Deansgate, for two ounces of arrowroot with which to feed the child. The assistant at first gave her caraway seeds, but on the mistake being pointed out he weighed a portion of what was supposed to be arrowroot and gave it to Lambert. Although the article did not mix properly with the milk and water, the child was fed with a bottleful of the mixture. The next day it was taken ill, and on Friday Dr. Mann was called in. The child died on Saturday afternoon. The tin from which the supposed arrowroot had been supplied was labelled in large letters, "Genuine St. Vincent Arrowroot," followed with directions for use. Across the label, however, the words "Cream of Tartar, 1*s.* 8*d.* per pound," were written in ink.

Dr. Mann described the symptoms of the deceased, which were, he said, those of acute diarrhœa. He was shown a portion of the stuff which had been given to the child, and upon examining it found it to be cream of tartar. The effect of administering half a teaspoonful of cream of tartar to a child of the deceased's age would be to cause diarrhœa. In his opinion the cream of tartar had been the primary cause of death in this case.

Henry Cavanagh, the assistant who supplied Lambert, said that he had never before sold cream of tartar. The manager, George Worsley, had told him that morning that he had filled the tin with cream of tartar, and had altered the label accordingly. Witness did not notice the writing on the label when he served Lambert.

Worsley, having been duly cautioned by the coroner stated that cream of tartar was put into arrowroot tins to preserve it. Until this affair he was not aware that cream of tartar was a poison, and he did not know what effect it had when taken, though he had sold it many a time. He admitted that he had altered the label, but said that he called the attention of the other assistants—Cavanagh included—to the change at the time.

The coroner, in summing up, called the attention of the jury to the importance of the point as to whether the label had been altered sufficiently to prevent the possibility of mistake, and said if the jury thought there had been any gross or criminal negligence on the part of Worsley they must send him to take his trial for manslaughter.

The jury found that the child died from diarrhœa, the result of the administration of cream of tartar in mistake, for arrowroot. They considered that Mr. Melia should be censured for employing a manager so young as Worsley (he being only 20 years of age), and that Worsley should be censured for his negligence.

The Coroner said that on the evidence the jury would have been quite justified in committing Worsley for trial for manslaughter.—*Manchester Guardian.*

Obituary.

Notice has been received of the death of the following:—

On the 17th of August, Mr. James Neville, Chemist and Druggist, Wallgate, Wigan. Aged 64 years.

On the 19th of August, Mr, John Godwin Protheroe, Chemist and Druggist, Chard Street, Axminster. Aged 31 years.

On the 21st of August, Mr. Thomas John Williams, Chemist and Druggist, Ordsal Lane, Salford. Aged 49 years.

On the 22nd of August, Mr. John Samuel Hodgkinson, Chemist and Druggist, Matlock Bridge, Derbyshire. Aged 53 years. Mr. Hodgkinson had been a Member of the Pharmaceutical Society since 1873.

On the 22nd of August, Mr. Alexander Maitland, Chemist and Druggist, Pitmachie-by-Insch, Aberdeenshire. Aged 66 years.

On the 25th of August, at Ockham Bryan, near York, Mr. William Simpson. Aged 37 years. Mr. Simpson had been connected with the Pharmaceutical Society several years as a Registered Apprentice.

ANSWERS TO CORRESPONDENTS.

A. E. Bones.—The communication is unsuitable for insertion.

Inquirer.—A reference to the subject of the Act will be found on another page.

H. Dimmin.—The return is published as a parliamentary paper and may be obtained from Messrs. Eyre and Spottiswoode, East Harding Street, E.C.

Aspirant.—All applications for membership should be addressed to the Honorary Secretaries of the Conference, 17, Bloomsbury Square.

Exhibition.—The exhibits of the other French colonies will be dealt with in future numbers.

J. Howe.—The Botany required in the Major examination comprises an intimate acquaintance with the parts of the flower, fruit and seed; the functions and mode of arrangement of the different organs of plants; a knowledge of the general principles of classification and of the Linnean and De Candoleés systems, and the ability to distinguish practically between about twenty of the principal orders, and to refer to their respective orders specimens shown to him. For further details see the Regulations of the Board of Examiners, a copy of which may be obtained from the Secretary.

Messrs. W. B. Orton and *W. Wilkinson* are thanked for their communications.

Formulary.—The National Formulary is a collection of formulæ issued under the auspices of the American Pharmaceutical Association. The "elixir adjuvans" of that work is a preparation chiefly intended as a vehicle, particularly for the acrid and saline remedies. The formula will be found in the *Pharmaceutical Journal* for July 28, 1888, p. 69.

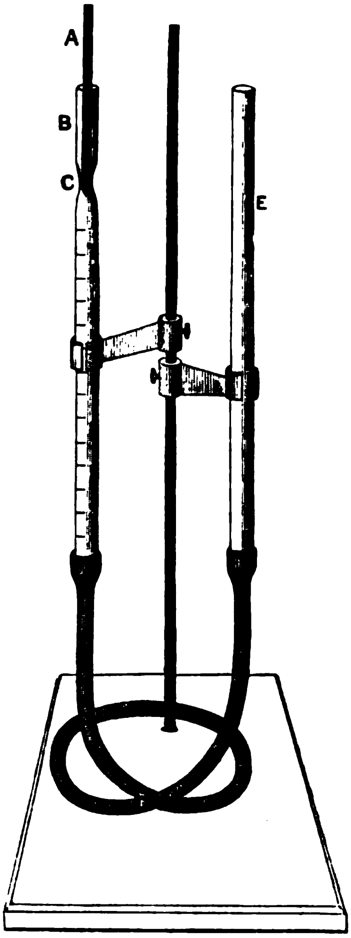
Communications, Letters, etc., have been received from Messrs. Prescott, Fraser, Naylor, Attfield, Umney, Plowman, Garnett, Raven, Battonian.

A SIMPLE APPARATUS FOR TESTING SPIRITUS ÆTHERIS NITROSI.

BY A. E. SLINN AND H. STUBBINS.

The well-known gasometric methods of estimating spiritus ætheris nitrosi are not generally resorted to by provincial pharmacists, owing to the fact, no doubt, that nitrometers as a rule find no place in their stock of apparatus. And the process lately devised by Professor Dunstan and Mr. T. S. Dymond, though admirably simple and accurate, is hardly more practical, since the average chemist does not possess a burette.

Now with a little manipulative skill, an efficient apparatus may easily be constructed as follows :—Take two straight pieces of glass tubing, having ½ inch bore and say twenty inches long. About three inches from the end, one of the tubes should be drawn out (by holding in a Bunsen flame) to the thickness of a ¼ inch. This we will call the neck (C). Next draw out to a point, a piece of narrow glass tubing, and make the point air-tight by fusing in a flame; while the point is moderately hot, insert it in a small piece of ordinary black (feeder) tubing (if done carefully it will adhere firmly). When cold, wet it, and insert it in the neck, so as to form a perfectly airtight plug (A). Gently scratch a mark on the neck with a sharp three-cornered file, to indicate the proper position of the plug when working it. The tube has now to be graduated: drachms will be found most suitable for this size tubing. Hold the tube upside down and pour into it a carefully measured drachm of water, and while taking care to hold the tube perpendicularly, scratch a mark with the file; introduce another drachm, mark as before, and so proceed to the end. The cup (B) can also be graduated, though using a measure direct saves time and trouble. The tube is now complete, and has only to be attached to the other tube, by a piece of india-rubber tubing (say about three feet long), and fixed to a heavy retort stand, by means of two clamps.



To use the apparatus raise the limb (E) about 6 inches, then pour in and fill up to the neck with strong brine, carefully insert the plug *so as to exclude any air*, then depress the limb (E) about 12 inches. Pour into the cup a carefully measured drachm of the sample to be tested; gently raise the plug with a spiral movement, and when all but two or three drops have run in, close the aperture, add a few drops of water and gently run in all but one or two drops. Next gently introduce a drachm of strong solution of potassium iodide (say 10 or 12 per cent.) and then let in *slowly* a drachm of dilute sulphuric acid. Carefully place the plug in its proper position, agitate briskly at intervals, and after five minutes or so adjust the liquid in the two limbs to the same level, and note the volume of gas produced. This is well-known as Allen's process; and the above apparatus was devised with the idea that the chemist who would not go to the expense of a nitrometer, would, by its very simplicity, be tempted to test his sp. æther. nit., if he had any reason for doubting its strength. Of course, strict accuracy cannot be claimed for it, but it is sufficiently accurate for testing according to the B.P. The materials for constructing it could, we venture to say, be found in every chemist's shop, while the cost would not exceed a shilling. It is extremely simple of construction, is not complicated in any way, and when made, the process of testing a sample of sp. æther. nit. is both interesting and easy; in fact, it could be successfully performed and understood by any senior apprentice of average intelligence.

LESSONS FROM FIELDS AND LANES.

SEPTEMBER.

"Season of mists and mellow fruitfulness,
  Close bosom-friend of the maturing sun;
Conspiring with him how to load and bless
  With fruit the vines that round the thatch-eaves run;
To bend with apples the moss'd cottage trees,
  And fill all fruit with ripeness to the core;
To swell the gourd, and plump the hazel shells
  With a sweet kernel; to set budding more,
And still more, later flowers for the bees,
  Until they think warm days will never cease;
For summer has o'erbrimm'd their clammy cells."

"Mellow fruitfulness!" Here we have described in two words the botanical character of the month. Wheat, oats and barley, apples, plums and pears, hips and haws, acorn and hazel-nut, rasps and brambles, all combine to tickle the palate of the youthful philosopher, to arouse the enthusiasm of the botanical student, or it may be to fill with dismay the heart of the "Minor" aspirant.

If the scales be separated from the "kernel" of the wheat the latter will be found to consist of a single seed firmly attached to an outer skin (the *pericarp*). The fruit of the *Compositæ* approaches very near to the *Gramineæ* in structure; both are one-seeded, dry and *indehiscent* (not splitting open when ripe). The fruit of composites is, however, known as an *achene*, while that of grasses is known as a *caryopsis* or *grain*; the difference is that in the achene the pericarp is easily detached from the seed while in the caryopsis it is not. A *nut* is simply an achene in which the pericarp has become thick and leathery or woody; the nut is often surrounded at its base with an involucre, and is then known as a *glans*, as seen in the hazel-nut and acorn. In the acorn the involucre forms a distinct cup or *cupule*. The *winged nut* of the elm is familiar to all frequenters of the country. The *samara* or winged fruit of the sycamore and maple differs from this in having two seeds, each provided with a wing and supported on a little stalk, just as we found in the cremocarp or umbelliferous fruit; the samara might in fact be described as a cremocarp in which the mericarps were winged.

The plum, apple, hip and haw, are examples of *succulent* fruits; they all belong to the same order (*Rosaceæ*), and are yet very different in structure. The plum—with its relatives the damson, sloe and cherry—is an example of the *drupe*, which cannot be better defined than as a *fleshy* achene. Three distinct layers may be noticed in the pericarp, the *epicarp* or skin, the *mesocarp* or pulpy portion, and the *endocarp* or stone, the latter enclosing the seed. The apple and pear form examples of the *pome*; the edible portion here is formed by the calyx tube, which has become succulent. The "hip" is known as a *cynarrhodum*, and consists of a number of achenes enclosed in a fleshy calyx tube. The bramble or blackberry and the raspberry consist of a number of drupes united into a head; such a combination is known as an *etærio* of drupes. The fruit of the buttercup is an etærio of achenes. The strawberry is also an etærio of achenes, but the receptacle, instead of being dry, as in the buttercup, has become enlarged and succulent, forming the edible portion. An interesting fruit now to be found almost everywhere is that of the willow-herbs (*Epilobium*). *E. montanum* is perhaps the most common species in dry places, while river banks and moist places should furnish an abundance of *E. hirsutum* and *E. palustre*; *E. angustifolium* is sometimes found wild, but is more common in gardens. The willow-herbs belong to the order *Onagraceæ*, the same order as the fuchsias, and when in flower—from June to August—may readily be recognised by their *long inferior* ovary, eight stamens, and four petals. The rich, soft, rose-coloured flowers of the three last mentioned if once recognised are not soon forgotten. *E. montanum* is paler and more delicate looking. The long ovary when developed forms a *capsule*, a general name given to fruits composed of several carpels, which dehisce or split open when ripe. Capsules have, however, different methods of effecting this dehiscence; in the present case it takes place by *valves*, the carpels splitting away and leaving the hairy seeds attached to a central axis. In henbane the capsule dehisces by means of a lid at its apex, while the poppy effects the same purpose by pores beneath the stigma.

The order *Labiatæ* has still some representatives among the flowers of field and lane, and to the pharmaceutical student perhaps the most interesting of these are the mints. The genus *Mentha* may be divided into two divisions, in one of which the calyx throat is hairy, while in the other it is glabrous or smooth. In the first division the only species is *Mentha Pulegium*, the *Pennyroyal*; damp heaths are its favourite habitat, but it is not by any means common, and in Scotland is scarcely known; it has a much branched leafy stem with recurved leaves, and the lilac flowers are in whorls arranged at different levels on the stem. The smooth-throated calyx bearers are again subdivided according to the arrangement of the flowers on the stem; in *M. aquatica*, the most common species, the flowers are in spikes at the apex of the stem; in *M. piperita*, the peppermint, the same arrangement holds; indeed this is sometimes considered simply as a variety of *M. aquatica*; *M. viridis*, spearmint, has the same characteristic, but is seldom found wild. In peppermint the leaves are stalked, while in spearmint they are sessile, the most ready means of distinguishing the plants, especially when dried. In *M. sativa*, a kind of marsh mint, and in *M. arvensis*, the corn mint, the flowers are arranged in whorls at different levels on the stem, just as in the pennyroyal. Growing alongside the corn mint there will probably be found two species of hemp-nettle, *Galeopsis Tetrahit*, with small purplish flowers and long stalked ovate-acuminate and serrate leaves, and *G. versicolor* with larger yellowish flowers, but in other particulars similar to the first mentioned. The hemp-nettles much resemble in structure and habit the common white dead nettle, in flower three months since, differing only in the lobing of the corolla lip and the shape of the nutlets.

The order *Scrophulariaceæ*, which we have already found to be so closely allied to *Labiatæ*, is also represented in the September flora. The figworts, *Scrophularia nodosa* and *S. aquatica*, may be easily recognized by their small dingy-purple coal-box-shaped flowers. The latter grows in wet places, and has a thick underground stem or *rhizome*, while the former takes its specific name from the knotty character of its root. The ovate, pointed fruit is a good example of the capsule, and its two cells serve to distinguish it from the four-celled fruits of the labiate order. *Linaria vulgaris*, the common toadflax, is a well-known Scrophulariaceous plant which still makes a brave show on railway embankments and waste ground: its leaves are linear and crowded on the stem; the inflorescence is a good example of the raceme, and its light yellow corolla is spurned and *personate*. A personate corolla is a corolla with two *closed* lips, and should be carefully distinguished from the *gaping* form of labiate corolla common to the dead-nettle and hemp-nettle, which is known as *ringent*, from a Latin word meaning grinning. The pretty little bluish-purple flowers of the ivy-leaved toadflax may still be found nestling in the crannies of old walls. It is often grown in cottage windows, and its graceful festoons of kidney-shaped leaves and bright, fragile-looking flowers form a by no means despicable ornament.

A walk by a corn-field now is almost sure to reward us with a glimpse of the little scarlet flowers and dotted leaves of the pimpernel (*Anagallis ar-*

vensis). Whether we see the interior of the flower is entirely dependent on the day, for it is only in the very brightest of weather that the "poor man's weather-glass" overcomes its shyness to such an extent as to open to the light of day its stamens and pistil; its small glassy capsules, looking almost as dainty as the flowers which gave them birth, dehisce transversely by means of a lid, as in the case of henbane. A capsule which opens in this manner is known as a *pyxis* or box. The plant belongs to the primrose order, and the *free central placentation* so characteristic of this order is in the capsule before us well marked. It should be noted here that where the placenta or ovule-bearing surface is free central (standing by itself in the middle of the ovary), it is impossible for the ovary to be anything but one-celled.

Our ubiquitous friends, the composites, show no signs yet of abating vigour. The pasture land is dotted with the yellow flowers of the hawkbits and the brown and purple of the knapweed; "prolific" walls still furnish a specimen or two of the wall-lettuce, with its slender heads and queer top-heavy looking inflorescence; dry banks are brightened with the yellow sprays of the golden-rod; railway embankments have their dreariness relieved by an abundance of the common hawkweed; the ragwort asserts itself everywhere, and is accompanied by the fragrant yarrow, whose white flowers give it a social position ahead of all its yellow brethren. High as we have seen the composites stand in the scale of development, many of them yet retain their primitive colour; while some, like the daisy, the marguerite and the chamomile, show a tendency to soar a little higher, and start by holding out greater attractions to their insect helps in the shape of large white ray florets.

The scabious and the teasel, members of an order —*Dipsaceæ*—much resembling the Compositæ, are now among the most pronounced features of the field and lane flora. Tho flowers, like those of the composites, are in heads surrounded by an involucre; the purple corollas are mostly tubular, although the outer florets of the heads show the same tendency as the ray florets of their composite relatives to flatten out and look more showy; the stamens are four in number and are *free*, an important distinction from Compositæ, in which the stamens are syngenesious or joined by their anthers. The teasel (*Dipsacus sylvestris*) is best known by its spiny involucre, which in some districts leads to its use by the country people as a wool-combing machine, and even as a clothes brush. The common field scabious may be recognised at once by its robust habit, the stems sometimes attaining a height of five feet, and bearing numerous heads of blue flowers which are surrounded by an involucre free from the stand-offish prickliness of the teasel; the leaves vary from pinnatifid to lanceolate; the calyx has become reduced to a number of bristles and much resembles the pappose calyx of Compositæ. *S. succisa* has flowers similar to the field scabious, but much smaller; the leaves are obovate and mostly radical; the root-stock appears to have been bitten off and is known as *præmorse*. It is from this character that the plant takes its popular name of "devil's bit." *S. Columbaria*, the only other species of scabious, often accompanies the devil's bit in dry pastures, and may be distinguished from it by its much divided, although very variable leaves, and involucre extending beyond the heads.

The *Umbelliferæ* are now making their last stand. Hedgerows in many districts owe their continued picturesqueness to one of the hedge parsleys—*Caucalis Anthriscus*—whose pinky-white flowers and prickly fruits have the appearance of a livelihood hard earned. Dry fields are still dotted with the creamy flowers and clusters of pink-topped flattened fruits of the burnet saxifrage—*Pimpinella Saxifraga*: the umbels have neither partial nor general involucre, but the plant is most easily recognised by its pinnate radical leaves with serrate leaflets; the stem leaves have linear segments, and in many the *sheath* is developed at the expense of the blade. Moist woods show a profusion of angelica (*Angelica sylvestris*), a plant in habit much resembling the cow-parsnip; the leaves, however, are much more divided (*bi-pinnate*), and the leaflets serrate. The plant before us measures 6½ feet in height, and the radical leaves are about 2½ feet across; the flowers are pinky and white, the umbels possessed of a partial involucre of very narrow bracts, and the mericarps distinctly winged.

USEFUL PLANTS OF THE GENUS PSORALEA.*

BY JOHN M. MAISCH.

One of the most interesting groups of plants are those belonging to the order of Leguminosæ which—as remarked by Lindley—"is not only among the most extensive that are known, but also one of the most important to man, whether we consider the beauty of the numerous species, which are among the gayest-coloured and most graceful plants of every region; or their applicability to a thousand useful purposes." Many of the plants are medicinal, or yield medicinal products, quite a number of which have been admitted into the various pharmacopœias, including some which are decidedly toxic, like physostigma.

Among the leguminous plants indigenous to the United States a species of *Psoralea*, common in the Southern States and west of the Alleghanies, has attracted some attention as a medicine, and though it does not seem to possess properties superior to other more generally-known drugs, it will perhaps be of interest to collect together the most important facts, recently ascertained or heretofore known, regarding the medicinal or economic value of the different species of this genus.

The name of the genus is derived from the Greek *psoraleos*, which means "affected with the itch or with leprosy," and has reference to the usually blackish glandular points found on the calyx and often on other herbaceous portions of most of the species. The plants are botanically closely related to the genus *Amorpha*, of which the indigenous *A. fruticosa* has a bark rich in tannin and containing a brown-red colouring matter, dyeing yellow with alum. The genera *Glycyrrhiza*, *Astragalus*, *Indigofera*, *Robinia*, *Wistaria* and others belong to the same tribe. The genus *Psoralea* comprises herbs, also shrubs, having leaves mostly divided into three or five leaflets, and a spiked or racemed inflorescence, the flowers being mostly purplish or blueish; the fruit is a one-seeded, indehiscent, frequently rough or wrinkled legume, which is about the length of the persistent calyx. About one hundred species of *Psoralea* have been described, of which more than forty, or nearly one-half, belong to Southern

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* Read before the Pennsylvania Pharmaceutical Association, June 5. From the *American Journal of Pharmacy*, July.

Africa, five or six to South America, and about thirty to North America; the greater portion of the latter are confined to the Southern States and west of the Alleghanies, and eight are found in California.

Only a small number of the species have been used, some medicinally, others as food. The food plants, as far as known, have their homes in the western section of North America. Two were mentioned some years ago by Dr. Edward Palmer in a paper entitled "Plants Used by the Indians" (see *Amer. Journ. Pharm.*, 1878, p. 545), namely:—

Ps. castorea, Watson, growing from Arizona to Nevada; the large white farinaceous roots are eaten by the Pah-Utes, raw as well as cooked, or made into bread or mush. The same tribe uses also the roots of

Ps. mephitica, Watson, which are small, but farinaceous. The plant is abundant in low places in Southern Utah; its specific name refers to the unpleasant odour of the leaves.

Ps. esculenta, Pursh., has been more widely known than the preceding two species. In the beginning of the present century it was brought to Europe by Lamare-Picquot, who recommended it as a substitute for the potato. It was cultivated for some time in France, where it became known as *picquotiane*; but the results were not encouraging, and at present it is rarely met with in Europe.

I am indebted to Mr. Clifford Richardson, of Washington, D. C., for the following graphic description of the plant, its tuberous root and the uses of the latter, written by Dr. V. Havard, Surgeon U. S. Army at Fort A. Lincoln, Dakota.

"The plant is the *pomme de prairie* or *pomme blanche* of the early Canadian voyageurs; the *prairie turnip* or *prairie potato* of the American settlers; the *tipsinah* of the Sioux, and the *taahgu* of the Osage Indians.

"Description: Perennial; roughish hairy all over; stem stout, erect, somewhat branched, from 5 to 15 inches high, growing from a tuberous root; leaves on long petioles, palmately 5-foliolate, the obtuse leaflets obovate, oblanceolate or oblong, about 1½ inches long; stipules free, lanceolate; flowers appearing in June and July in dense thick spikes about 2 inches long, borne on peduncles 2 to 3 inches long, exceeding the petioles; each three-flowered cluster subtended by a large bract; lobes of calyx lanceolate; acuminate, 4 to 6 inches long, equal to, or larger than, the gibbous tube, and but little shorter than the purplish corolla; seed oval, three lines long, flat, smooth and shining.

"Soon after blossoming the plant dries up into a brown rigid mass, then breaks off and becomes a 'tumble weed' blown over the prairie, scattering its seeds as it goes.

"The tuber is 2 or 3 inches under ground. It is irregularly elliptical in shape, from ovoid to fusiform; in size ranging from a hen's heg to a large filbert, averaging 1½ to 2 inches in length and 1 inch in diamater. The upper end shows the scars of previous years' stems; the lower end is produced into a long and very tough tap root. It is covered with a thick leathery skin, easily peeled off its white and smooth surface. Passing through the axial line are clusters of fibers, which proceed from the stem and run into the tap root. These tough, fibrous clusters are the only inedible part of the skinned tubers. On section it is seen to be composed of a white granular mass, at first somewhat spongy, but becoming hard on drying, in which state it is friable and easily pulverized into a light starchy flour.

"The prairie turnip is a widely distributed plant. It is found from the lakes westward to the Rocky Mountains, and from the Saskatchawan river downward to Louisiana and Texas. It is on the dry table-lands of the Missouri, however, from Montana, through Dakota and Nebraska, to Kansas, that it is most abundant.

"The tuber of this plant has always been of great importance to the Indians, one of their vegetable staple foods. It is mentioned by all the explorers and voyageurs who first traded with the Indians of the Western prairies. It is in its best condition when the flowers begin to fade, in the latter part of July. At that time the squaws start out to gather their crop of tipsinah. Formerly they used a strong pointed stick to pry the tuber out; now they use a small iron bar, one end of which is beaten into a narrow blade. The tuber, cut into slices and dried, can be kept for several years without deterioration. In this state it is found in the tents of the Sioux Indians, and formerly constituted an important ingredient of their winter food. Eaten raw it has a very palatable farinaceous flavour. The Indian children, when cutting teeth, are given pieces of it to chew, with apparent benefit; they are treated in the same manner, and likewise with good result, when suffering from bowel complaints. I am told by an old settler that on several occasions, when making long marches without water, he successfully appeased the sharp pangs of thirst by keeping pieces of it in his mouth, their effect, doubtless, being to stimulate the salivary glands. The Indians generally eat this root cooked, and as they appreciate the advantages of a mixed *pot-au-feu*, boil it with tripe, fattened pup, or other choice nitrogenous food.

"Although the prairie turnip is mostly found on high prairies, it does not follow that it prefers a sandy, barren soil; on the contrary, I have observed that it thrives best in deep and fertile soil, if, at the same time, dry and porous; under such conditions the root attains its maximum development. I have hardly any doubt that under patient cultivation for a few seasons it could be improved, perhaps to an extent that would make such cultivation profitable; and supply our market with another toothsome, wholesome and nutritious vegetable."

Dr. Havard had sent some of the root to Mr. Clifford Richardson for analysis, which was completed last year, but has never been published, and was kindly furnished by him for publication with this paper. Mr. Richardson's results are as follows:—

Water	9·49
Ash	1·74
Oil (with petroleum ether)	·37
Resinous substances (with ether)	·35
Sugar (with 80 per cent. alcohol)	4·77
Sweet substance (soluble in water)	1·14
Starch (by difference)	69·60
Globulin	1·04
Albumin soluble in water	1·02
Albumin insoluble in water	6·10
Non-albuminoid nitrogenous matter	·90
Fibre	3·48
	100·00

Mr. Richardson remarks that the roots are distinguished by their large amount of starch, the presence of a new sugar readily crystallizing, and by the varied forms of nitrogenous matter; he will further investigate the sugar isolated by him.

An analysis of the root, communicated by Payen to *Comptes Rendus* in 1848, gave water 12·50, mineral matter 1·61, nitrogenous matter 4·09, and starch 81·80. The last-named item evidently includes other carbohydrates and compounds separated by Mr. Richardson.

The three American species named above are the only ones used as food, as far as I was able to ascertain. Of the species medicinally employed,

Psoralea glandulosa, Linné, attained some notoriety and created some confusion during the first half of the present century through an error into which the distinguished French naturalist, Alcide Dessalines d'Orbigny, was led, more than sixty years ago, while travelling in South America, by referring to this plant the Paraguay tea, or *yerva maté*, which is extensively employed in South America. The parent plant of this tea had been previously named *Cassine Gongonha* by the German scientist, Karl Friedrich von Martius, and *Ilex paraguariensis* by the French botanist, Auguste de Saint-Hilaire. The name given by the last-named authority is generally recognized; but d'Orbingy's error figured in scientific literature to some extent for about thirty years, and as late as 1850, Lenoble, when publishing an analysis of Paraguay tea, followed the erroneous nomenclature (see *Amer. Journ. Pharm.*, xxiii., 182). To the same mistake must also be attributed the origin of the statement current in some recent works, that the leaves of this species are used in Chili as a *substitute* for Paraguay tea. The leaves were exhibited at the Centennial Exposition in Philadelphia (see 'Proc. Amer. Pharm. Assoc.,' 1876, p. 765), under the vernacular name of *culen*. The odour can hardly be called agreeable; it resembles that of rue, and the leaves are in their native country employed as a tonic and anthelmintic, and externally as a vulnerary. The root possesses emetic properties. Both the leaves and root have been admitted into the Mexican Pharmacopœia under the name of *yolochiahitl* (*Amer. Journ. Pharm.*, 1886, p. 171). An analysis of either part does not appear to have been made.

Psoralea bituminosa, Linné, is a suffruticose plant of Southern Europe, the leaves being trifoliolate, like those of the preceding species; the specific name refers to the peculiar odour of the plant. The leaves have long been popularly employed as a tonic, stimulant and emmenagogue.

Ps. physodes, Douglas, likewise a species with three leaflets, is enumerated by Dr. W. P. Gibbons, in a "List of the Medicinal Plants of California" (see 'Proc. Amer. Pharm. Assoc.,' 1871, p. 300), but its reputed properties or uses are not given. Neither is the plant mentioned by Carter.[*]

Ps. melilotoides, Michaux, s. *Ps. Melilotus*, Persoon, grows from Virginia southward, and westward to Illinois. It is very common in middle and upper Carolina and in Georgia. Two students of the Philadelphia College of Pharmacy, Aug. Bradley and Edward D. MacNair, both from North Carolina, call attention to this plant in their graduating essays, which are mainly of a descriptive nature. As indicated by the specific names the plant resembles the melilot or sweet clover in appearance. It is somewhat pubescent and more or less granular; the stem grows to the height of 2 feet, is much branched, and bears trifoliolate leaves, the leaflets varying in shape between lanceolate and narrowly oblong; not unfrequently they are glandless, which is the main distinctive character of the form *Psoralea eglandulosa*, Elliott. The numerous small purplish flowers are in axillary and terminal long-peduncled oblong spikes, and produce oval or sub-orbicular, transversely wrinkled pods. The perennial root is fusiform, sending out stout branches of similar shape, ½ to 1 inch thick, from 8 to 12 inches and more in length, externally light brown, internally white, and tough and fibrous in the bark as well as in the meditullium. The plant is collected when in full bloom. The herbaceous portion being of a weaker odour and taste is used to some extent; but the root is the principal part employed. In the fresh state it has an agreeable aromatic odour and a bitterish, spicy, or even rather acrid taste; but odour and taste are much weaker after drying.

Mr. MacNair obtained from the fresh root about 2 per cent. of volatile oil, having the sp. gr. 0·93, a pungent and bitterish taste and a neutral reaction. Tannin appears to be absent; but a dark-green colour is produced in the infusion and tincture by ferric chloride. Starch is present; also a bitter principle which has not been isolated.

Dr. Carter (*loc. cit.*) states that the drug is aromatic, bitter tonic, nervine, and is used in chronic strumous diarrhœa. The same properties were attributed to it by Dr. Mettauer, in 1867. It is said to have been much and very advantageously employed by the negroes in an affection of the digestive organs, known to them by the name of *poison*, and is usually given in the form of infusion made with the addition of a little chamomile and Canadian hemp (apocynum). Mr. MacNair has made a number of galenical preparations, among them *Tincture Psoraleæ composita*, following the pharmacopœial formula for compound tincture of gentian, substituting psoralea root for the gentian.

Extractum Psoraleæ was prepared with diluted alcohol and *Extr. Psoraleæ fluidum* with diluted alcohol, the finished preparation containing 5 per cent. of glycerine.

Mr. Bradley states that the drug is administered in the form of a 20 per cent. *tincture*, made with a diluted alcohol, and given in doses of one to four drachms.

Some of the popular names of the drug are Samson's snake root, congo root, pigtail root, and Bob's root.

Psoralea pentaphylla, Linné, is a Mexican species having five leaflets. During the past century the root was sent to Spain; it is mentioned in the universal pharmacopœias of Jourdan (1828), and Geiger (1835), as *radix contrayervæ novæ, p. albæ* (*s. majoris, s. mexicanæ*); it had been recommended as a substitute for the South American contrayerva (*Dorstenia*), but like the latter had become obsolete. Though of Mexican origin, it appears to be at present little known in that country and is not mentioned in the Mexican Pharmacopœias of 1874 and 1884. The root was described as being of the thickness of a finger to about two inches, with a rugose brown bark, which is internally white and covers a white woody axis; taste aromatic and sweet.

Recently the drug was chemically examined by Mariano Lozano y Castro,[*] who obtained the following results:—Moisture, 10·0; ash, 3·75; extracted by petroleum ether (fat, 1·38; resin and volatile oil, 0·12), 1·50; ether extract (crystalline acid, 0·40, fat, 0·50, resin and colour, 2·40), 3·30; alcohol extract (alkaloid and glucose, 9·25; resin, 1·46), 10·71; water extract, gum and sugar, 8·336; starch, 26·5; albuminoids, 1·0; cellulose and lignin, 28·75 per cent. The presence of an alkaloid was inferred from the precipitates obtained in the aqueous solution of the alcohol extract by tannin, picric acid and platinic chloride. Subsequently Mr. Lozano prepared 8 per cent. (40 gms. from 500 gm. of the root) of what he considered nearly pure hydrochlorate of the alkaloid which gave alkaloidal reactions with other reagents (Mayer's and Marmé's), besides those mentioned before. It was obtained by mixing the powdered root with lime and water, after three days treating with water acidulated with HCl, concentrating the filtrate, mixing with alcohol, filtering, evaporating, treating the extract with alcohol, evaporating, taking up with water, repeating these operations several times, and finally decolorizing with animal charcoal. While it is possible, though by no means certain yet, that the root may contain an alkaloid, it has not yet been isolated, and the chemical reactions and the physiological experiments described by Lozano were made with calcium chloride mixed with organic matter of unknown quantity and quality.

Psoralea corylifolia, Roxburgh, is an annual plant with undivided leaves, the seeds of which have been long in use in India as a tonic and deobstruent and in skin diseases. In 1876 (*Proc. Am. Ph. A.*, 1877, 209), Dymock called attention to the use made in India with the oil expressed from the seeds, and later (*Ibid.* 1882, p. 245), the oleoresin of the seeds diluted with simple unguents was highly lauded for its efficiency in leucoderma. Sometimes it was used mixed with chalmugra oil, to which some of the alleged effects in skin diseases may have been due. But the writer has been unable to find any record of the results of experiments, which were said to have been undertaken in England with the oil and the oleoresin of these seeds, during the years 1881 and 1882.

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[*] 'Synopsis of the Medicinal Botany of the United States.' By J. M. G. Carter, M.D., 1888.

[*] 'La contrayerba blanca o de México.' Mexico, 1889. Pp. 48.

Whether others of the North American species of Psoralea, besides those mentioned above, possess valuable medicinal properties must be left for future investigations to decide. The genus is certainly an interesting one, notwithstanding the economic and medical uses are confined to a small number of species and to limited localities.

INFUSION OF DIGITALIS.[*]

BY JOSEPH W. ENGLAND, PH. G.

In the introductory portion of his paper, the author refers in detail to the chemical researches on digitalis, and lays stress upon the fact that the active constituents may be divided into three groups. First, those soluble in alcohol and insoluble or nearly insoluble in water; second those soluble in water and soluble or nearly insoluble in alcohol; third, those soluble in both alcohol and water. Under the first group are placed digitalin and digitoxin; under the second digitonin; under the third digitalëin. The tincture and fluid extract being alcoholic or rather dilute alcoholic preparations, contain most largely digitalin, digitoxin and digitalëin, whilst the infusion, an aqueous preparation, holds in solution digitonin and digitalëin. It is evident from these facts, comments the author, that the custom of making infusion of digitalis from the tincture of the fluid extract, needs to be mentioned only to be condemned, and should never be followed.

To determine the value of an infusion of digitalis, the first step would be to ascertain the percentage of active ingredients and next to standardize. In the absence of standardization the best method would be to ascertain the amount of solids, active and inactive, dissolved. In view of its delicate chemical composition, it is manifest that prolonged heat should not be used to obtain such results, so in all the experiments herein recorded, evaporation of the finished product was not resorted to. The amount of solids dissolved in each fluid ounce was found by taking the specific gravity of the infusion (in a flask holding 32·4 gm. of distilled water, at 70° F.), multiplying it by the weight of a fluid ounce of water and subtracting from the result 455·69 grains.

The first series of experiments made were to determine whether cold or boiling water exerted the greater solvent action upon digitalis, and whether, in each instance, maceration for one, two, three or four hours produced any variation. The results of eight experiments upon the same sample of powdered digitalis (No. 80), 1 drachm to each pint of infusion, were these, that the cold water infusions were lighter in colour than those made with boiling water, and that the specific gravity (1·00154) was identical in *all* cases, whether maceration was for one, two, three or four hours. It may then be deduced that cold water infusions are preferable to those made with boiling water, because, although having the same specific gravity as the latter, they contain a relatively larger percentage of active solids, because the latter hold more colouring matter in solution, and as both exhibit the same amount of dissolved solids it must then contain a smaller quantity of the colourless, active ingredients. This belief is confirmed in the observations of M. Roger[*], who found that "the toxicity of digitalis diminishes very notably, when the product of maceration is concentrated by the water-bath. Then, a 5 per cent. maceration, which is toxic in doses of 0·05 gm., no longer kills save in doses of 1·8 gm., when it is concentrated by 4 per cent. If reduced by 6·6 per cent., 3 gms. would be required to produce the same effect." These experiments would then indicate that the use of heat and boiling water, in the preparation of the infusion, should be avoided, for the reasons that the constituents of the leaf are altered in chemical composition; the active ingredients being changed to non-toxic, inactive ones, whilst the non-active colouring matter is rendered more soluble.

In the previous experiments the specific gravity of the finished product (made from 1 drachm of No. 80 digitalis powder to the pint) was 1·00154; showing 0·7 grains of dissolved solids in each fluid ounce of the infusion. Eight more samples were now made, double this strength, with cold water and with boiling water, each, and macerated for one, two, three and four hours; using the same digitalis as previously. The results were all alike (sp. gr. 1·00308), indicating 1·4 gm. of dissolved solids in each fluid ounce.

It became of interest in this connection, to see just how far this regularity of increase of dissolved solids would go, and fourteen infusions of the same sample of powdered (No. 80) digitalis, as previously used, were made of different strengths. The results are these:—

Grains to pint, 60, 120, 130, 140, 160, 180, 200, 240, 300, 360, 420, 480, 720, 960.

Solids in fl. oz., ·7, 1·4, 1·54, 1·68, 1·89, 2·1, 2·38, 2·52, 2·95, 3·51, 4·07, 4·50, 6·35, 8·15.

The regularity of increase seems to be reached with 200 grains to the pint; above that point the increase is variable.

Infusions of the *whole* leaf were now made, taking ten different samples (120 grains to the pint, cold water, two hours' maceration, etc.). With singular unanimity they *all* showed the same specific gravity 1·00308, indicating 1·4 gm. of solids to the fluid ounce, a remarkable constancy in the amount of solids dissolved.

To compare this result with those of infusions made from the No. 80 powder (same strength, conditions, etc.) ten different specimens were made from commercial samples. The results are variable, as follows:—

Solids in fl. oz., 1·4, 1·26, 1·12, 0·98, 1·4, 1·4, 1·4, 1·12, 1·12, 1·26 grains.

It should be mentioned that in all these experiments the so-called English leaves were used. Right here, it is of value to know whether the popular prejudice in favour of the English leaf is founded on any other basis than that of custom. So ten infusions of German digitalis leaves, as found in commerce (120 grains to the pint, cold water, two hours' maceration, etc.), were prepared. The results were as follows:—

Solids in fl. oz., 1·4, 1·12, 1·105, 1·4, 1·105, 1·12, 1·4, 1·26, 1·4, 1·4 grains.

It will be observed that the amount of solids dissolved is not constant, as in the commercial English leaf. Examination of the commercial German leaves reveals the fact that they have not been as carefully selected and freed from stalks, etc., as the English leaves. That the difference in the care of collection and selection is the only difference is shown by the fact, that the infusion when made of leaves selected from each of the ten specimens above evinced 1·4 grains of dissolved solids in each fluid ounce, as in the English-leaf infusions, and that the infusion, when made of stalks, etc., selected from each of the ten specimens above gave but 0·98 gr. of dissolved solids in each fluid ounce, indicating that it was the large and varying quantity of stalks in the commercial German leaves which caused the variability in the amount of solids dissolved, and that the English leaves were superior to the German only because the commercial samples of the former were carefully selected and freed from the stalks; thereby reducing the element of variability to a minimum. In point of fact, it has been intimated that some of the English dealers buy their digitalis leaves in the German markets, and select and repack them as English leaves. Whether this is the case or not the writer does not know.

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[*] From a paper read before the Pennsylvania Pharmaceutical Association, June 5. Reprinted from the *American Journal of Pharmacy*, July.

[*] Toxic Power of Digitalis; *Nouv. Rem.*, Feb. 24, 1889; *vide Amer. Journ. Pharm.* 1889, p. 174.

That the small quantity of solids dissolved in the infusion made of stalks shows a low percentage of active ingredients, is indicated by the experiments of Mr. Broeker,* who, while he found about 1 per cent. of digitalin in the parenchyma of the leaf (the stalks and nerves being rejected), found in the stalks and nerves only 0·2 per cent. of that constituent. Moreover, he observed that the presence of these latter is liable to render the infusion gelatinous.

Although digitalin is insoluble in water, and hence the results of Mr. Broeker cannot be used to prove that the stalks are largely destitute of the water-soluble active principles of digitalis, they would indicate that if there was such a radical diminution in the percentage of one active principle, there was in all.

In the U.S.P. infusion of digitalis it will be remembered that powdered cinnamon (No. 20) is directed to be infused in connection with powdered digitalis (No. 20). Cinnamon is here employed, not for any medicinal action it may possess, but solely for the purpose of flavouring; a purpose which it but imperfectly fulfils, through the solution of a small quantity of volatile oil of cinnamon.

It is of interest to know whether the presence of this volatile oil exerts any retarding influence upon the solution of the water-soluble principles of digitalis. To determine this point, infusions were made of digitalis leaves, which had shown 1·4 grains of soluble solids in each fluid ounce of infusion, and cinnamon water, the specific gravity of which was first taken. The result in all cases indicated but 0·98 grains of solids to the fluid ounce, a decrease of 0·42 grains, or 30 per cent. It may be claimed that the officinal infusion of digitalis is by no means analogous to cinnamon water in the amount of volatile oil which it contains. But it seems evident that the presence of that volatile oil, however small it may be in amount, must exert a retarding influence upon the solution of the digitalis principles, and hence powdered cinnamon should be dropped from the officinal formula.

In reducing the strength of infusion of digitalis to 7 grains to each fluid ounce, the Revision Committee, in the opinion of many, altered the quantity in the wrong direction. It should have been increased, if anything. But as the limit of regular saturation appears to be about 200 grains to the pint, it would be better to return to the pharmacopœial strength of 1870, *i.e.*, about 7·5 grains to the fluid ounce, or 120 grains to the pint.

The following is the formula in use by the writer:—

Take of—

Digitalis leaves, bruised .	120 grains.
Water	14½ fluid ounces.
Alcohol	1½ „ „

Macerate the digitalis leaves, previously bruised in a Wedgwood mortar for one hour with the water, agitating occasionally. Express, filter and wash the residue placed on the filter with sufficient water to make the filtrate measure 14½ fluid ounces. To this add the alcohol. As made by this formula the infusion is a clear, transparent, amber-coloured liquid, darkening in colour on keeping for several days; characteristic in odour and bitter in taste. It is well, in view of the ready decomposition of such a weakly alcoholic solution, to make only such quantities as will last but a short time, or, better still, to make it extemporaneously. This latter method is readily practicable with such a short period of maceration. In the preparation of infusion of digitalis there is urged the usage of the English leaf, or the German leaf selected and freed from stalks; the employment of the whole leaf, broken up as above directed, instead of a No. 20 powder; cold water maceration instead of boiling water infusion, for reasons previously mentioned; the omission of powdered cinnamon, as retarding the solution of the digitalis principles and as of no special value as a flavour; and, lastly, one hour's maceration as all sufficient for the solution of the water-soluble digitalis principles.

CANAIGRE.*

BY HENRY TRIMBLE.

The following account of a tanning material, which has several times in the past few years been mentioned as new, or as a possibility for the tanner, is undertaken with a view of relating what has been done toward developing this source, and at the same time calling attention to the fact that if we encourage home production we have in canaigre a material which gives promise of superseding the uncertain and much adulterated gambier.

Canaigre is found in large quantity in the sandy soil on both sides of the Rio Grande and northward over a large portion of Western Texas and New Mexico.

Its history is briefly as follows:—It is said to have been used in tanning by the Mexicans for over two centuries. Our first information, however, dates from July 9, 1868, when a package of these roots was forwarded for Mr. John James, of San Antonio, Texas, to the Agricultural Department at Washington, together with a letter stating that Mr. F. Kalteyer, chemist in San Antonio, had found them to contain 32 per cent. of tannin. This sample was mislaid or overlooked until 1878, when it was reported on by the chemist.† It was then found to yield 23·45 per cent. of tannin. A fresh sample was also procured and the tannin estimated in the still fresh root with almost identical results, after making due allowance for difference in moisture. The other constituents reported at that time need not claim our attention at present further than to notice a considerable amount of starch, 18·00 per cent.

Previous to this publication by the Government, Mr. Rudolph Vœlcker, of Galveston, Texas, published‡ an analysis of roots gathered in July, 1874. He found 23·16 per cent. tannin, and proved the presence of chrysophanic acid and aporetin. He was not aware of the botanical origin of the plant, but supposed it to belong to the natural order Polygonaceæ.

In 1879, Mr. Wm. Saunders§ in his report on canaigre stated it was the *Rumex hymenosepalum* of Torrey, and furnished a lithographic plate of the plant in bloom.

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* *Amer. Drug.*, Jan. 1888, p. 10. From *Niew Tijdschr. voor de Pharm. in Netherland.*

* Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 56. From the *American Journal of Pharmacy*, August.

† Report of the Commissioner of Agriculture, 1878, p. 119.

‡ An Analysis of Raiz del Indio, *American Journal of Pharmacy*, 1876, p. 49.

§ Report of the Commissioner of Agriculture, 1879, p. 364.

At the New Orleans Exposition, 1885–86, in one corner of the section devoted to products from New Mexico were some of these roots, above which was the inscription, "A new tanning material."

As will be shown later, this exhibit, insignificant as it appeared, attracted the attention of at least one person.

In 1886,[*] a sample of a root sent to me from San Antonio, Texas, under the name of "Indian Root," was analysed and the results published under the title of "Yerba del Indio," from the impression it was the *Aristolochia fœtida* of the Mexican Pharmacopœia. This impression, however, was corrected by Professor J. M. Maisch in the same issue, page 115. He suggested, and it has since been found to be correct, that this "Raiz del Indio" was the canaigre root. That analysis fixed the amount of tannin at 11·66 per cent., but it was found that the root, which was not analysed as soon as received, had commenced to decay and, later, it was completely riddled by insects. In this respect my experience differed from that of the Government chemist, who found no change after ten years.

Soon after the New Orleans Exposition samples of two or three hundred pounds were sent to Chicago for experiments in a number of tanneries there. Mr. E. C. Denig of that city has devoted much time since then to studying this material, from its source in Texas and New Mexico to its application in the tanning of hides.

Canaigre consists of heavy globular and fusiform pieces from two to six inches long and one to three inches in diameter. Externally it is of a dark, reddish-brown colour, becoming, by age, almost black; internally it is from a bright to a brownish-yellow according to age and amount of exposure to atmosphere. When collected the roots consist of clusters resembling sweet potatoes. They are found near the surface or sometimes on top of the ground, are rapidly dried and, at a certain stage, cut into small pieces. If allowed to get very dry they become so hard as to resist any ordinary method of cutting. From samples of the whole and clipped root, kindly furnished me by Mr. Denig, I have found 17·33 per cent. of tannin. This figure is rather lower than that obtained by other investigators, but the deficiency may be explained by my sample containing more moisture. Dr. H. E. Sturcke[†] has found a total of 28·57 per cent. tannin.

The ground root is at present used in a number of tanneries and has been found to more closely resemble gambier in its action than any other tannin material. An extract has also been prepared and used which contains from 40 to 60 per cent. tannin, and it is thought that in this form it will probably replace gambier. Should the hopes and efforts of those who are engaged in the development of this material be realized, we will have a source of tannin which is said to be inexhaustible, and which will be the means of either bringing a better gambier into this market or of driving it entirely out of use here. It is said that the dried and ground root can be delivered in any part of the United States at a price not exceeding 3 cents per pound.

Thus after a delay of twenty years this root has reached that stage of practical application when a useful future may be predicted for it, and the persistent efforts of the past four years have every prospect of being rewarded.

The presence of so much starch in a tanning material is, perhaps, without precedent, and there are good reasons why this is no disadvantage. The properties of the pure tannin have not been investigated, and it is not known whether canaigre red or gallic acid is the product of its decomposition. Crystals have been obtained by agitating an aqueous extract of the root with ether, which do not resemble either gallic acid or catchin.

This crystalline compound and the pure tannin are under investigation by me at the present time.

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[*] An Analysis of *Aristolochia fœtida*, *American Journal of Pharmacy*, 1886, p. 118.

[†] *Shoe and Leather Reporter*, Oct. 27, 1887, p. 882.

A NEW MEDIUM FOR MOUNTING STARCHES AND POLLENS.[*]

BY A. P. BROWN, PH.G.

Having occasion to mount a variety of starches for examination under the microscope, I have been looking for a suitable medium that would best show the structure and at the same time preserve the specimen. Balsam of fir makes starches too transparent. Glycerin is good, but it is almost impossible to find a cement that would hold it, on account of its solvent properties. Carbolic acid and water in time dry out. Cosmolin has been recommended, but it is too greasy, and it has the same fault as glycerin; it is almost impossible to find a cement that will hold it.

A short time ago Mr. Charles Bullock spoke to me of a new medium he had been using to mount vegetable tissues; it struck me as being the very article for mounting starches in. I prepared some and found it to answer the purpose admirably; it is as follows:—

Selected gum arabic	℥ij.
Glycerin	
Distilled water, of each	f℥iss.
Thymol	gr. j.

These are all placed in a wide-mouthed bottle, which is corked carefully to exclude dust, and placed in a warm situation. It takes several days to effect a perfect solution, the mixture being stirred up occasionally. When all is dissolved strain through linen, and set aside the liquid about a week longer to get rid of air bubbles and to allow any small particles that may have passed through the strainer to settle to the bottom; or it can be filtered through absorbent cotton by using a funnel for hot filtration, which consists of a double tin case holding water, kept at the required temperature by a spirit lamp placed under the projecting arm. A glass funnel fits inside the hot water bath, a plug of absorbent cotton is placed in the funnel, and the solution is passed through it. After filtration it is best preserved in compressible tubes.

To mount starches or pollens, a clean slide is breathed on and then dusted over with the starch or pollen to be mounted; the surplus is removed by gently tapping the slide against any hard substance—a table, for instance. Enough of the starch will adhere to the slide, and will be nicely distributed over the field. A drop of the mounting medium is now placed on the slide carefully and the cover placed over it. If there are any air bubbles in the mounting medium when placed on the slide they should be carefully picked out with a mounting needle. If the medium is kept in a compressible tube there is not much danger of air bubbles on squeezing out a drop; or if there are any, they will be on the surface, and can be readily removed with a mounting needle. The slide can then be finished immediately by running a ring of any kind of cement round the edges of the cover glass, and the mount is permanent.

The medium can be coloured blue by adding a small quantity of aniline blue, although it is not necessary, as the structure of the starches can be plainly seen. They should be examined by central and oblique illumination, and with the polariscope, to give the student interested in this subject an idea of the beauty of starches and pollens.

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[*] From the *American Journal of Pharmacy*, April.

The Pharmaceutical Journal.

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SATURDAY, SEPTEMBER 7, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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TOPICS DISCUSSED AT THE LEEDS MEETING OF THE BRITISH MEDICAL ASSOCIATION.

THE enormous area of the field included within the purview of the numerous sections of the British Medical Association almost ensures that here and there points of discussion shall crop up presenting nearly as much interest to the pharmacist and chemist as to the medical practitioner. The publication in the journal of the Association of a detailed account of the business transacted in the different sections at the recent meeting shows in fact that such topics were fairly numerously represented at Leeds, and in this number of the Journal opportunity has been taken to reproduce one or two communications that may be said to lie on the border-land. For instance, the paper by which Dr. FRANKLIN PARSONS, Medical Inspector to the Local Government Board, introduced the discussion in the Public Medicine Section on Disinfection and Isolation, besides indicating the wisest steps to be taken by the Medical Officer who has to battle with an outbreak of epidemic disease, is full of information respecting disinfectants useful to the pharmacist who may be called upon to distribute them to the public. Dr. PARSONS, it will be noticed, limits the definition of the word "disinfection" to the destruction of that matter which produced by a sick person and received into the system of a healthy one has the power of causing in the latter a disease similar to that from which the former was suffering. This definition draws a line between true disinfectants, on the one hand, and antiseptics, which merely retard or prevent putrefaction, as KOCH has shown to be the case with carbolic acid, and simple deodorants on the other. In the case of some diseases, the organized matter requiring to be destroyed to the extent of depriving it of its pathogenic properties has been recognized, as in anthrax, relapsing fever, septicæmia and tuberculosis; in others, as cholera, scarlatina, diphtheria, and enteric fever, organisms have been discovered that are suspected to be connected with the causation of the respective diseases; and in others no such organisms have been discovered, though it is assumed that they exist. Some of these organisms, especially those bearing spores, are very resistent to ordinary destructive agents, and as the spores of the anthrax bacillus are extremely tenacious of life they are commonly used as an experimental material, on the assumption that a substance that can rob them of their hurtful properties will affect similarly all other disease germs. In Dr. PARSONS's communication will be found a very inclusive *résumé* of the results obtained by KOCH, KLEIN and others, in treating these anthrax germs with the principal reputed disinfectants, and it will be observed that the author has a high opinion of the powers of corrosive sublimate, boiling water, and steam heat. Evidently he has not an unduly high opinion of the class of more or less volatile substances which are supposed to be useful in disinfecting the air of sick chambers, for he remarks that active chemicals, if present in sufficient quantity to be effective as disinfectants, would render the air irrespirable. In fact, Dr. PARSONS has more faith in getting rid of the foul atmosphere and letting its place be taken by a supply of fresh air, on the ground that the contagia of most infectious diseases, with the notable exception, however, of small pox, appear to be destroyed when freely diluted with air. For some of the possible carriers of infection fire is commended as the best disinfectant, as for instance the discharges from the throat and nostrils in scarlatina and diphtheria, which should be received on pieces of rag and burnt. For the disinfection of typhoid and other excreta a liquid consisting of half an ounce of corrosive sublimate and an ounce of hydrochloric acid dissolved in five gallons of water is recommended, which as a measure of precaution against mistaken use should be coloured by the addition of five grains of aniline blue. Many useful hints are also given as to the disinfection of bedding and similar articles, and other points upon which the pharmacist is not unfrequently consulted by the public.

In another paper read in the same section on the "Physiological Value of Meat Food for Invalids and Waste in Methods of Preparation," Mr. E. M. JESSOP dealt with the physiological aspect of a subject upon which the pharmacists have already brought to bear a considerable amount of practical skill. It may be thought by some readers that the author is somewhat dogmatic, and refers to the human body too much as if it were a huge test-tube, full of known reagents, surrounded by exactly ascertained conditions; but in denouncing the abominations that commonly pass muster in the sick room as "beef-tea," and in recalling attention to the true nature of many of the "meat extracts," there can be no doubt that Mr. JESSOP does useful service. On the other hand, it may be remarked that when an ounce of meat has been introduced into the stomach of a sick person in the form recommended by the author, so that there should be "neither refuse nor remainder," it does not follow that the 14·22 grains of nitrogen it is supposed to contain, or any great part of it, will be assimilated. A great deal of nonsense has been published as to the relative alimentary value of various substances, based upon a knowledge of their elementary composition, but vitiated by ignorance as to their behaviour in the stomach into which they are supposed to be introduced. In this case, Mr. JESSOP, however, says that his theory is confirmed by experience, and at the least it must be admitted that his plan has the advantage of presenting to the stomach an important food constituent that is notoriously absent from some preparations of meat.

Still another discussion that took place in the Section of Public Health, on the "Contamination of Drinking Water by Lead," was one in which the chemist is particularly interested. It was introduced by Dr. SINCLAIR WHITE, Medical Officer of Health at Sheffield, to whose investigation as to the cause of a recent outbreak of "plumbism" in that town reference was made in this Journal when commenting last April upon the report of the Medical Officer to the Local Government Board. As a *résumé* of the results obtained was given on that occasion, and no particularly new points were brought forward at Leeds, it has not been thought necessary to reproduce this later paper. It will suffice to recall that Dr. WHITE found the moorland water, to the action of which upon the lead supply pipes the mischief was attributed, to be distinctly acid, and that the acidity and consequent power to remove lead could be removed by filtration, or on the large scale, by contact for a few hours with freshly-broken limestone. As to the nature of the acid Dr. WHITE said nothing had been determined, though he inclined to the opinion that it was an organic compound derived from decaying peat. In the course of the discussion, however, Dr. BROWN, of Bacup, said that a Lancashire drinking water examined by him owed its acidity to free sulphuric acid.

Lastly, the report of Dr. SIDNEY MARTIN to the Scientific Grants Committee of the British Medical Association upon the nature of the jequirity poison, practically brought to a close an investigation, the earlier stages of which were recorded in this Journal soon after the seeds of *Abrus precatorius* had been introduced into ophthalmological practice. It will be seen that Dr. MARTIN refers the toxic action of jequirity seeds to two proteids—a globulin and an albumose—which are similar in their action, are rendered inert by a temperature below that of boiling water, and bear some resemblance to snake venom, though far from identical with it. Some doubt still exists as to whether these proteids are poisonous in themselves or whether they owe their toxic power to some other body linked to or formed from them. Such a substance would probably be a ferment, and the destruction of activity by heat would point in this direction, but it may also be due to an alteration in the molecular constitution of the proteid itself.

BRITISH PHARMACEUTICAL CONFERENCE.

ON Monday next the proceedings in connection with the visit of the British Pharmaceutical Conference to Newcastle-upon-Tyne will commence, and it may therefore be useful to some readers to present a brief *résumé* of the programme of the local arrangements in its latest form. As previously announced on Monday evening, at eight o'clock, a Reception will be held by the President, Mr. C. UMNEY, and other officers of the Conference at the University of Durham College of Science, Barras Bridge, which will be followed by a Conversazione and Concert. At ten o'clock there will be a meeting of the Executive Committee to arrange the business of the following day. The General Meetings of the Conference will be held in the Physical Lecture Theatre of the College, commencing at ten o'clock on Tuesday morning. At one o'clock there will be an adjournment for luncheon, which will be provided at Cambridge Hall, Bath Road. Resuming at two o'clock, the reading and discussion of papers will be continued until four o'clock, when an "afternoon tea," provided at the College, will be followed by a drive through the parks and a visit to Jesmond Dene. On Wednesday the arrangements will be the same as on the previous day, except that the "afternoon tea" will be followed by an excursion down the Tyne by special steamer leaving Quayside Landing Stage at a quarter-past four o'clock. On Thursday the members will meet at the Central Station, from whence they will be taken by special train to Hexham, where visits will be made to Duke's House Grounds, open by permission of Mrs. BACKHOUSE, and other places of interest, including one to the Abbey Church. At noon luncheon will be served in the Town Hall, after which the party will travel by special train to Rothbury, and by permission of Lord ARMSTRONG will have an opportunity to visit the beautiful grounds of Craigside. Between five and six o'clock tea will be provided, after which the company will travel by train *viâ* Morpeth to Newcastle, arriving shortly before 8 o'clock.

It may be as well to add that in accordance with the decision of the Conference participation in the future proceedings now involves contribution towards the expenses. The set of tickets admitting to the luncheons and teas, the carriage drive and the steamboat excursion on Tuesday and Wednesday, will cost 5*s*., and the set of tickets for the excursion on Thursday will cost 10*s*. 6*d*. Application for these tickets, where this has been neglected, should be made at once to the Honorary Local Secretary, Mr. T. MALTBY CLAGUE, 11, Grey Street, Newcastle.

The following titles of papers to be read have been received in addition to those already published:—

Note on Volumetric Process for the Assay of Ipecacuanha. By T. P. BLUNT, M.A.

The Strength of Commercial Specimens of Scheele's Prussic Acid. By R. WRIGHT.

The Relative Value of Alcohol and Chloroform and Mixtures of the two for the Extraction of Aconite and Belladonna Roots. By R. WRIGHT.

An Impurity in a Commercial Sample of Sodium Salicylate. By R. WRIGHT.

Arsenic in Glycerine. By L. SIEBOLD, F.I.C., F.C.S.

Note on Lemon Juice. By J. P. WILLIAMS, F.C.S.

Tannin: Its Solubilities, etc. By B. S. PROCTOR, F.I.C.

Narceine and its Salts. By D. B. DOTT.

British Medical Association.

DISINFECTION.*

BY H. FRANKLIN PARSONS, M.D.,
Medical Inspector, Local Government Board.

The invitation of my friend and colleague, the President of the Public Medicine Section, must be my excuse for submitting to the Section, as a text for discussion, the following remarks on disinfection with reference to the control of epidemics.

By disinfection I mean the destruction of infection —the destroying of the activity of that matter which, produced by a sick person and received into the system of a healthy one, has the power of causing in the latter a disease similar to that from which the former was suffering. In popular language the word disinfection is used to include the use of substances ("deodorants") which destroy offensive odours, and "antiseptics" which prevent or retard putrefaction, but I shall employ it in its strict etymological sense.

What, then, is the nature of this infective matter which in the interests of the public health we seek to destroy? It is known that it is organic matter, and particulate—that is, solid, not liquid or gaseous—matter, although the fine colourless particles of which it is composed may be freely suspended in both water and air. There is reason also to believe that it is in all cases living matter, and consists of microscopic vegetable organisms. The analogy between the life history of infectious fevers and that of the yeast plant in a saccharine solution long ago suggested to Liebig this view—a view embodied in the term "zymotic," often applied to such diseases. Modern research has shown that certain diseases in men and animals are undoubtedly caused by the presence in the system of micro-organisms, and are communicable by the inoculation of such organisms. Among these I may mention two acute febrile diseases, namely, anthrax and relapsing fever; acute suppuration and various forms of septicæmia; the chronic diseases, tuberculosis and leprosy; also fowl cholera and infectious pneumoenteritis of the pig, "swine fever." The last-named disease has an interesting resemblance to the common human infectious disorders, in that the contagium may be transmitted through the air, and attaches itself to places in which the affected animals are kept. In other diseases, as Asiatic cholera, scarlatina, diphtheria, and enteric fever, certain micro-organisms have been found and have been looked upon with more or less probability as the cause of the disease; but the connection is not perhaps as yet completely established, mainly owing to the difficulty of testing it by the results of inoculation on animals. In other infectious diseases, again, as small-pox, measles, and whooping-cough, no such organism has, I believe, as yet been identified; but we may probably for our present purpose, without much risk of error, assume the *materies morbi* in these also to be a living organism. This assumption furnishes us with a practical means of testing the efficacy of the agents we employ to destroy infection. It is in most cases not practicable to test directly the effect of our disinfecting agents upon the contagia of the ordinary infectious diseases of mankind, for the reason that we cannot make the necessary experiments (including control experiments with undisinfected portions of material) upon human beings; and these diseases cannot, or cannot with certainty, be produced by inoculation in the lower animals. If, however, we choose the most refractory organism, pathogenic to animals, that we can find, and ascertain how it may be killed, we shall be tolerably safe in assuming that the same means will kill the contagia of the infectious diseases of mankind, with which as sanitarians we have to do. Now certain of the pathogenic micro-organisms, bacilli, have the property of forming spores, and these spores are found to be more resistent than the fully developed organism, just as a grain of wheat will survive treatment, such as drying and dipping in poisonous solutions, which would kill a growing wheat plant. Of the pathogenic microbes, the most convenient for the purpose of testing disinfecting agents is the *bacillus anthracis*; it forms, under certain circumstances, spores which are exceedingly tenacious of life; it can be cultivated, and is easily recognized both by its microscopic characters and its appearance when growing; and, if inoculated into animals, it produces in them with certainty the disease known as anthrax. None of the ordinary infectious diseases of mankind are known to be caused by spore-bearing microbes (though it is possible that small-pox, the contagium of which is very tenacious of life, may turn out to be so); and so far as our present knowledge and experience go, we may assume that means which will destroy the spores of the *bacillus anthracis* may be relied on as efficacious for our purpose, though it does not follow that agents which do not destroy the *bacillus anthracis* are, therefore, useless against the less resisting contagia of other diseases.

An extensive and important series of researches upon the efficacy of disinfectants, conducted by Koch and his coadjutors for the German Imperial Board of Health, is in large part the foundation of our modern knowledge on the subject, though his results have been confirmed and extended by other workers, as Dr. Klein in this country, and a committee of the American Medical Association in the United States. Koch employed both spore-bearing and non-spore-bearing organisms of several kinds. Threads steeped in cultures of these were exposed to the action of disinfectants and tested by cultivation or by inoculation on animals. The general result of the experiments with chemical agents was to show the comparative or entire inertness as germicides of many of the substances commonly considered disinfectants. Carbolic acid was found to have a powerful restraining effect upon the growth of bacteria, but was much less efficacious in destroying their vitality. To kill spore-bearing forms it was necessary to steep them for one or two days in a 5 per cent. watery solution; a 2 per cent. solution only killed them at the end of a week; while a 1 per cent. solution did not kill them in fifteen days. Solutions of carbolic acid in alcohol or oil had not the smallest disinfecting effect; 5 per cent. solutions did not kill spore-bearing bacilli however long they were exposed to their action. Vapour of carbolic acid at ordinary temperatures had no destructive effect on spore-bearing bacilli, though some effect was produced at elevated temperatures. In other cases also it was found that the disinfecting effect of substances in the form of vapour was increased by elevation of temperature; thus spores of bacilli in garden earth were killed in two hours by exposure at a temperature of 176° F. to the vapour of bisulphide of carbon, although neither a temperature of 176° in dry air nor the vapour of bisulphide of carbon in equal concentration at ordinary temperatures had any destructive action at all on them.

Sulphurous acid gas was found efficacious for the destruction of non-spore-bearing organisms. Exposure to 1 part in 100 of air killed micrococci, if dry, in twenty minutes; if moist, in one minute. Spore-bearing-forms, however, were not killed, even after four days' exposure to a 6 per cent. gaseous mixture of sulphuric acid in air. Chloride of zinc had no disinfecting effect; spores of anthrax bacillus which had remained for a month in a 5 per cent. solution were in no way affected. Absolute alcohol, glycerine, chloroform, sulphates of copper, zinc, alumina and iron (5 per cent. watery solutions), and boracic acid (5 per cent.) were not found to have any destructive effect on the spores of bacillus anthracis. These spores were, however, destroyed by exposure for one day to the action in watery solution of either of the above substances, namely chlorine, bromine (2 per cent.), iodine, corrosive sublimate (1 per cent.), permanganate of potash (5 per cent.), and osmic acid (1 per cent.). They were also destroyed after longer periods by the following substances, namely ether, oil of turpentine, hydrochloric acid, chloride of iron (5 per cent.), arsenious acid (1 per cent.), chloride of lime (5 per cent.), and quinine (1 per cent.).

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* Paper read to introduce a discussion on Disinfection and Isolation; with special reference to the control of Epidemics, in the Section of Public Medicine at the Annual Meeting of the British Medical Association, held in Leeds, August, 1889.

Experimenting with heat in the dry form, Koch found that bacteria free from spores could not withstand an exposure of an hour and a half to a temperature of a little over 212° F. in hot air, but that spores of bacilli were only destroyed by remaining three hours in hot air at 284°. He also found that in hot air the temperature penetrated so slowly that, after three or four hours' heating to 284°, articles such as small bundles of clothes and pillows were not disinfected, and that by heat of this degree and duration most textile materials were more or less injured. The results with steam were strikingly superior. It was found that an exposure of five minutes to steam at 212° was sufficient to kill the spores of the bacillus anthracis, and that the penetration of heat into articles exposed to steam took place far more rapidly than into the same articles exposed to hot air.

A series of experiments made by Dr. Klein and myself on disinfection by heat confirm, on the whole, the results of Koch. The materials experimented with were spore-bearing cultures of anthrax bacillus, anthrax blood free from spores, bacilli of swine fever, and tuberculous pus; and the results were tested by inoculation on animals. Our results were more favourable to the efficacy of dry heat than those of Koch. We found that spores of bacillus anthracis were killed by exposure for four hours to a temperature between 212° and 216° F., or for one hour to 245°. Non-spore-bearing bacilli were rendered inert by one hour's exposure to 212° to 218°. Anthrax spores were killed by boiling for one minute in water, or by exposure for more than five minutes to steam at 212°. We also found steam heat to penetrate far more rapidly than dry heat. Similar results have been obtained by other observers, so that the superiority of steam over hot air as a disinfectant may be looked upon as thoroughly established. With a view to ascertain whether the advantages of steam could be obtained while avoiding certain inconveniences in its use, we made some experiments with hot moist air, but the result was that, while the moistening of the air aided the penetration of heat, it did not up to the point of one-third saturation render it more effectual in killing bacilli than dry air.

Burning, of course, is a very thorough means of disinfection.

It is characteristic of the class of infectious diseases that the morbid poison which produces any such disease multiplies in the body of the patient, and is given off again from it, and that it continues thus to propagate itself for a considerable period—often for several weeks. The poison is believed to be especially given off from the part of the body upon which its local effects are manifested, as from the skin in small-pox; from the skin and throat, and perhaps the kidneys, in scarlet fever; in discharges from the throat and nostrils in diphtheria, and from the bowels in enteric fever and cholera. There is reason to think, also, that the contagia of some at least of these diseases can multiply in suitable media outside the body, as in milk, sewage, soiled linen, or moist sewage-contaminated soil; perhaps, also, even in potable water. On the other hand, some of the pathogenic organisms are found to perish as putrefaction advances, either through the formation by them of chemical compounds antagonistic to their own life, or through the competition of the ordinary putrefactive forms, just as in a neglected garden the exotic flowers are choked or stifled by the ranker growth of the indigenous weeds.

Contagia are not as a rule permanently destroyed by cold, though that of yellow fever is so. They also in general are able to survive drying, though Koch states that drying is fatal to the *comma bacillus* which he finds in Asiatic cholera.

The matters which may act as carriers of infection, and may thus require disinfection, are: 1. The body of the patient, living or dead. 2. The discharges given off from the body of the patient, and more particularly those from the organs specially affected by the disease, for example, the exfoliating scarf skin in small pox and scarlet fever; the discharges from the throat and nostrils in scarlet fever and diphtheria, and those from the bowels in enteric fever and cholera. 3. The air tainted from exhalations from the sick; the poison probably existing therein in the form of suspended particles. 4. The clothes, bedding, and other articles used by the sick. 5. Articles of food, as milk and water. 6. Walls, floors, etc., of dwellings occupied by the sick, especially dust and dirt lodging upon the walls, and dirt accumulating in the cracks of the floor. 7. Collections of filth, as sewage, especially in a stagnant state, or deposited in or encrusting the sides of foul drains; foul ground surfaces and subsoil.

The processes of disinfection applicable to the living body, such as baths, inunctions, lotions, and dressings, come within the province of curative medicine and surgery rather than that of public health.

For the prevention of the spread of infection from the corpses of persons who have died of infectious diseases the means usually employed are enclosure in a more or less air-tight coffin with chloride of lime or charcoal, and early burial, and I do not think that anything more is necessary. I have never found any reason to think that a body lying undisturbed surrounded by plenty of earth of a suitable nature is a danger to the public health. The advocates of cremation refer to the observations of Pasteur that cattle grazing in a field in which the bodies of others that have died of anthrax have been buried have contracted the disease; and that the spores of the *bacillus anthracis* are found in the superficial mould over the graves, being brought to the surface by earth worms; but, as I have mentioned, the spores of the anthrax bacillus are exceptionally tenacious of life.

It is not of much use attempting to disinfect the infected air of sick rooms by chemical means, for active chemicals, if present in sufficient quantity to be effective as disinfectants, would render the air irrespirable. It is easier to get rid of it, and let its place be taken by fresh air. The contagia of most infectious diseases appear to be destroyed when freely diluted with fresh air. The poison of typhus fever is notably so, but that of small-pox does not appear to be, as Mr. Power has shown that small-pox may be disseminated through the air for considerable distances around a hospital in which many cases of that disease are under treatment. To avoid this it has been proposed that instead of ventilating small-pox wards into the open air, the air from them should be extracted through a flue and burnt in a furnace; or I might suggest that a steam blast might be used to extract the air and disinfect it at the same time. A recent invention of ventilating sewers uses a circle of gas burners for creating an up current of air, and passes the extracted air through the flames with a view to disinfect it. The offensive, and possibly infected, vapours from refuse destructors and the caldrons used in bone boiling and similar trades are best destroyed by passing them through a furnace.

For the disinfection of the discharges of the sick chemical agents must, as a rule, be used, though the discharges from the throat and nostrils in diphtheria and scarlatina are best received upon pieces of rag and burnt. It is of prime importance that infectious discharges should be disinfected immediately on being passed from the body, both because delay will give them more opportunity of causing mischief, and also because if the infected matter be mixed with a large quantity of other organic matters, as in a drain or privy, before the disinfectant is applied, the action of the latter will have to be exerted on a greater mass of material, and its effect will be *pro tanto* weakened; and the chances will also be great that portions of the infective material will escape its action. It is thought by some that germs of enteric fever, for instance, may long lurk unsuspected in defective drains and privies until some accidental circumstance, such as disturbance of the contents, brings them into activity, and that many of the "sporadic" cases of this disease thus arise.

Of chemical disinfectants for the disinfection of excreta, corrosive sublimate is probably the most trustworthy and suitable for ordinary use. In its use, however, three precautions have to be borne in mind. 1. It is very poisonous, and hence, in order to avoid accidents (such as frequently occur with carbolic acid), the solution should be coloured, as with permanganate of potash, sulphate of copper, or aniline blue. 2. It corrodes iron and other common metals, and is instantly decomposed by contact with them, hence it must be used in non-metallic vessels. 3. It forms with albumen an inert insoluble compound, but this may be prevented by acidulating the solution. A solution suitable for disinfection of excreta, clothing, etc., is made by dissolving ½ ounce of corrosive sublimate with 1 ounce of hydrochloric acid and 5 grains of aniline blue in 3 gallons of water.

Chloride of lime is a useful disinfectant for excreta, but too strong a solution injures clothing. Carbolic acid is especially an antiseptic, retarding putrefaction, for example, in sewage, but a 5 per cent. solution is recommended by Koch by preference for disinfecting excreta and soiled linen of cholera patients. Creolin, a substance allied to carbolic acid, is said by recent experimenters to exceed it in destructive action upon spores of bacilli, at the same time that it is not poisonous to human beings. Permanganate of potash is an excellent deodorant, and has the advantage of not being poisonous. It is also, to some extent, a true disinfectant, but its action upon infective matter is much weakened when this is mixed with a quantity of other organic matter. Green copperas (ferrous sulphate) is a cheap deodorant, but, according to Koch, is not a disinfectant proper. Its habitual use for flushing sewers in time of cholera was strongly recommended by Dr. Budd, and was said at Bristol to have produced excellent results.

With regard to the disinfection of clothing, bedding, etc., used by the sick, it may in the first place be pointed out that for such articles as will stand it, boiling in water for, say, five minutes is an effectual means of disinfection. And, since the infectious matters are not actually incorporated with the fibres of the fabric, but merely attached as dirt to their outside, there is reason to think that even a thorough ordinary washing will be a sufficient disinfection, so far as the articles themselves are concerned; but the infectious properties are transferred to the water in which they have been washed. The dangerous properties of such water are shown by the frequency with which cholera is contracted by those who wash the linen of cholera patients, and by cases like that at Moseley, recorded by Dr. Ballard, where an outbreak of enteric fever occurred among the persons drinking the water of a well into which had percolated the soapsuds in which the soiled linen of an enteric fever patient had been washed. To avoid such risks it is necessary that infected articles which are washable should be disinfected before being washed; this should, for obvious reasons, be done immediately on their being left off. Boiling might be used for this purpose; but boiling water in sufficient quantity is not always at hand; and again, if soiled clothes are boiled, the coagulation of albuminous matters fixes stains in them and spoils their colour. Hence it is more convenient to put the clothes to steep in some chemical disinfecting solution, of which a panful should be kept in readiness. A solution of corrosive sublimate is the best for this purpose, as, besides being the most effective, it has the advantage that it does not change or rot the linen. When the grosser dirt has been removed by rinsing in water, the articles may be boiled.

Articles which cannot be boiled in water without injury, such as cloth clothes, blankets, and beds, are best disinfected by exposure to heat, and the experiments which I have quoted show that for this purpose a steam heat is preferable to a dry heat for several reasons, especially because a lower temperature and a shorter exposure suffice to kill infective organisms, and because a steam heat penetrates much more rapidly than a dry heat into bulky and badly conducted articles. Further advantages are that in a steam apparatus the temperature is approximately equal in all parts, that it can be accurately ascertained, and kept constant at any required degree for any length of time—conditions which are essential to a good apparatus, but which are very difficult to obtain where dry heat is employed. Of dry heat apparatus known to me, Dr. Ransom's self-regulating gas disinfecting stove is the only one in which these conditions are successfully complied with. In several kinds of disinfecting ovens frequently used I found a wide difference, sometimes as much as much as 100° F., between the temperatures in different parts of the heated chamber, and the thermometer used to indicate the temperature did not do so by a wide interval, again sometimes by as much as 100°. Also in ovens heated by coal or coke it is difficult to regulate the temperature so as to keep it near the required point. The result of such defects is apt to be either that clothes are scorched and spoiled, or that, on the other hand, with a view to avoid this, they are so insufficiently heated as not to be thoroughly disinfected.

With care and in a suitable apparatus most articles can be submitted to either dry or steam heat without serious injury, but leather is instantly destroyed by steam. Books, in these days of free libraries, sometimes want to be disinfected; it may be done by exposing them to dry heat, the covers being held back so as to open out the leaves and allow the heat to penetrate. Steam is inadmissible, as it would soften the glue and destroy the leather. Letters may be disinfected by heat, but the effect upon sealing-wax and of steam in loosening the gum of envelopes must be remembered.

A process suitable for the disinfection of rags and paper and shoddy mills is a great desideratum; the requisites being that it shall be cheap, rapid, and effectual, and applicable to rags in the bale without unpacking. An American process attempted to do this by forcing steam into the bale through hollow screws; but it was found that the heat was not uniformly distributed. The infection from which rag-workers incur most danger is that of small-pox, the contagium of which is the most persistent of any of the common infectious diseases, though I could quote cases which show that the contagia of scarlet fever and diphtheria may retain their activity a long time in articles that are kept shut up and not exposed to the air. Outbreaks of small-pox occur from time to time among workers both in linen and cotton, and in woollen rags, but are most frequent at paper mills where the best writing paper is made, the reason being that such paper is made from white linen rags, the remains of articles that have come into close contact with human bodies. Unfortunately there are no means of recognizing infected rags except by their effects, which are not manifested until too late for preventive measures to be of any use. It is not practicable to insist on the disinfection of all rags, and it is not possible to say which rags ought to be disinfected and which it is not necessary to disinfect. Fortunately, against small-pox—the only disease from which rag-workers incur risk—they have in re-vaccination an effectual protection.

As regards disinfection of food, no one would, I presume, willingly eat or drink articles that he knew to be infected. As, however, one cannot always guarantee the absence of infection in the viands we eat or the water or milk that we drink, it is satisfactory to know that boiling or thorough cooking may be trusted to secure complete disinfection. In the experiments I have quoted it was found that even the very refractory spore-bearing bacilli of anthrax were destroyed by one minute's boiling in water at 212° F., though certain non-pathogenic bacilli found in vegetables and milk require for sterilization a higher temperature or more prolonged boiling, a fact familiar to the housekeeper who makes jam. It is doubtless owing to the efficiency of cooking as a disinfectant that sanitarians in France and Germany, where milk is, I believe, always boiled before use, are sceptical as to the possibility of the propagation of infectious disease by that medium; whereas with us in England, where milk is drunk raw, epidemics of milk origin are a matter of almost every-day experience. On the other hand, trichinosis, so common among the Germans, who eat the ham raw, that it has to be guarded against by an elaborate system of microscopic examination of all slaughtered swine, is practically unknown as a human disease in England and France, where meat is always cooked.

The case of the Welbeck outbreak in 1880, investigated by the President of our Section, in which a number of persons were seized with an acute specific diarrhœa after eating cooked ham at an auction, may at first sight appear to disprove the efficacy of cooking, as the disease was proved to be caused by a spore-bearing bacillus which was present both in the raw ham and in that which had been cooked. The explanation, however, is probably that the cooking had not been sufficient, of which there was evidence; but that the cooking had not been without effect was shown by the fact that experiments made by feeding animals with portions of raw ham were more uniformly successful than those with the cooked ham. It is to be borne in mind that any bacteria left undestroyed would in time reinfect the whole material, and also that a chemical poison produced by the bacteria would not necessarily be destroyed by a degree of heat sufficient to kill the bacteria themselves. A series of cases of "pork-pie poisoning" at Retford, investigated by Mr. Spear in 1887, which presented similar features to the Welbeck outbreak, was found to be caused by a bacillus developing in the pies after cooking. It was found by Dr. Klein that exposure for one moment to a temperature of 153·5° was sufficient to kill the bacillus; but exposure for twenty minutes to a temperature falling from 143·6° to 136·4° did not do so.

For house disinfection fumigation with sulphurous acid or chlorine gas, the latter preferred, followed by thorough cleansing and scrubbing, removal of wall-paper and lime-washing, are to be recommended; but these processes, to be effectual, need to be carried out with more thoroughness than is frequently done. A difficulty often met with is to know where the inmates are to go while the house is being disinfected; and it would be useful for this and other purposes if sanitary authorities had power to provide refuges for people whom, although not themselves sick, it might be desirable to remove from their homes.

PHYSIOLOGICAL VALUE OF MEAT FOOD FOR INVALIDS, AND WASTE IN METHODS OF PREPARATION.*

BY CHARLES MOORE JESSOP, M.R.C.P., LOND.

Deputy Surgeon-General, Army (retired).

In the preparation of beef-tea it appears to me that there is considerable waste of material, which arises from a desire to give food of high nutritive value in small quantities, irrespective of its component parts combined in natural proportion. This idea has been fostered by an eminent chemist, whose preparation has not the object, as he himself states, of feeding the sick, but unfortunately adopted by the public for that purpose. Nature does one thing, man another; which is the preferable teacher I will endeavour to show.

Forty years ago patients were deluged with meat washings, under the belief they were being nourished; as they did not improve, brandy was adopted, so between brandy and meat washings, their recovery was delayed, under a mistaken idea that there was virtue in scent, salts, and brandy. Pounds of meat were, and still are, wasted in the preparation of beef-tea, whilst brandy is rightly enough tabooed. Medical men know perfectly well what good beef-tea should be, but patients complain that the doctors do not give them easy directions for its preparation. There is some truth in the complaint, for we are apt to forget that what we are familiar with, the laity, including nurses, is unlearned in. We accept the off-hand statement, "We know all about it," without inquiry.

One reason for waste in material is, that the fastidious palates of the sick are catered for whilst their bodily health is unintentionally neglected; this results from ignorance. Nurses, cooks, and patients all clamour for clear beef-tea. Clear beef-tea is of no use to anyone as food. It is true it is "just what the patients like," and what they "can be got to take;" but what is proper for sustenance is lost sight of. However well beef-tea may be made, the most important part is left at the bottom of the cup—"the grounds which are no good." The patient does not progress; the attendants "have done all they can do"—which is just what they have not done by rejecting the "grounds as no good." When patients are sick, mental equilibrium is more or less at fault, and against their will must they be fed. Attendants, therefore, require instruction, and with requisite tact they will apply that knowledge.

I propose to bring together (1) facts relating to the nutritive value of meat and what becomes of it after ingestion; (2) to comment on the literature of the subject as found in various journals; and (3) to consider how waste may be remedied and a saving to public and private institutions effected.

Physiological Value.—Meat consists of 78 parts of water and 22 parts of solids, nearly all albumen or nitrogenous substances, which are easily assimilated, and from which a much more rapid metamorphosis of tissue takes place than from vegetable food. Hence, when meat fibre enters the stomach, the gastric juice converts it into a soluble crystalloid or peptone capable of diffusion through animal membrane. By osmosis it passes through the walls of the capillaries of the stomach, whence it is conveyed to the liver by the portal vein before entering the general circulation.

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* Read in the Section of Public Medicine at the Annual Meeting of the British Medical Association, held in Leeds, August, 1889.

The duty of this nitrogenous substance is to develope and renovate the tissues, assist in the formation of secretions, and produce force. Every substance in the body in which any form of force is manifested is nitrogenous; and as nitrogen where function is performed is traceable throughout the world, such constancy proves necessity. "Nitrogenous substances composing the textures of the body determine the absorption of oxygen. The absorption of oxygen does not determine the changes in the tissues, but changes in the tissues determine the absorption of oxygen. In other words, without the participation of nitrogenous bodies no oxidation and no manifestation of force is possible."* Hence, if nitrogen be cut off from the body, the various functions languish and the body dwindles. "Gelatin is chiefly destroyed in the blood and glandcells, and its energy therefore has a direction different from that of albumen." It is the least perfect kind of albuminous matter existing in animal bodies, and its nutritive value is one-quarter that of albumen. Submitted to prolonged ebullition, or 220° F., it evolves ammonia, becomes syrupy, loses the property of coagulation, and speedily putrefies. Hence, its nutritive property is destroyed and it impairs digestion.†

From the albuminates fat arises, so that the nitrogenous substance plays two parts; first, of the organic framework, that is, the regulation of oxidation and of the transformation of force; and, secondly, it forms a non-nitrogenous substance, which is oxidized and transformed. Fat stored up in fattened pigs cannot be derived from the fat given in the food, but must have been produced partly from nitrogenous substances, but chiefly from the carbo-hydrates. So also it seems now probable that the fat in milk is not derived at once from blood, but from changes of albumen in the lacteal gland cells.*

The digestive system of man is so formed that fat either cannot be formed in sufficient quantities from albuminates or the body is poisoned by the excess of nitrogen which is necessarily absorbed to supply it, so that fat must be taken in addition. Excess of albuminates causes a more rapid oxidation of fat, while excess of fat lessens absorption of oxygen and hinders the metamorphosis of both fat and albuminous tissues.*

Chossat laid down as a broad principle, derived from experiments on many different creatures, that life ceases when an animal loses two-fifths of its weight, so that an animal weighing 100 pounds would die when its weight was reduced to 60 pounds. The daily loss amounts to one twenty-fourth part of its entire weight —a statement in harmony with the conclusions of Bidder and Schmidt that an animal to maintain its weight ought to take one twenty-third part of its weight daily in the shape of food susceptible of being assimilated, water of course included.‡

1. An adult European, in moderate work and 150 pounds in weight, requires 22·866 ounces of water-free food, that is, 0·15 ounce for each pound weight, with which is mixed from 50 to 60 per cent. of water, or a total of about 40 ounces of ordinary food—about 305 grains of nitrogen. In addition a total water supply of from 70 to 90 ounces, or an average of 0·5 ounce per pound weight. 2. In rest the amount is about 16 ounces water-free food, equal to 240 grains of nitrogen, and is sufficient. 3. The smallest amount of nitrogen necessary for the inner movements of the body and bare maintenance of life is 138 grains, or 2 ounces.† This may be considered to be the sick man's state.

The quantity of urea passed in twenty-four hours is said to be the measure of the ingestion of nitrogen, but this view seems somewhat defective, because in fasting or with non-nitrogenous diet urea is still secreted. The nitrogenous diet, therefore, cannot be its sole source. Hence the determination of the quantity of nitrogen to sustain life, or keep up the inner movements of the body of an adult, does not depend upon the amount passed as urea, since urea does not depend upon nitrogenous food for its sole production. The human body may be likened to a closed vessel full of liquid with escape valves; extra liquid added will escape by the valves and be a measure of the liquid added, but the drops which escape are not the drops that were added, for the overflow depends on the inability of the vessel to hold more than it can contain. So when extra nitrogenous diet is indulged in, this determines the passage out of the body of matters which have performed their functions, at a rate proportionate to the activity induced by fresh material, and is a measure of the mechanical energy throughout the body, but is not an index of what is required to sustain life.

A cubic millimetre of blood contains about five millions of blood corpuscles, each one of which Dr. Hunter considers to have a life-duration of probably three weeks. Many millions of corpuscles are doomed at every round of the circulation to destruction and conversion into urea and the like. This destruction, says Dr. Paton, must be considered a powerful stimulant to the secretion of bile, the liver having as one of its functions the elimination of effete hæmoglobulin. By this same process urea also is increased. Hence, urea formed even in starvation continues to be secreted till there are no corpuscles left to secure the office of respiration, and go the round of the circulation. But when fresh albumen enters the portal circulation, the blood pressure is raised and products, ready formed for use in the direction assigned them, are passed on

For the state of rest in heath 240 grains of nitrogen are said to be sufficient; but a bed-stricken patient, whose muscular and mental efforts are reduced to a minimum, whose vital processes are carried on with much less energy than usual, and who loses comparatively little heat, requires a relatively small supply of food; and as at least 138 grains must be supplied, this supply should be thoroughly wholesome, easily digested, and consist of nutritive material.* Animal food especially rich in nitrogenous elements digests in proportion to the minuteness of division and tenderness of fibre sooner than farinaceous, so that it is better adapted for those who are only able to take small quantities at one time.

Meat peptonized by the gastric juice is absorbed by the vessels of the stomach; the blood in those vessels charged with constituents whose period of service in the economy has expired is on its way to the liver to be transformed into bile and urea. Arrived at the interlobular veins, it traverses the acini by fine capillaries which enter the intra-lobular veins for conveyance to the right auricle. This work constantly going in is like the daily routine work in a manufactory in which, when new material is brought, there is increased energy in all departments: and the process is comparable with iron ore entered at the mouth of a smelting furnace, passed through several ovens, and which appears at the orifice of exit converted into steel; no one sees the conversion, but the highly-finished product is far different from that of the raw material.

Literature of the Subject.—Extractum carnis, Dr. Beneké states,† is made by chopping 1 pound of beef finely and mixing it with its weight of cold water slowly heated to boiling, then briskly boiled for a minute or two and strained. Six pounds of meat thus treated yield, after evaporation on a water-bath, 3 ounces. Hence 1 ounce of this extract equals 32 ounces of meat.

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* Parkes.
† Power.
‡ Guy.

* Power.
† *Lancet*, 1851.

Dr. Hassall[*] exposes the fallacy of this supposed nutritive value, since fibrin, gelatin, albumen and fat are absent, and that what remains consists of excrementitious substances and blood-salts.

Baron Liebig himself says that neither tea nor extract of meat is nutriment in the ordinary sense. "It will be well understood, therefore, that by the addition of extract of meat to our food we neither economize carbon for the maintenance of the temperature nor nitrogen for the sustenance of the organs of the body, and that, therefore, it cannot be called food in the ordinary sense."[†]

Dogs fed exclusively on extractum carnis die sooner than those not fed at all, which seems to be due to the deleterious influence of the potash salts contained in the extract, for though these are indispensable in the economy, yet a larger dose of them is injurious in the absence of food whose metabolism it is their office to direct.[‡]

A patient may be swallowing several ounces of extract daily, and yet be actually starving; he may feel better for it, but his strength will not return unless he can swallow something else as well. We have eaten half a pot of the stuff, and remained as hungry as ever, the only effect being to produce thirst, to heighten the bodily temperature, and to increase the nitrogenous waste in the urine.[§]

Extracts of flesh, fish and crab are prepared, and have been used for several centuries, and probably longer, says a writer in the *Medical Times and Gazette* for October, 1870, in different countries. In the Malay Archipelago certain meats, sea fish, and little marine crabs the size of a pea are reduced to extracts, and used extensively as flavours and to strengthen with these extracts celebrated native dishes.

These extracts, then, are good stimulants, and useful to bring up the flavour of poor soup, but have no nutritive value, and require as great, if not greater, caution in administration to the sick than wine or brandy.

Meat extracts are neither direct aliments, for they contain no albuminous matter, nor indirect aliments, for their azotised principles do not arrest disassimilation.[‖] In small doses they may be useful from the stimulant action of the potash salts, which aid digestion and circulation. In larger doses they have an injurious effect. In prolonged illnesses, when the powers of life are enfeebled, the salts of potash may, in place of favouring nutrition, impede it (1) by direct action upon the blood globules, causing a diminished absorption of oxygen; (2) by the predominance of salts in the serum, which exert no special solvent action on carbonic acid, and do not permit the exhalation of the normal quantity of this gas, and consequently the introduction of oxygen. To give these extracts alone is to keep the patient in a state of inanition.[‖]

A piece of beef, 1 or 2 drachms in weight, ground to a very fine pulp, is placed in a cup with two tablespoonfuls of water, with a pinch of salt; this can be warmed by the fire in ten minutes. The whole (grounds and fluid) is to be swallowed every four hours. Given in this way it is regarded as a medicine, and will be taken when, as beef-tea, it would be rejected. This process is only intended for cases of emergency, and when delay would be injurious.[†]

Dr. Leared describes a digester; in this he places 1 pound of beef finely minced, with 4 ounces of water, or preferably 8 ounces, from which he produces 9 or 13 ounces.[¶] He does not say how he disposed of the remainder.

In the *Gazette Médicale*, 2 pounds of beef are directed to be taken, chopped up and placed in a litre of water with a small quantity of hydrochloric acid; this is to be boiled for fifteen hours, then strained, the mass crushed, emulsified, and boiled again for fifteen hours. The whole is then neutralized with bicarbonate of soda, and evaporated to the consistence of pap.[*]

Dr. Leared macerated 1 pound of crushed muscle for three-quarters of an hour with a pint of cold water, boiled for two hours, and strained.

In the journal for 1880 is described a complicated process, the last of the various methods described in the journal. Except the French method, which is peptonized beef-tea, only one aims at presenting to the stomach meat fibre in its natural condition, small in bulk and of physiological value when swallowed; the rest are highly scented and highly salted specimens of broth of little nutrient value, and extravagant waste in production.

Waste of Meat.—Private individuals and public institutions have various ways of making beef-tea, some boiling for long periods and others adding "stock," and equally varied ways of disposing of the remainder when they have, as they term it, "extracted all the goodness out of the meat," which means they have wasted half or two-thirds of the quantity of meat employed, and double salted what they have retained; the effect of which concoction is to produce thirst, heighten the bodily temperature, and increase nitrogenous waste; these results arise from the salts being out of proportion to the albuminates. The half or two-thirds of discarded fibre, termed refuse, is by some sold with "hogs" wash. In one institution alone I know that over 20 pounds were thus daily thrown away; others charitably (?) give it away. If the goodness has been extracted, where is the charity? Surely actions belie words. Each thus satisfies the conscience that subscribers' or ratepayers' money is not wasted. Private individuals throw the remainder into the ash-pit. There are others, however, in both classes who, more thrifty, use the remainder in soup or other ways.

In the Metropolitan area—not counting cottage hospitals, private and public asylums, poor-law infirmaries, numbering 28, workhouse infirm wards and military hospitals—there are no fewer than 87 establishments, including Bethlem, with 11,100 beds, which necessarily use fluid meat food more or less. On the supposition that 2,220, or one-fifth of the whole number, may require fluid food, and allowing 12 ounces of meat to each pint, in the course of one week 5·2 tons of solid meat would be required for this purpose alone. I venture to think that this amount is two-thirds in excess of what is necessary to be used. The cost of this quantity will depend upon the quality of beef used; and for the larger establishments, where 100 or more pints are used daily, this is a subject for inquiry, since not only is there waste of food, yearly loss of revenue, no benefit to the sick, but habits of extravagance fostered amongst a class of persons who, of all people, should practice economy.

Of course, the present system is continued on the plea of succouring the sick person with "the best beef-tea that can be made," whilst his starving brother lies outside vainly wishing for what the pigs are fed upon. But admitting that the present method is continued—as I am sure it is—from honest conviction that it is the best, may it not be worth while to inquire if it cannot be improved by putting on one side preconceived notions, and the dull round of routine, and adopting a method which does not countenance waste, does not injure or defraud the sick, and reduces the butcher's bill?

If albuminates are essential to health, and animal food digests in proportion to the minuteness of its division, how much meat-fibre can be suspended in a given quantity of water to make such a draught of nutriment agreeable in swallowing? After many trials I find that 4 ounces of meat can be suspended in 1 pint (20 ounces) of water, and can be taken without disgust, that is, "grounds" do not collect on the palate nor remain in the gullet to annoy the patient; and that from 2 to 4 ounces of such fluid given every three or four hours is sufficient for any sick man. So that if a patient receives a pint and a half of such food in twenty-four hours he gets a very large supply of nitrogenous food, and enough for a healthy man in a state of rest. If the food is made stronger than this proportion a very sick man will refuse it, and this is the very difficulty which will be overcome by a good nurse.

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[*] *Lancet*, 1865.

[†] *Lancet*, 1869.

[‡] *Medical Times and Gazette.*

[§] Editor of *Medical Times and Gazette*, 1871.

[‖] M. Muller in *Medical Times and Gazette*, 1872.

[¶] *Lancet*, 1874.

[*] *Lancet*, 1878.

One ounce of the best meat contains 14·22 grains of nitrogen; 6 ounces will contain 85·32 grains, and, as 138 grains of nitrogen are supposed to be required the remainder has to be made up from eggs, flour, and other matters. But the question has frequently arisen in my mind, whether a sick man does really require so much nitrogen daily. Theoretically he may, but practically he does not, nor does he get it. On many occasions I have witnessed very remarkable results from much smaller quantities of meat food—very far below the physiological quantity—so that I cannot help thinking there is some fallacy in the quantity of nitrogen required to keep up the inner movements of the body, particularly if urea, as hitherto maintained, is not the measure of nitrogen required, but in part the measure of the disintegration of blood corpuscles.

In making fluid meat food there should be neither refuse nor remainder. Say 100 pints is required: 25 pounds of good beef well chopped up or minced is placed in a digester with 100 pints of water and boiled for three hours, being frequently stirred and rubbed about with a wooden masher. At the end of this time the fibre is cooked; it should then be passed through a colander to ensure evenness of size and that no fibres adhere. If the process is properly managed there will be no remainder. If required, it can then be seasoned with a little salt, onions, and so forth. The better the quality of meat the less gelatine and better flavour. Prolonged ebullition has not destroyed whatever nutritious properties the gelatin may possess. The food of nature is thus simply cooked and suspended in a given quantity of water. The addition of stuff called "stock" is not required, for, besides being injurious, owing to prolonged ebullition, it gives a disagreeable flavour. The salts are in proportion to the albumen; the draught is thoroughly wholesome, and if administered not more frequently than every three or four hours the stomach will have suitable intervals of rest.

If rectal alimentation has to be employed only half or one-third of water need be used, or even less, so long as the fluid food can be passed through the tube.

For workhouse infirm wards the cut up "shin of beef" can be placed upon a strainer of nine meshes to the inch within an ordinary meat boiler, and by frequent stirring the disintegration fibres will drop through. In one institution this process answers its purpose admirably, and gives the cook no trouble.

Last year Dr. Laffan obtained from Sir C. Cameron an analysis of the old and new processes as follows:—

	New process.	Old process.
Water	94·65	98·45
Albuminates, crystalline bodies, kreatin, etc.	4·25	0·90
Fats	0·20	0·07
Salts	0·90	0·55

The fluid from the new process was thick; in the old clear.

I confess I was not prepared to find my notion of an increase of salts in the old process so at fault, but the increase in the new process is more than compensated by the increase in the albuminates, while disproportionate in the old.

For travellers and urgent use at any time water-free beef, pounded and sealed hermetically in small tins, would be very advantageous; but all fluid extracts are disappointing and expensive. Poor folks require food within their means, and for such the above method is advantageous, let alone the saving to public institutions.

PROTEID POISONS, WITH SPECIAL REFERENCE TO THAT OF THE JEQUIRITY (ABRUS PRECATORIUS).*

BY SIDNEY MARTIN, M.D.LOND., M.R.C.P.,

British Medical Association Research Scholar, Assistant-Physician to the Victoria Park Chest Hospital.

It is only within the last thirty years that the fact has been established that a proteid, when introduced into the circulation of the blood, is poisonous. This fact, remarkable as it is in itself, becomes of greater significance when it is considered that these poisonous proteids are not distinguishable by any well-marked chemical reactions from the non-poisonous proteids, and that proteids are not only essential as food to animals, but also have an important nutritive relation to protoplasmic cell-life both in the animal and vegetable kingdoms. During the last two years I have been engaged, as British Medical Association Research Scholar, in the investigation of the properties and action of certain of these proteid poisons. Those that have specially occupied my attention are the jequirity (*Abrus precatorius*), the papaw juice (papain), and the animal albumoses and peptones.

The list of the proteid poisons is extending more and more, and may be subdivided into two groups—those found in animals and those found in plants.

Animal Proteid Poisons.—1. First and foremost stands the *venom of snakes*, both colubrine and viperine; 2. The *serum of the eel*—the conger eel and the muræna; 3. Poisons formed during natural digestion in the stomach and small intestines—*albumoses and peptones*; 4. Proteid poisons found in certain spiders. To these may be added the body which produces coagulation of the blood *intra vitam* (Wooldridge).

The Vegetable Proteid Poisons.—5. Jequirity (*Abrus precatorius*); 6. Papain (*Carica papaya*); 7. Lupinotoxin (?) (*Lupinus luteus*).

The Poison of Jequirity (*Abrus precatorius*).—The seeds of jequirity contain a substance which, as is well known, when extracted, as in a watery infusion, produces a local irritation and inflammation of the conjunctiva, which has been utilized in practical medicine for the cure of granular lids and of pannus. Its employment in these conditions has not, however, been found to be so beneficial as at one time was thought probable, so that at the present time jequirity may be said to possess chiefly a scientific interest—one, as I shall indicate, of possibly great significance. Investigations into the exact nature of the poison have not been wanting, and the knowledge obtained from them has gone through many curious phases.

From the researches of Sattler, Cornil, and Berlioz, it was concluded that the irritant action of jequirity was due to a special bacillus which grew in the infusion of the seeds, and was called the jequirity bacillus. Contrary, however, to the behaviour of liquids containing specific bacteria, the physiological activity of the infusion of abrus seed was totally destroyed by heating it to the boiling point of water (Klein); and, following this result, Warden and Waddell† separated from the seed a body they called "abrin," which was a proteid body, and which possessed the physiological properties of jequirity. Furthermore, although these observers found bacteria in the local lesions produced by jequirity, these organisms were of various kinds, and, after cultivation and separation, were found to have none of the poisonous properties of jequirity. To dispose at once of this idea of the bacterial nature of jequirity poison, I may say that in my experiments, using a pure product, I have found no bacteria present in the local lesions, either in those produced at the seat of injection or in those produced internally in the peritoneum or alimentary canal. The sections were stained by Gram's method.

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* From a report presented to the Scientific Grants Committee of the British Medical Association, *Brit. Med. Journal*, July 27.

† 'The Non-Bacillar Nature of Abrus Poison,' Calcutta, 1884.

We must look, therefore, to the proteid or proteids present in the seed for the poison of jequirity. Warden and Waddell's "abrin," as described by them, did not possess very definite characteristics; it was called a vegetable "albumin," but evidently did not belong to this class, as it was precipitated by acetic acid. In 1886, I separated and examined the proteids present in the seeds, and obtained the following results[*]—both of the proteids separated possessing poisonous properties.

Nature of Jequirity Poison.—The seeds contain two proteids—a globulin and an albumose. The globulin is soluble in 15 per cent. sodium chloride solution, and coagulates by heat between 75° and 80° C. Like other members of its class, it is precipitated from solution by saturation with sodium chloride and magnesium sulphate. It belongs to what I have described elsewhere as the vegetable paraglobulins.[†] The albumose is soluble in water, is not precipitated by boiling, but is thrown down by nitric acid, the precipitate being soluble on heating the solution, and coming down again on subsequent cooling, this being the characteristic reaction of the albumose class. This body also gives the "peptone" reaction, namely, a pink coloration with copper sulphate and caustic potash.

For the investigation of the physiological action of these two proteids, the mode of separation from the seed is important, because, as I shall discuss subsequently, it is a question whether these proteids are of themselves poisonous, or produce their toxic effects by having a non-proteid body, as it were, tacked on to them—in fact a body, possibly alkaloidal in nature, not completely separated from the proteid in the preparation of the pure poison.

The globulin is separated by extracting the crushed and decorticated seed with 15 per cent. sodium chloride solution, and precipitating the clear filtrate by saturation with solid sodium chloride after acidulating with acetic acid. The precipitate of globulin with part of the albumose is mixed with distilled water, and dialysed in running water for several days. The globulin is in great part thrown down in the dialyser, while the albumose remains in solution. The globulin is now removed by filtration, and washed with distilled water (previously boiled to sterilise it) for two days, in order to remove any albumose or sodium chloride clinging to the precipitate, the absence of the albumose being tested by the washings giving no reactions for a soluble proteid, and the absence of the salt by a negative reaction with silver nitrate. The globulin is then removed from the filter and dried over sulphuric acid. Prepared in this way, it is a whitish-yellow, amorphous powder, soluble for the most part in 15 per cent. sodium chloride, and giving the reactions previously described. In the dried state, it may be kept for a long time without losing its physiological properties. Specimens prepared for more than fifteen months are as active now as when first dried. This fact is, indeed, only in accordance with the behaviour of other dried proteids; they can be kept an indefinite time in the dried state without undergoing any chemical change.

The albumose was prepared by making a concentrated watery extract of the seeds, and filtering the clear infusion direct into an excess of absolute alcohol, thus throwing down both proteids as a white precipitate. After a few days the precipitate was removed, redissolved in water, and reprecipitated by alcohol, this process being repeated at intervals of a few months. The precipitate was allowed to stand under alcohol for about eight months or longer, at the end of which time the globulin was completely coagulated, while the albumose was still soluble in water. Dried over sulphuric acid, the residue was a yellowish-brown, amorphous powder, consisting of coagulated globulin and unaltered albumose.

Physiological Action of the Proteids of Jequirity.[*]—For subcutaneous injection and for instilling into the eye a solution of the proteids was made. The globulin was dissolved in 15 per cent. sodium chloride solution, and the albumose in distilled water or normal saline solution (0·75 per cent. NaCl). Previous to using these liquids or solvents, they were well boiled to sterilise them, and then cooled. A weighed quantity of the proteid was then dissolved and used in the experiment; or a solution of the proteid was made, and the quantity present was estimated.

Local Action on the Eye.—A watery infusion of the seeds when instilled into the eye produces, as is well known, severe inflammation with purulent discharge; and it is this action which is both beneficial in the treatment of granular lids and of pannus. Both the globulin and the albumose of jequirity possess this property. Thus in one experiment 2 milligrams of the solid globulin (containing some coagulated proteid) were placed on the inner surface of the left eyelid of a large rabbit. In seventeen hours and three-quarters the conjunctiva was reddened and slightly swollen; there was no chemosis, but there was a clear serous discharge. In twenty-four hours, there was intense purulent ophthalmia, with subconjunctival ecchymosis: the cornea being quite clear. The purulent discharge lasted till the death of the animal, eighty-three hours after inoculation; the animal being apparently ill for about four hours before death. At the *post mortem*, there was severe subconjunctival hæmorrhage, with œdema round the eyeball. If the dose be smaller, the animal does not die after eye inoculation, nor does it suffer from any general symptoms; but local inflammation and œdema with purulent discharge always follow in about sixteen or seventeen hours.

One milligram of the albumose dissolved in two minims of sterilised distilled water, when placed on the eye of a rabbit, produced in less than twenty-four hours severe conjunctivitis with chemosis, and left at the end of six days a steamy cornea with leucomata and subconjunctival ecchymosis. The animal showed no symptoms of poisoning. Both globulin and albumose therefore possess this property of producing severe conjunctivitis.

General Action on the Body.—The symptoms produced by the subcutaneous injections of the proteids of jequirity are those which have been described by Drs. Warden and Waddell. The action of the globulin is not, however, quite identical with that of the albumose. In the first place, the globulin is more poisonous than the albumose. In rats, for example, 10 milligrams of globulin per kilo of body-weight is a fatal dose, and in the same animals 60 milligrams of albumose per kilo of body-weight.

If the above mentioned dose of globulin be injected into a rat, symptoms of poisoning begin to appear in about six hours; the animal then seems a little languid, and in a condition impossible to distinguish from sleepiness. It continues in this state, making no voluntary movement, irresponsive to slight external stimuli, and with half shut eyes. It lies huddled up in its cage, the breathing becomes more rapid, and bloody motions are passed shortly before death, which occurs in about twenty-four hours after inoculation. If the animal is with young, it aborts. *Post mortem*, there are signs of œdema and punctiform ecchymosis at the seat of injection, and punctiform ecchymosis also beneath the peritoneum, and sometimes in the lungs. The intestines are congested, and sometimes greatly inflamed; the adenoid patches in the mucous membrane are swollen, and submucous ecchymoses are often seen. The blood sometimes remains fluid for a long time, and is sometimes coagulated. The symptoms of poisoning by the albumose and the *post-mortem* signs are similar to those described as produced by the globulin.

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[*] *Proc. Roy. Soc.*, vol. 42, p. 331.

[†] *Proc. Physiolog. Soc.*, 1887.

[*] The action of the globulin was investigated in co-operation with Dr. Wolfenden; for the account of the albumose I alone am responsible. The results are published in two papers in *Proc. Roy. Soc.*, May, 1889.

It may be pointed out that there are no symptoms referable to definite lesions of the organs, except the occurrence of bloody motions due to gastro-enteritis. The sleepiness in gradually increasing coma may be explained by an effect on the cerebrum; as there is not sufficient dilatation of the vessels of the abdominal organs to explain the occurrence of coma by drainage into the "splanchnic area," the occurrence of rapid breathing, which is produced chiefly by the globulin, may be explained by an affection of the respiratory centre. The only early symptom of abrus poisoning is a fall of body temperature, and this is produced both by the globulin and the albumose.

This lowering effect of the jequirity proteids on body temperature was noticed in cats by Warden and Waddell. It is important, when taken in consideration with the fact that rattlesnake venom produces a similar effect (Weir-Mitchell and Reichert), and that, on the other hand, animal albumoses and peptones have been shown by Ott and Colmar[*] to produce fever in mammals.

Effect of Heat on the Activity of Jequirity Proteids.—Boiling the liquid destroys the activity of the infusion of jequirity seeds. This, as has been mentioned, is an argument against the bacterial nature of the poison. It was desirable to test, however, with exactness at what temperature this activity was permanently destroyed. For this purpose solutions of the globulin and albumose were momentarily heated up to 50°, 60°, 75°, 80°, 85° C. before being used for inoculation. In each separate series of experiments an unheated solution of proteid was also inoculated, in order to have a control, and a lethal dose was always used. For the details of these experiments the papers in the *Proceedings of the Royal Society*, already quoted, must be referred to. Suffice it to say here that the results obtained were—(1) that the activity of the globulin was permanently destroyed by momentarily heating its solution to between 75° and 80° C., that is, about its coagulation temperature, while the solution of albumose had to be heated up to 85° C. before the activity of the proteid was destroyed; (2) that momentary heating of the solution to above 50°C. but below 75° in the case of the globulin, and 85° in the case of the albumose, weakened the activity of the proteid without destroying it.

The conclusions therefore arrived at regarding the jequirity poison may be thus summarised:—

1. The toxic action of the jequirity (*Abrus precatorius*) resides in two proteids—a globulin and an albumose.

2. Both these proteids produce nearly the same effects, namely, local œdema and ecchymosis at the seat of inoculation, with ecchymosis in the serous membranes, and gastro-enteritis, the blood in many cases remaining fluid. The general symptoms are a gradual sleepiness, ending in coma, with rapid onset of rigor mortis.

3. That both portions have a remarkable lowering effect on the body temperature; the globulin, at the same time, producing rapidity of breathing, while the albumose does not have this effect to the same degree.

4. That the activity of both proteids is destroyed by a temperature below the boiling point of water; the globulin between 75° and 80° C. and the albumose at 85° C., while temperatures below these points but above 50° C. diminish the poisonous activity.

Relation of the Abrus Poison to Snake Venom.—It is chiefly due to the researches of Weir-Mitchell that the poisonous principles of snake venom have been shown to be of an albuminoid nature. In the latest publication on the subject Weir-Mitchell and Reichert[*] affirm as the result of their analyses and experiments that the poisonous proteids present are of two kinds—a globulin and a peptone, or peptone-like body; that all kinds of venom contain these two bodies, although in varying proportions, speaking generally, the globulin being greater in proportion to the "peptone" in viperine snakes (such as the rattlesnake), and the peptone being in greater proportion in the venom of colubrine snakes, such as the cobra; that both the globulin and peptone of the venom are poisonous, producing practically the same general symptoms, but with this exception (and a noticeable one it is), that the great local ecchymosis and inflammation of snake-bite is due to the globulin present in the venom and not to the "peptone."

For reasons which I have detailed elsewhere,[†] it seems to me that Weir-Mitchell and Reichert's venom "peptone" is not a true peptone, but belongs to the albumose class of proteid bodies. The relation of abrus poison to snake venom is now apparent. Abrus seed contains two poisonous proteids—a globulin and an albumose—which both produce local œdema and ecchymosis. Rattlesnake venom also contains a globulin and a peptone-like body (probably an albumose), the former of which produces local ecchymosis and inflammation. The resemblance is further strengthened by the fact that heat diminishes the activity of both abrus poison and of snake venom; but in this respect abrus poison seems to be more sensitive than venom. Thus, even after boiling and filtering, rattlesnake venom, if given in sufficient dose, is fatal; and cobra venom is still active (although permanently destroyed by boiling for half an hour), while, with abrus proteids, a momentary heating of the globulin in a solution up to 80° C., is sufficient to destroy its activity, while with the albumose the destroying temperature is 85° C. Rattlesnake venom, like abrus poison, also lessens the body temperature. The great difference, however, between snake venom and abrus poison rests in the fact that venom produces local paralysis and general convulsions while abrus has no such effect. Abrus seems to affect the cerebral hemispheres, producing stupor, ending in coma.

It is evident, therefore, that while abrus poison bears some resemblance to snake venom it is far from being identical with it.

Nature of Abrus Poison.—At present it is not explicable why proteids should be poisonous; why, when injected subcutaneously or into the venous system, they should cause death. And so anomalous does the toxic power of these bodies seem that we are bound to consider whether a proteid is of itself poisonous or possesses toxic properties by virtue of some agent or body tacked on to it or formed from it. Such an agent associated with a proteid would be called a "ferment." We know that the ferments used in digestion are normally associated with proteids, although Cohnheim claimed that he had separated ptyalin from all associated proteid, and Brücke stated the same of pepsin; and even granting that these two ferments may be separated from their associated proteids the fact remains that ferments are in nature closely linked with albuminoid bodies. What characteristics of unorganized ferments, we may fairly ask, are present in abrus poisons which would lead to the supposition that what might be called a "toxic" ferment is present? The unorganized ferments known alter the constitution of the bodies on which they act, the digestive ferments acting on proteids, amyloids, and fats, while other ferments, such as the fibrine ferment and the curdling ferments, cause the proteids on which they act to assume a solid form. All these ferments have certain characteristics common to all; their action is increased by a moderate heat and permanently destroyed by boiling their solutions; and their activity is not apparently diminished after they have produced their effect.

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[*] *Journal of Physiology*, vol. viii., p. 218.

[*] 'Researches upon the Venom of Poisonous Serpents.' Philadelphia, 1886.

[†] *Proc. Roy. Soc.*, May, 1889.

From this it will be seen that the fact which would point to abrus poison being a "toxic" ferment is the fact that its activity is permanently destroyed by a moist heat below 100° C. Farther than this we cannot at present go. Abrus globulin and albumose possess neither a proteolytic nor amylolytic action, whatever the reaction of the digestive mixture may be. The fact that the activity of the globulin is destroyed at about its coagulation temperature would seem to point to an alteration in the constitution of the proteid as the cause of the loss of poisonous activity; but this again is the temperature at which ferments are destroyed. No evident effect, chemical or physical, is noticed if the albumose be heated up to 85° C. or even boiled, yet its toxic activity is at once and for ever destroyed. This may point to a ferment associated with the albumose; but until we know the chemical constitution of the proteid molecule we cannot assert that this degree of heat does not so alter the construction as to prevent the development of the toxic action. In this uncertain condition the matter must at present rest. It may be considered that the toxic action is not due to the proteid nor to a ferment attached to it, but to some chemical toxic body carried down with the proteid in its preparation. The effect of heat on the toxic activity of abrus would seem at once to dispose of this view. Toxic bodies, such as ptomaines and leucomaines, formed from proteids, are not so sensitive to heat as the abrus poison; and if the details of the preparation of abrus globulin and albumose be referred to it will be seen that the prolonged dialysis in running water and the long extraction of the albumose by alcohol preclude the presence of any crystalline product in the residue obtained.

Parliamentary and Law Proceedings.

SALE OF DEFECTIVE SPIRIT OF NITROUS ETHER.

The adjourned hearing of a summons against Mr. William Hardcastle, of Stockton, chemist, for selling adulterated spirit of nitrous ether came before the Stockton Borough Bench on Monday. At the hearing a fortnight ago Mr. J. H. E. Hunton, who defended, asked that the case might be postponed to allow of the sample in question being submitted to Somerset House.

In his certificate, Mr. Stock, the county analyst, certified that the sample was not a sample of genuine spirit of nitrous ether. The certificate from Somerset House stated that the sample analysed was deficient in nitrous ether to the extent of not less than 60 per cent. of the quantity which ought to be present, even after it had been kept some time, and the vessel containing it had occasionally been opened.

The Bench decided that the case had been duly proved, although they exonerated defendant from any intention to defraud. They accordingly fined him 2*s.* 6*d.*, and costs £2 3*s.* 6*d.*—*Leeds Mercury.*

THE SUPPLY OF STRYCHNINE VERMIN KILLERS.

An inquest was held on Monday last at Newport, Isle of Wight, respecting the death of Frances Hind.

It appeared, that the deceased had sent her daughter, aged eleven years, to a chemist's in the town for threepennyworth of rat poison, warning her not to tell her father. The poison was obtained, and upon receiving it deceased went up stairs, where she was afterwards found dead. The packet of poison was stated to have contained 1½ grain of strychnine.

The jury returned a verdict of suicide while of unsound mind and requested the coroner to censure the chemist's manager for supplying the poison to a child.

Correspondence.

NOTES ON CHLORALAMIDE.

Sir,—As this synthetical product seems destined to obtain a place in pharmacy as a hypnotic, the following notes, in addition to those in the *Pharmaceutical Journal* of the 31st ult., may be of interest:—

The solubility is stated to be 1 in 9 of water. I have failed to dissolve 20 grains in 240 fluid grains of water, the actual solubility being about 1 in 14.

On heating in a dry test-tube it melts, and gives a strong smell of chloral, which condenses on the sides of the tube; and on further heating, chars, and gives a peculiar smell recalling HCN and onions. Heated with solution of potash, it gives off a smell of chloroform and ammonia. H_2SO_4, HNO_3, HCl and Fe_2Cl_6 respectively have no apparent action in the cold.

On adding a few grains to a mixture of ʒss of strong sulphuric acid and 4 drops of 90 per cent. carbolic acid, and warming, the mixture boils almost immediately, and quickly changes to a bright red colour, with a strong chloral odour. This test will distinguish it from most of the new synthetical products, if applied as above, the reactions being shown by the following table:—

Antipyrin.	Antifebrin.	Chloralamide	Phenacetin.	Sulphonal.
No effect.	No effect.	Bright red colour with chloral odour.	Dark purplish-brown, with strong acetous odour.	Bright emerald green, immediately changing to dark, dirty green with strong sulphurous odour.

Chloralamide does not reduce Fehling's solution or decolorize Pavy's.

It occurred to me, on reading the next paragraph in the issue quoted above, viz., "Physiological Action of Disulphones," that if the hypnotic effects were proportional to the increase in number of the ethyl groups, would not the introduction of an ethyl group into chloralamid also enhance its hypnotic properties.

8, Hanover Street, W. R. CASSWELL HARRISON.

A. Pumphrey.—A paste made by mixing together one drachm each of black wool dye and methylated spirit, 10 drops of acetic acid, 5 drachms of water and 2 drachms of glycerine has been recommended as a black ink for rubber stamps.

J. H. Smith.—(1) We do not think the substance is suited for making a good ink. (2) Crocus of antimony is a compound made by deflagrating together equal parts of black sulphide of antimony, a small quantity at a time, and reducing the fuse to powder. (3) See previous answer. (4) A black hectograph ink may be made by dissolving 25 parts of nigrosine in 95 parts of boiling water and when cold adding 5 parts of acetic acid. Or a violet ink may be made by dissolving 1 part of aniline violet in 5 parts of methylated spirit and 3 parts of water.

Battonian.—Diphenylamine: see a paper by N. H. Martin in *Pharm. Journ.*, [3], viii., 229.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Umney, Ekin, Holmes, Fox, Thomas, Wall, Gostling, Butler, Martin, Hurd, Spero.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 14, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRITISH PHARMACEUTICAL CONFERENCE AT NEWCASTLE.

THE visit of the British Pharmaceutical Conference to its birthplace is over and past, but it will be long before the memories of so successful and pleasant a gathering will die out. Unfortunately for amateur prophecies as to the decadence of the Association, they received very little confirmation in the incidents of the meeting, for the attendance was large and representative, whilst the papers read were unprecedentedly numerous and eminently practical. The happy commencement of the proceedings, at the numerously attended Reception by the President of the Conference and his colleagues in the Durham University College of Science, where Music and Science each appealed to its votaries, augured well for success, and when on Tuesday morning the Principal of the College, Professor GARNETT, rose to utter a few happily chosen words of welcome from the authorities of the College, the fine Physics Lecture Theatre was well filled with ladies and gentlemen. Mr. N. H. MARTIN followed with a welcome from the pharmacists of the North of England, in which he ingeniously called attention to the presence of the "fathers of the Conference," in Messrs. SCHACHT, REYNOLDS and BRADY. A list of delegates appointed to attend the meeting by various associations was then read and the more serious business of the Conference began.

Report of the Executive.

The President first called upon Mr. W. A. H. NAYLOR, one of the Honorary Secretaries, to read the Report of the Executive Committee. This commenced with the satisfactory announcements that the numerical strength—which, however, was not stated—had been more than maintained, and that signs of increased activity were not wanting. Beyond the fact, however, that a somewhat larger number of papers were to be read at the meeting, the latter statement was scarcely borne out by the succeeding paragraphs, which were, indeed, chiefly negative in character. The biennial "whip" for new members had hardly been so successful as had been hoped, and an appeal was made to supplement it by personal influence. Regret was expressed that no application had been made during the year for a grant in aid of research, and it may be added that the papers subsequently read did not include any report on the subject of a previous grant. In addition, the Chairman of the Unofficial Formulary Committee had reported that the work in hand had not reached a sufficiently advanced stage to justify a recommendation for any fresh publication. The other items in the report were a reference to the recent revision of the "blue list," a statement as to a new local secretary for Canada, a complimentary allusion to the imminent departure of Mr. PLOWMAN, late senior Honorary Secretary to the Conference, to take up an appointment in the Melbourne College of Pharmacy, and an appropriate recognition of the loss the Conference had sustained in the death of Mr. JOHN WILLIAMS.

Financial Statement.

The Financial Statement was then read by the Honorary Treasurer, and proved satisfactory in so far that it showed that in the past year, unlike the two or three previous ones, the income of the Conference had been sufficient to cover the expenditure. This improvement was not consequent upon any very large increase in the amount received for subscriptions—£583 10*s*. 4*d*. against £534 13*s*. 6*d*. in 1887-88—since the amount was still below that received in 1886-87. As will be seen it was principally due to a decrease of upwards of £100 in the cost of the last Year-Book. Taking away the disturbing elements of outstanding liabilities and assets the cash income for the year appears to have been £698 9*s*. 7*d*., and the expenditure £642 2*s*. 7*d*., being an excess of income amounting to £56 7*s*. 0*d*. This has enabled the Treasurer to reduce the liabilities, which stood in the last financial statement at £138 17*s*. 10*d*., to the sum of £6 17*s*. 9*d*., against which the Conference possesses assets amounting to £185 7*s*. 7*d*., in addition to the value of the stocks of Year-Books and Formularies. The Report and Financial Statement were, on the motion of the President, seconded by Mr. C. B. ALLEN, unanimously adopted.

President's Address.

The way was now clear for the President's Address, which as it is printed in another part of this Journal need only be summarized here. Commencing with some appropriate allusions to the return of the Conference to its birthplace, Mr. UMNEY selected for his theme an article agreed to by the founders of the Conference in 1863, to the effect that one object of the Association should be to maintain uncompromisingly the principle of purity in medicine. It may be remarked in passing that the treatment of this and other topics in the address was largely from the point of view of the wholesale druggist, a fact that was recognized by the speaker himself and apologized for on the ground that from the nature of his business he was less perfectly acquainted with the dispenser's aspect of pharmacy. Taking as a starting point the time when in consequence of the prevalence of sophistication of drugs Henry VIII. empowered the physicians to "search, see and view the apothecaries' wares, drugs and stuffs" and to destroy such as were found unfit for use, the speaker recalled how this power had passed to the Society of Apothecaries after their separation from the grocers, and eventually, on account of sophistications by the latter, had led to a combination of apothecaries for the production of pure medicines. The subsequent recognition by wholesale dealers of the fact that the traffic in drugs and medicines might in future be carried on more successfully by due regard being paid to purity, was a new departure, and led to the introduction of guaranteed powdered drugs by Thomas Herring and parallel enterprises by others, followed in its turn to greater attention being paid to the purity of chemical compounds intended for use in medicine. The founders of the Conference in 1863 recognized the importance of the subject, and the consolidation of the pharmacopœias in the following year initiated an advance in the uniformity and purity of medicine. Here reference was made to the qualifications required in the editor of a pharmacopœia, and the opinion was expressed that the suitable performance of his work became apparent when, knowing the requirements of the medical profession and the capabilities of pharmacists and manufacturers, he adopted standards and framed characters and tests that were satisfactory to all concerned. Emphasis was then laid upon the desirability that pharmacists should do all in their power to impress upon the public that household remedies should invariably be purchased of a similar strength and quality to those medicines that physicians direct to be used in compounding their prescriptions, on the ground that such a course would rid them of much outside competition. The Sale of Food and Drugs Act was next referred to and the friction that had been caused at first by, in many cases, the imperfect knowledge of officials; but it was thought that the superabundant energy had now been toned down to a reasonable pitch, and only those cases were heard of that indicated fraud on the public. In fact the speaker wondered whether the present prevalence of satisfactory reports might not be due to some of the official analysts not being sufficiently conversant with the characters and tests and commerce of drugs to enable them always to test efficiently substances submitted to them. It was also pointed out that highly trained pharmacists have neither sought nor obtained the post of public analyst in anything like the number of instances they should have done. The excise regulations as to the use of alcohol in manufactures, and the injury they have worked in restraint of British industry was next dwelt upon, recognition being accorded to the relaxations that have been granted recently. To the influences of these stringent regulations, and to the meagre opportunities hitherto afforded in this country for research work, the speaker attributed any falling behind in chemical manufactures that may have been shown by England in recent years, and in respect to the latter cause the part that might be played by the Research Laboratory of the Pharmaceutical Society was hopefully alluded to. The remainder of the address was devoted to arguments, strengthened by illustrations, as to the importance and value to the pharmacist of a sound scientific training. The address was well received, and at the close a vote of thanks was, on the motion of Mr. S. R. Atkins, seconded by Mr. T. M. Clague, enthusiastically accorded to the President.

Proctor on Tincture of Senna.

The Conference then proceeded to the reading and discussion of papers, and following the plan adopted in previous years, a *résumé* will be given here sufficiently full to enable our readers to follow the principal points, pending the publication of the full report. The first paper read was a Note on Tincture of Senna, in which Mr. B. S. Proctor reiterated an opinion, expressed on previous occasions, that the official tincture of senna is an inert preparation of an active drug. In support of his position Mr. Proctor stated that alcohol is in this case an unsuitable menstruum and that, in fact, he had taken the rectified spirit extract from half an ounce of senna leaves without producing any effect; but that a draught made from the senna marc that had been already extracted with rectified spirit produced pretty strong catharsis with griping. In respect to proof spirit, Mr. Proctor said that he had taken an ounce of the official tincture of senna without any effect, and pleaded his temperance principles as a reason for not taking the quantity that would be required to produce results beyond those due to alcohol. In the discussion that followed Mr. Gerrard pointed out the desirability that the Pharmacopœia should include a greater variety in the strength of alcohol, a suggestion that was endorsed by other speakers.

Ball on Papain and Pepsin.

In the next paper read, Mr. A. Ball described the results obtained in some comparative experiments with commercial samples of papain and pepsin. From these it appeared that the papains examined by him were far inferior to the pepsins in digestive power and that in addition the peptone formed by papain was deficient in diffusive properties. Mr. Ball criticized sharply the official test requiring that two grains of pepsin should be equal to the digestion of only one hundred grains of albumen, whereas he had found that "one grain of the best pepsins in the market will digest five hundred to fifteen hundred grains when subjected to the prescribed test," and he commended "some intelligent pharmacists" who, when pepsin is ordered, dispense the pepsin guaranteed pure and free from any admixture. In the discussion that followed the pertinent question was raised as to how much albumen the pepsins for which greater activity was claimed would digest when tested strictly under B.P. conditions. But this point Mr. Ball did not appear to appreciate; at any rate the question remained unanswered.

Reynolds on the Solubility of Glass.

A paragraph that appeared in "The Month" (before, p. 163), relative to the coloration of some chloral hydrate by pigment derived from the bottle, gave Mr. Reynolds the opportunity for the next paper, in which he suggested that the question as to whether and how far glass bottles are soluble was one worthy of further investigation. As a contribution to the subject from personal experience he mentioned that a solution of 1 in 10,000 of hydrochloric acid in water, which when freshly made gave a distinct reaction with congo paper, failed to do so after being kept a day in a flint glass bottle. This result he was inclined to refer to the chemical interference of the bottle with its contents. Other instances were mentioned in the discussion, and Dr. Thresh referred to an observation that a "rainfall" which when collected on litmus paper he had found to be invariably acid was either neutral or faintly alkaline when collected in a bottle.

Gerrard on Extract of Stramonium.

A practical note by Mr. A. W. Gerrard on Extract of Stramonium followed. It was the record of an observation made in an emergency that in the preparation of extract of stramonium the preliminary percolation of the seeds by ether might be omitted. He found that when the seeds were exhausted with hot proof spirit the resulting tincture yielded on evaporation a satisfactory extract containing very little fixed oil, which, if desired, could be removed by washing with a little ether.

Proctor on Ferri et Ammonii Citras.

The next paper, by Mr. B. S. Proctor, had its origin in the observation of changes that took place in mixtures containing ferri et ammonii citras as a constituent. For instance, one mixture consisting of forty grains of the citrate to eight ounces of water gradually became turbid, depositing a brown precipitate, and the liquid eventually becoming colourless or nearly so. When the mixture was made up with hard instead of distilled water part of the precipitate was buff-coloured and part black. At first an explanation of the instability was looked for in Mr. Umney's opinion, expressed in this Journal in 1873, that the official compound was deficient in ammonium citrate, and indeed a slightly better result was obtained upon the addition of a little of that salt. But that this was not a full explanation was shown by the fact that a sample that yielded 32 per cent. of ferric oxide on incineration was more stable than one that contained only 30·7 per cent. It was then observed that the residue from an incineration gave off the odour of sulphuretted hydrogen upon the addition of hydrochloric acid, and the presence of sulphate in the original citrate was confirmed by the barium test. A suggestion that a manufacturer's modification of the official process for citrate of iron and ammonium, in precipitating the ferric hydrate with caustic soda and the use of hard water, might have introduced a trace of sulphate, was negatived by the fact that a sample in the preparation of which the ferric hydrate was known to have been precipitated by ammonia gave palpable quantities of sulphate and only traces of lime. Mr. Proctor himself refers the contamination, which in some cases equalled 2 per cent. of sulphuric anhydride, to the conditions under which the citrate is manufactured on the large scale. It is known that when ferric hydrate is precipitated from the sulphate it will contain a notable quantity of basic sulphate, unless the caustic alkali used in the precipitation is kept continually in free excess. But when a large stream of iron liquor is poured into alkali this condition is not present, since the liquid immediately surrounding the point of impact will always contain iron in excess of alkali for a sufficiently long time to allow of the formation of basic sulphate, which may escape decomposition even after the mixture becomes more complete. The remedy suggested is to allow the two solutions to mingle in thin streams so regulated that the correct equivalent proportions are pretty closely maintained. Mr. Proctor's paper also contained some interesting observations on the retardation of the precipitation of barium sulphate in the presence of a citrate.

After the reading of this paper the Conference adjourned to lunch, which on this and the following day was served in the Cambridge Hall.

Clague on Easton's Syrup.

Upon resuming, Mr. Clague called attention to the fact that samples of Easton's syrup are sometimes met with which through the influence of a low temperature have undergone such change as to render them unfit for use. In one case the "syrup" was a jelly-like mass with long needle-shaped crystals and tufts of crystals, and a smaller amount of fine white precipitate showing. Warmth brought about solution, but precipitation again took place on cooling to about 32° F. It was found, however, that the addition of 25 per cent. of water sufficed to maintain solution at the lower temperature, and that this was not affected upon the addition of the quinine, strychnine and ferrous phosphate requisite to bring it up to Easton's strength. The high specific gravity of the samples pointed to excess of sugar as the source of trouble, and it was ascertained that the precipitation and gelatinous appearance stood in direct relation to the quantity of sugar present. Mr. Clague therefore recommended that where Easton's syrup finds a ready use, the original formula, containing 35 per cent. of sugar, should be adhered to; but that where it is not in so frequent demand the formula of the 'Extra Pharmacopœia' should be followed, reducing the quantity of sugar (37·5 per cent.) 10 per cent. Mr. Clague also expressed regret that there should have been introduced into the B.P.C. Unofficial Formulary a preparation bearing the same name as Easton gave to his syrup, though only containing three-fourths as much quinine phosphate. In commenting upon the paper the President said he felt inclined to attribute the present relatively frequent occurrence of solidification in such syrups to cane sugar having been displaced in the market by beet sugar.

Pattinson on Nitrous Vitriol and Aerated Waters.

The note of Mr. Pattinson on the effect of using vitriol containing a nitrous contamination in the manufacture of certain aerated waters, although having a valuable practical application, contained nothing that had not been published before. It was to the effect that the author had traced an opalescence in a sample of ginger ale to the action of a nitrous impurity derived from the vitriol used for generating carbonic acid upon the ginger essence, the colour of which it eventually discharged. The same subject was brought before the Pharmaceutical Society at an evening meeting in March, 1885 (*Pharm. Journ.*, [3], xv., 731), when Mr. Naylor recorded the much more important observation that the nitrous impurity is also capable of rapidly destroying the pungency of both ginger essence and capsaicin.

Braithwaite and Umney on Standardized Ipecacuanha Preparations.

The standardization of the fluid extract and wine of ipecacuanha was the subject of the next paper read, which was the joint production of Mr. J. O. Braithwaite and Mr. J. C. Umney. For their experiments the authors had used a root estimated to contain 1·32 per cent. of emetine, and the menstruum selected as giving the best results was rectified spirit. An extract was obtained, which estimated by a modification of Ransom's process yielded 1·28 per cent. of alkaloid. It is therefore proposed that a standard extract, prepared by a process consisting essentially of a first maceration and percolation with spirit, and then after addition of slaked lime to the mark, of a second maceration and percolation with spirit, should be so adjusted in strength that 100 fluid parts should contain 1·25 parts by weight of emetine. From this it is proposed to prepare a standardized wine by dissolving one fluid part of the extract in sufficient sherry wine to produce twenty fluid parts.

Braithwaite and Umney on Ipecacuanha Wine, B.P.

Finding that the modified Ransom process of assay referred to in the previous paper could be applied directly to the wine, Messrs. Braithwaite and Umney made some experiments as to the effect of the conditions obtaining in the official process for ipecacuanha wine in the amount of alkaloid present in the finished preparation. From their results they conclude that the present official process extracts practically all the alkaloid from the root, but that a considerable proportion of it is afterwards lost in the drying and powdering of the acetic extract, so that the wine produced is far inferior in relative alkaloid strength to the root from which it is prepared. They further express the opinion that the wine of the present Pharmacopœia, although a more elegant preparation than that of the B.P., 1867, is considerably inferior to it in its chief therapeutic ingredient. Samples of the preparations referred to in this and the preceding paper were shown, and the authors were strongly complimented on their contribution towards the solution of a troublesome problem.

Blunt on Assay of Ipecacuanha Wine.

In another contribution to the literature of ipecacuanha that followed, Mr. T. P. Blunt suggested a modification in the present method of assaying the wine for alkaloid by means of Mayer's solution. It consisted in adding a saturated solution of mercuric chloride in potassium chloride in excess to the wine previously evaporated to remove the alcohol, and then after filtering taking the quantity of a centinormal solution of mercuric chloride that can be added to the filtrate before a permanent precipitate is produced as the measure of the quantity of mercuric chloride that has been removed from the originally saturated solution by combination with the alkaloid.

Jones on Strychnine and Morphine Hypophosphites.

In the next paper read Mr. H. W. Jones called attention to the possible value of hypophosphorous acid as a solvent of strychnine and morphine. Both these alkaloids dissolve readily, according to the author, in dilute hypophosphorous acid to form solutions which can be obtained neutral, or only very faintly acid, by using a slight excess of the alkaloid. The hypophosphite of strychnine was described as a very stable salt in solution, suitable not only for hypodermic injection, but as a substitute for the hydrochlorate in the official liquor strychninæ, which sometimes causes trouble in cold weather. The ready solubility of morphine in the dilute acid allows of a solution of 1 in 6, or even stronger, being easily prepared.

Martindale on a Methyl Chloride Apparatus.

The object of the next note, by Mr. Martindale, was to bring under the notice of the Conference a convenient little apparatus for holding chloride of methyl, which has been recently introduced into medical practice as a refrigerator. This apparatus consists of a "thermo-isolator" made of a glass test-tube fused at the top to a larger surrounding tube after the interspace has been first rendered vacuous. The vacuum acting as a non-conductor the methyl chloride may be kept in the jacketed test-tube for some time without undergoing the volatilization which takes place almost immediately when the liquid is released from pressure under ordinary conditions. It is thus rendered accessible for saturating tampons for direct application to any part of the body and for similar purposes, when it is not desired to apply the refrigerator as a spray.

With the reading of this paper the business proceedings of the Conference terminated for the day. After partaking of "afternoon tea" in the rooms of the North of England Pharmaceutical Association the company proceeded for a drive through the parks and a walk through Jesmond Dene.

Naylor and Chaplin on Euonymus Bark

On Wednesday morning the Conference resumed its proceedings with some Chemical Observations on the Root Bark of *Euonymus atropurpureus*, by Messrs. W. A. H. NAYLOR and E. M. CHAPLIN. This paper represented the useful class of work which consists in repeating the experiments of previous observers. In this instance the authors regulated their proceedings by the experiments on euonymus root bark made by Mr. W. T. WENZELL, as recorded by him in a paper published in the *American Journal of Pharmacy* in 1862. They report that they have separated from the bark an unidentified crystallizable glucosidal principle, to which they have given the name "atropurpurin," WENZELL'S "euonymin," citric, tartaric and malic acids, neutral fixed oil, crystalline free fatty acid or acids, an acrid and pungent principle, yellow and brown resins, bitter extractive and wax. Their results differ from WENZELL'S chiefly in that instead of asparagin they obtained atropurpurin, which contains no nitrogen; besides which they got bitter extract instead of a soft resin, free fatty acid in place of crystalline resin, brown resin soluble instead of insoluble in ether, and an acrid pungent principle that WENZELL failed to detect.

Siebold on Misconceptions about Lithia.

In the next paper Mr. SIEBOLD referred to the great faith shown by some therapeutists in the superior solvent action of lithia upon uric acid, and pointed out that this faith extends not only to the carbonate and citrate, which are capable of acting as antacids, but also to mineral waters containing mere traces of lithium compounds and those in the form of chloride or sulphate. In a series of experiments made to ascertain how far this faith has a chemical foundation, he found that the solvent action of solutions of lithium, sodium and potassium carbonates on a given weight of uric acid, pure or as deposited from urine, or on a given weight of urinary sediment consisting of acid urates, under exactly similar conditions, is strictly proportional to the ratio of the molecular weights of these solvents. Further that lithium chloride and lithium sulphate have no solvent action on uric acid and acid urates, and lastly that the degree of alkalinity of urine produced by the internal administration of medicinal doses of lithium citrate is not greater than that produced by equivalent doses of potassium citrate.

Siebold on Arsenic in Glycerin.

Consequent upon some statements that have been made recently, respecting the occurrence of arsenic in glycerin, Mr. SIEBOLD'S attention has been directed also to that subject, and in the paper next read he reported the results of the examination of a number of samples for the presence of such a contamination. The experiments were not extended to low qualities of glycerin, but were confined to colourless and odourless samples sold for toilet and pharmaceutical purposes. The majority of the samples tested proved to contain arsenious acid varying in proportion from 1 part in 4000 parts to 1 part in 6000. A few samples exceeded this proportion, and one contained as much as 1 part in 2500. Some samples that were found free from arsenic were traced all to one process of manufacture, which was described as being that by which as a rule glycerin used for dispensing purposes is understood to be made. The process followed in testing, which was demonstrated by Mr. SIEBOLD, was a modification of one recently recommended by VULPIUS and FLÜCKIGER, which depends upon the action of the gas given off by a mixture of the glycerin with zinc and very dilute hydrochloric acid in a test tube upon a paper cap that has been touched with a drop of a solution of mercuric chloride, a yellow spot being the result of the presence of minute traces of arsenic. A further observation by Mr SIEBOLD was consistent with arsenic being sometimes introduced into glycerin from the glass of the containing bottle, and it is proposed to further investigate this point; but there was a general agreement among the speakers that such quantities of arsenic as those found in some cases were more probably introduced during the manufacture.

Reynolds on Lead in Water.

The special object of the paper next read, by Mr. R. REYNOLDS, was to point out that the report of a chemical analyst on the presence or absence of lead in any particular sample of drinking water, should be so framed as to guard against it being taken to mean more than it stated. It was pointed out that the quantity of lead taken up by an acid water might vary considerably with the conditions, and that therefore the results of an analysis of a water that had been subjected to a minimum influence might have no relation to the results obtained with the same kind of water after it had been submitted to more energetic or prolonged action. This was illustrated by the results obtained in the examination of a sample of water drawn at 7 a.m., when it had probably lain in contact with the pipes for some hours, which gave 0·35 grain of lead per gallon, and one drawn three hours after, which gave only 0·1 grain per gallon. It was therefore suggested, among other ways, that relative certainty should be secured by the analyst directing that samples of water intended for analysis should be left in contact with the ordinary service pipe for twenty-four hours.

Allen on Strychnine Vermin Killers.

In a paper on Vermin Killers containing Strychnine, Mr. A. H. Allen next gave the results of the examination of a number of samples of vermin killer obtained from different sources. These appeared to show considerable variation in the absolute and relative quantities of strychnine they contained. The principal interest of the paper lay in a suggestion as to the use of pigments for the coloration of such powders, which in those examined were ultramarine, prussian blue and carmine. Mr. Allen is of opinion that a preferable substance would be found in chrome green, or green oxide of chromium, principally on the ground of its great stability. Further he thought arsenical fly papers should be impregnated with some soluble colouring matter, which would colour water in which they are placed, and for this purpose he suggested indigo-carmine, or sulphonated indigo might be used.

Proctor on a Scale of Small Residues.

In washing precipitates or exhausting drugs by percolation it often becomes important to be able to estimate the amount of solid matter that the solvent is extracting. With a view to aiding the judgment Mr. Proctor has constructed a scale of standards for comparison consisting of the residues of the evaporation on glass slides of drops of liquid containing from one millionth to one thousandth of a grain of solid matter. The materials selected are calcium sulphate, potassium nitrate, gum acacia and gum tragacanth. The lower dilutions are made with water, but for the higher dilutions spirit is used in order to avoid vitiation of results by the fixed matter present even in distilled water.

Christy on Strophanthus.

This was followed by a paper in which Mr. Thomas Christy gave the results of observations on various parcels of strophanthus seeds received by him since 1878 and of plants grown from some of them. So far as could be gathered his opinion coincides with that already expressed by Professor Fraser, that seeds received under the name "kombé," although differing in some minor respects from "hispidus" seeds, are like them referable to *Strophanthus hispidus*. The seeds of "*Strophanthus glabrus* of Gaboon" were stated to yield a crystallizable alkaloid," but if this be correct it will be apparent from Professor Fraser's results that they differ in this respect from the seeds of *S. hispidus*. Another variety of seeds was referred to under the name *Strophanthus minor* (B.), "very small in size, blunt at one end and having a spike at the other," thought to be suggestive of the appellation "turtle strophanthus," which appears to have contained little active principle. A number of specimens were shown to illustrate the great diversity in leaf presented by plants grown from seeds received in the same parcel.

Fraser on Strophanthus.

The next paper read may be looked upon as one of the most important—as it was certainly the most elaborate—brought under the notice of the Conference at the Newcastle meeting. It consisted of a *résumé* of recent work done by Dr. T. R. Fraser upon the chemistry of strophanthus seeds, and appeared to be a continuation or development of the paper read by him before the Royal Society of Edinburgh a few months since and reported in this Journal (Feb. 16, p. 660), in which he dealt principally with the botany of this new and important drug. In the present paper the results obtained by treatment of the triturated dried seeds with petroleum ether, ethylic ether, water and rectified spirit, are recorded, but for the purposes of this note detailed reference need only be made to the alcoholic extract, since it contained the whole of the active principle, strophanthin. An alcoholic extract obtained after removal of fat by ether amounted to 8·94 per cent. of the original weight of the seeds and it was estimated to consist of 63·367 per cent. of impure strophanthin, 16·275 per cent. of mucilage and 14·542 per cent. of resin. The extract was the product of three successive percolations, the first with 10 parts of rectified spirit and the other two with 5 parts each. It was found that the first percolation removed 7·9 per cent. of the 8·94 per cent. of extract obtained, and that it was very much richer in strophanthin than the products of the succeeding percolations, nearly all the active principle being extracted by the 10 parts of spirit and in a more satisfactory state than in the later portions of the extract. Further experiments showed that most of the colouring matter, resin and mucilage is derived from the testa and most of the strophanthin and oil from the cotyledons and embryos. Treatment of the dry extract as well as of an aqueous solution with reagents failed to indicate the presence of an alkaloid, but the reduction of Fehling's solution by solutions of the extract in dilute acids gave evidence of a glucoside. This action was satisfactorily connected with a substance that appeared in well-formed crystals during the evaporation of non-acidulated watery solutions of the extract, and which was identified as the active principle strophanthin. In fact it was found that strophanthin is readily decomposed by weak solutions of acids, yielding glucose and a body that has been named "strophanthidin," which crystallizes so readily that it is thought that its production in an extract by treatment with an acid might be taken as an indication of the amount of active principle originally contained therein. Strophanthin is difficult to separate; but it was obtained pure by a somewhat tedious process depending upon the formation of a tannic acid compound and subsequent decomposition by lead oxide, and it yielded upon analysis results corresponding with the formula $C_{16}H_{26}O_{8}$. Strophanthidin, the product of decomposition of the glucoside, is described as having an intensely bitter taste and a neutral reaction, and as being very slightly soluble in water, moderately soluble in cold and freely in warm rectified spirit. It is extemely active as a pharmacological agent, with symptoms closely resembling those of strophanthin. Strophanthin was also found to be present in the comose appendages and the seeds, the pericarp of the follicles, the leaves, branches, stem and root. No alkaloid was detected, but in the lead precipitate from an aqueous solution of the alcoholic extract a compound was found, of strongly acid reaction and freely soluble in water, to which the name "kombic acid" has been given.

Dott on Narceine.

Recent statements as to the extent to which commercial narceine is affected in its therapeutic action by contamination with other alkaloids, together with the paper by Merck on chemically pure narceine, seem to have constituted the *raison d'être* of the next paper, by Mr. Dott, on Narceine and its Salts. Mr. Dott is of opinion that considering the facility with which narceine can be separated from morphine and codeine it is highly improbable that any manufacturer would send out the alkaloid so contaminated; but even supposing that some morphine and codeine were present in the narceine it is difficult to conceive how they would affect its action. With respect to Merck's paper, Mr. Dott points out also that the tenacity with which narceine retains hydrochloric acid had been previously recorded by Dr. Wright, who obtained pure narceine from the basic hydrochloride by converting it first into sulphate. As to the nature of the basic hydrochloride, Mr. Dott does not think it to be a mixture or compound of the normal hydrochloride with the alkaloid, but that in it so many molecules of alkaloid are loosely combined with so many molecules of hydrochloric acid, after the manner of the relation of water of crystallization to a salt molecule.

Williams on Lemon Juice.

The official standard of the citricity of lemon juice was the subject of the next paper, in which Mr. T. Howell Williams expressed the opinion that this is now fixed much too high. In the B.P., 1867, the specific gravity was stated as 1·039 and the contents of a fluid ounce in citric acid as 32·5 grains; in the B.P., 1885, the specific gravity is given as 1·035 to 1·045 and the citric acid as 36 grains to 46 grains to the fluid ounce. In Mr. Williams's opinion, 30 to 36 grains of citric acid in the ounce would more correctly represent the amount present in the lemon juice as commonly obtained from the finest imported fruit during the winter months and from 20 to 30 grains when the juice is pressed in summer or autumn. In support of this opinion he quoted some memoranda from the laboratory books of his firm.

Proctor on Tannin Solubilities.

The title of the next paper read was "Tannin: its Solubilities, etc.," the author being Mr. B. S. Proctor. It contained the record of a very large number of experiments, undertaken with a view to get an explanation of the somewhat anomalous behaviour of tannin towards ether. According to the B.P., tannic acid is only sparingly soluble in ether, but Mr. Proctor confirms some previous observers in the statement that ether is really capable of forming a solution with a relatively large quantity of that compound. What appears to happen when commercial tannin is added to methylated ether is that after a time two ethereal layers are formed, one heavy and turbid and the other light and clear, and that with successive additions of tannin the lower stratum increases in bulk and the upper one decreases and finally disappears. In one experiment this point was reached when 180 grains of tannin had been added to about 235 grains of ether, and the liquid then yielded on filtration a very small quantity of insoluble and was still unsaturated. The experiments were varied in many ways, involving higher rectification of the ether and drying of the tannin, but the nature of the solution, whether one of ether in tannin or tannin in ether, or whether an etherate is formed, cannot yet be said to be demonstrated. The solubilities of tannin in water, alcohol, and other menstrua were also given.

Hawkins on Wild Cherry Bark.

The next paper, by Mr. L. W. Hawkins, dealt with the subject of the amount of hydrocyanic acid occurring in wild cherry bark and the proportion of this which finds its way into pharmaceutical preparations of the bark. Six samples of bark from different leading houses, examined by distilling the finely powdered drug with water and titrating the distillate with centinormal silver nitrate solution, gave results corresponding to a yield of hydrocyanic acid ranging from 0·079 per cent. to 0·160 per cent. The preparations in use are the liquid extract, infusion and syrup of the U.S.P. and the tincture of the B.P.C. Formulary. Commercial specimens of the liquid extract, which is supposed to represent its weight of bark, gave very poor results, the highest quantity of hydrocyanic acid in any of six samples being 0·030 grams in 100 c.c. and in two cases none at all. A sample made by the author strictly according to the U.S.P. formula from a bark containing 0·137 of acid only contained in the finished product 0·084 per cent., apparently showing that the portion of the menstruum not subjected to the influence of heat is insufficient to extract the whole of this constituent. Commercial samples of the infusion and syrup also gave results considerably below the theoretical quantity, supposing that they were made from average quality bark, although it was demonstrated that a much nearer approximation could be obtained by following the U.S.P. processes. A similar remark applies to commercial samples of the tinctura pruni virginianæ, B.P.C. The author, therefore, drew the conclusion that preparations of wild cherry bark do not, as a rule, represent the full value of the drug, so far as hydrocyanic acid, its supposed active constituent, is concerned, and that this might be caused by loss of acid in keeping or insufficient care in preparation.

Johnston on Concentrated Infusion of Gentian.

In the next paper read, Mr. Johnston raised the old vexed question of concentrated infusions, with a view to the introduction of some such preparations in the next edition of the British Pharmacopœia. In order to give a practical turn to the discussion he suggested the following formula for a concentrated infusion of gentian:—

"Take of—

Bitter orange peel, bruised Gentian root, bruised	of each, 3 ounces.
Fresh lemon peel	6 ounces.
Rectified spirit	7½ fluid ounces.
Cold distilled water . . .	15 ounces.
Boiling distilled water . .	a sufficiency.

Mix the orange peel and gentian root with the spirit and cold water, and, into the mixture contained in a suitable vessel, such as a wide-mouthed jar to which a bung can be fitted, grate the lemon peel. Macerate for seven days, stirring occasionally; strain through a press bag or piece of calico, and press out the rest of the infusion. Remacerate the marc with about twelve ounces of boiling distilled water for twelve hours, and again press. Mix the liquid obtained with the previous portions, and set aside for a few days, afterwards filtering and making up with distilled water to a pint and a half."

In respect to the lemon peel it was recommended that the yellow portion should be grated from previously weighed lemons (about six will be required) directly into the liquor, and as much of the spongy part as may contain essential oil pared off and added also, the quantity being checked by noting the loss of weight in the lemons. Such a preparation, when mixed with seven parts of distilled water, was stated to yield a liquid exactly the same in colour, aroma and bitterness as the freshly-made B.P. infusion. Recognizing the possibility of an objection that the formula would yield a weak tincture rather than an infusion, Mr. Johnston thought this would be hypercritical, and suggested that here the physician wanted to avoid even this quantity of alcohol he might order "inf. gent. co. recent." It was admitted however, that, all the infusions might not be so easily represented by concentrated preparations.

Johnston on Tincture of Lemons.

As a sequence to the previous paper Mr. Johnston sent a note suggesting a modification in the official formulæ for tincture of lemon and tincture of fresh orange peel, which consisted practically in adopting the method proposed for grating the peel.

Macpherson on Official One per cent. Solutions.

In a paper read at an evening meeting of the Pharmaceutical Society in Edinburgh last year Mr. Macpherson criticized the formulæ given in the British Pharmacopœia for what are known as the 1 per cent. solutions, on the ground that they do not yield preparations in accordance with their reputed strength. The strychnine solution especially was singled out as one in which the proportional parts formula differs from that in which imperial weights and measures are used, and an amended formula was given by which it was claimed that a true 1 per cent. solution could be obtained whether the imperial weights and measures or the proportional quantities were used. Following up a suggestion made by Dr. Attfield Mr. Macpherson has since extended his work and now presented a series of formulæ for the other liquors constructed on the same principle. For the sake of uniformity imperial quantities for eight ounces of solution are given in each case; otherwise official data have been adhered to as far as consistent with bringing the finished products into consonance with their reputed strength.

Macpherson on Liquor Morphinæ Meconatis.

Following up his work on the official liquors still further, Mr. Macpherson proposed in another note that solution of meconate of morphine should be brought into uniformity with the other alkaloidal solutions, and made to contain one per cent. of meconate of morphine instead of about 1¼ per cent. of the "bimeconate," as stated in the present official formula. For this purpose he has contrived two formulæ, one starting with morphine meconate and the other with morphine hydrate. Mr. Macpherson also proposes that the name of the preparation should be changed to "Liquor Morphinæ Meconatis," as being more correct than the present official one, the "bimeconate" having been shown by Dott in this Journal to be a hypothetical compound.

Wright on Strength of Prussic Acid.

In view of the fact that solutions supplied as Scheele's prussic acid are known to vary in strength Mr. Wright's report on the strength of some commercial samples examined by him serves a useful purpose. It appeared that the range in twelve commercial samples was between 3·6 and 5·7 per cent. of HCy, or a difference of no less than 2·1 per cent. Mr.

Wright suggests that the Formulary Committee might do something towards securing more uniformity in the strength of this potent agent.

Wright on Menstrua for Aconite and Belladonna.

With a view to ascertaining whether chloroform presents any advantages over alcohol in the extraction of aconite and belladonna, as suggested in Squire's "Companion," Mr. Wright made a series of experiments using alcohol, chloroform and mixtures of alcohol and chloroform in different proportions as menstrua. With belladonna the best results were obtained with a mixture of four parts of alcohol and one of chloroform, 20 c.c. of a tincture made by maceration and percolation of 50 grams of the powdered root with sufficient menstruum to produce 100 c.c. containing 40 milligrams of alkaloid, against 30 milligrams contained in the same quantity of a rectified spirit tincture, and 11 milligrams in a chloroform tincture. In the case of aconite the best results were obtained with a mixture of three volumes of alcohol and one of chloroform, 20 c.c. containing 76 milligrams of alkaloid against 66 milligrams in the alcoholic tincture and 34 milligrams in the chloroform tincture.

Wright on Sodium Salicylate.

A third note by Mr. Wright related to an impurity observed in a sample of commercial sodium salicylate, which was not easily and completely soluble in cold water. An examination of the insoluble residue left no doubt that it consisted of salicylic acid.

Mootooswamy on Casearia esculenta.

The last paper read was a contribution from India, being an account, by Dr. Mootooswamy, of Tanjore, of a drug said to be coming into use as a remedy for chronic enlargement of the liver, hepatic obstructions, piles and diabetes. It consists of the root of *Casearia esculenta*, bearing a native name owing its origin to a "supposed property of drying up the sea." According to an analysis by Mr. D. Hooper the root contains 3 per cent. of neutral resins soluble in ether and partly soluble in spirit, an organic acid having the characters of cathartic acid, and about 10 per cent. of a tannin giving a green colour with ferric chloride, which, however, does not prevent the drug from acting as an aperient.

At the conclusion of the reading of the papers the presentation of books, provided by the Bell and Hills fund, supplemented by a copy of Hanbury's Science Papers and 'Pharmacographia,' given by Mr. Thomas Hanbury, was made to the North of England Pharmaceutical Association and suitably acknowledged by its President, Mr. N. H. Martin. This was followed by the re-election of the Formulary Committee, a vote of thanks to the College authorities for the use of the building, and another well-earned and enthusiastic vote of thanks to the Local Committee, coupled especially with the names of Mr. N. H. Martin, Chairman, Mr. T. Maltby Clague, Secretary, Mr. B. S. Proctor and Mr. Harrison. Mr. Reynolds then in eloquent terms invited the Conference to meet next year in Leeds, and the invitation having been supported by Mr. Ward, was unanimously accepted.

The Conference then proceeded to the election of officers for the ensuing year, and at the request of the meeting the Chairman deposited a unanimous ballot for the following list which had been proposed by the outgoing executive:—

President.—C. Umney, F.I.C., F.C.S.

Vice-Presidents.—M. Carteighe, F.I.C., F.C.S., S. Plowman, F.R.C.S., A. Kinninmont, W. Smeeton.

Treasurer.—W. Martindale, F.C.S.

Hon. General Secretaries.—W. A. H. Naylor, F.I.C., F.C.S., and J. C. Thresh, D.Sc., M.B.

Local Secretary.—F. W. Branson.

Other Members of the Executive Committee.—J. E. Brunker, M.A., M. Conroy, F.C.S., R. H. Davies, F.I.C., D. B. Dott, F.R.S.E., A. W. Gerrard, F.C.S., T. Maben, F.C.S., B. S. Proctor, F.I.C., F. Ransom, F.C.S., J. Harrison.

Auditors.—T. Rheeder, and G. Ward.

This being the conclusion of the business a hearty vote of thanks was given to the President for his able and courteous conduct in the chair.

About five o'clock, notwithstanding a downpour of rain, a numerous party embarked on a special steamer for a trip down the Tyne; but it is to be feared that the weather prevented the full enjoyment of the excursion.

The Excursion.

Thursday opened with atmospheric conditions very unpromising to members of the Conference and their friends who had looked forward to joining in the excursion that had been arranged by the Local Committee. By the time of starting, however, the rain had ceased, and although the sun was not much in evidence, water-proofs and umbrellas proved to be superfluities. At nine o'clock the special train left the Central station with one hundred and eighty passengers, the first stopping-place being Hexham, which was reached just before ten. Here a visit was made to the beautiful abbey church, and Mr. J. P. Gibson, a local pharmacist, recounted the principal events in its history and explained the antiquities in a most able and interesting way. Some of the visitors then went to see other places of interest in the town, under the guidance of Mr. W. R. Riddle, whilst others went for a stroll through the wood in the Duke's House Grounds. At noon the company assembled in the Town Hall, where an excellent lunch was provided, after which hearty recognition was made of the excellent service that had been rendered by the organizers of the excursion, Messrs. Gibson, Riddle, Clague and Harrison. Joining the train again a start was made for Rothbury, which was reached about three o'clock, when a most enjoyable couple of hours were spent in strolling through the wonderfully beautiful grounds attached to Lord Armstrong's seat at Cragside. Then followed an ample and most refreshing tea, and the company having again rejoined the train the return was made through Morpeth to Newcastle, where they arrived about eight o'clock.

The length to which this abstract of the proceedings has already extended necessitates brevity in any further remarks; but it would not be right to omit a word of congratulation to the Local Committee upon the outcome of their arrangements for one of the most successful meetings that the Conference has yet held. As Chairman of that Committee, Mr. N. H. Martin must be well pleased with the result of the arduous task carried out under his supervision, whilst Mr. T. Maltby Clague, the Honorary Secretary, may pride himself upon having secured the hearty thanks of all the members that took part in the proceedings, whether serious or festive, for the unsparing and genial way in which he laboured to secure their comfort and enjoyment.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday the 4th instant at the rooms of the Society, No. 11, Harcourt Street, Dublin, at three o'clock.

The President, Mr. Charles Evans, in the chair.

The other members of the Council present were Messrs. Hodgson (Treasurer), Beggs, Wells Hayes, McCormack, Baxter, Merrin, and Professor Tichborne.

The President said that ten days after the last Council meeting Mr. Hodgson and himself called on Mr. Allen, in pursuance of a request of the Council, for the purpose of asking him to reconsider his intention of withdrawing from the Council. Mr. Allen was out; but on the next morning he (the President) received a letter from him saying that it was his fixed determination not to allow his name to go forward for re-election. On receipt of that letter he and Mr. Hodgson considered it useless to call on Mr. Allen again. He was sure they all regretted Mr. Allen's decision.

Mr. Hodgson said that personally he regretted it very much. He felt that they would sustain a serious loss in Mr. Allen's withdrawal, as he was a most useful member of the Council.

The minutes of the last meeting were then read by the Registrar, Mr. Ferrall, and afterwards signed by the President.

The President said a letter had been received, written in French, from the Secretary of the Committee for organizing the meeting of the Seventh International Pharmaceutical Congress at Milan in September, 1890, asking whether the Council would send representatives to it.

It was ordered that the Registrar should write thanking the Committee for the invitation, and intimating that it was rather premature to appoint representatives.

A letter was read from Mr. McCreery Hill, Honorary Secretary of the Irish Pharmaceutical Chemists' Association, thanking the Council for the permission which it had given to that association to hold its meetings in the Council room, and stating that it would always be the endeavour of the association to promote the interests and well being of the Society, and to secure for its licentiates the privileges granted to them by the Irish Pharmacy Act of 1875.

The President said that after the permission had been given letters addressed to the Irish Pharmaceutical Chemists' Association began to come to No. 11, Harcourt Street; in consequence of which he directed Mr. Ferrall to write to the Secretary of the association on the subject.

The Registrar read the letter which he had written, dated August 16, which pointed out that the leave granted to use the room for meeting in did not include a permission to the association to use No. 11, Harcourt Street as their official address and requested that that should be discontinued.

Mr. Wells produced a card of the Irish Pharmaceutical Chemists' Association summoning one of their meetings, and also a circular explaining their objects, on both of which the address "11, Harcourt Street," was printed. He had spoken on the subject to Mr. Hill, who at first thought there was an intention to slight the association involved in the objection to their using the address; but he (Mr. Wells) explained to him that if it were allowed to be continued the Registrar would be inundated with letters which it would be hard to distinguish from those intended for the Council.

Professor Tichborne: We agreed to lend them the room to meet in, but nothing else.

Mr. Hodgson said that to allow the association the use of the rooms as an official address for the transaction of all their business would be to do a thing which the Council had no right to do. He questioned the wisdom of granting the use of the room at all.

Professor Tichborne said he quite agreed with Mr. Hodgson.

The President said it was only right to mention that since this question had been raised he had received a letter from Mr. Hill, stating that the wishes of the Council respecting correspondence would be complied with, and that it would no longer be sent to 11, Harcourt Street.

The Registrar was directed to write to Mr. Hill stating that the permission given to the Association only extended to the use of the room for their meetings, *once* a month, and that the summonses should contain a statement that that was by permission of the Council of the Society.

A letter was received from Dr. I. W. Moore, Registrar of the King and Queen's College of Physicians, enclosing one from the Privy Council stating that the latter body declined to sanction the scheduling of carbolic acid as a poison.

Mr. Wells: Did we ask the College to take action?

The President: Yes, at a time when there had been several cases of poisoning by carbolic acid.

Mr. Wells: It is constantly given out to people by sanitary officers in England. I believe there have been more cases of accidental poisoning from it than from all the other poisons put together.

Mr. Hayes: It is not from druggists that people get it, but from the sanitary authorities.

Mr. Wells: We can only thank the College for their action, and express our regret that they were not successful.

Mr. Hodgson: And that our opinion on the subject is unchanged, as it is a very dangerous poison.

The Registrar was directed to write to Dr. J. W. Moore, thanking the College of Physicians for their action in the matter, and expressing the regret of the Council that the Privy Council had not seen their way to including carbolic acid in the schedule of poisons, as the opinion of the Pharmaceutical Society remained unchanged as to the necessity for it. A letter was read from Mr. Pring, tendering his resignation as a member of the Pharmaceutical Council.

The President: I am sure we all regret this. It would be a serious loss to the Society at this time to lose Mr. Pring.

Professor Tichborne: I propose that Mr. Pring be asked to reconsider his resignation. It has been almost invariably the custom of the Council to take this course in a case of the kind. We cannot afford to lose such a man as Mr. Pring. Although he was not a constant visitor, his great experience and the interest he always took in the Society, entitle him to the best consideration we can give him.

Mr. Hodgson said he fully endorsed what Professor Tichborne had said. Mr. Pring was one of the original members of the Society, and in its early history he knew the great services he was able to render to it.

On the motion of Professor Tichborne, seconded by Mr. Hodgson, the following resolution was passed:—

> "That the Council have received the letter containing Mr. Pring's resignation with great regret, and it is the unanimous wish of the Council that he may see his way to withdraw it."

The following letter, dated from Paris, was received from Mr. Greenwood Pim, Secretary of the Committee of Management of the College of Physicians and College of Surgeons Conjoint Examinations:—"Dear Sir,—Your favour of the 9th was sent here. In reply, I am to say that under the new regulations coming into force in October, the only certificates recognized in pharmacy will be from (A) duly recognized hospitals; (B) a recognized course of demonstration; and (C) service as assistant or apprentice to an apothecary. Hence certificates from licentiates, except as above, will not be accepted. I will have a copy of the regulations sent to you."

A copy of the regulations referred to in the above letter was also received.

The President read from the regulations the following passage :—"Every candidate is required before admission to the first professional examination to produce, with respect to practical pharmacy, (1) Evidence of attendance for three months in the compounding department of a clinical hospital, which hospital shall have satisfied the Committee of Management that its means of instruction are sufficient, and shall return to the Committee the names of its students at the comment of the course, together with the record of their attendances at its close; or (2) evidence of attendance on a course of practical pharmacy in a recognized medical school, the course to consist of not less than twenty demonstrations; or (3), evidence of having served a full apprenticeship of three years, or of having acted as paid assistant for not less than one year in the establishment of a licentiate apothecary, or of a *registered pharmaceutical chemist.*"

Mr. Beggs: That is not so bad as we were given to understand.

Mr. Wells: When I moved in the matter we were led to believe that our certificates would not be accepted.

Mr. Hodgson: Mr. Pim's letter excludes pharmaceutical chemists.

Mr. Wells said the printed regulation admitted evidence of apprenticeship to or service with a pharmaceutical chemist.

Mr. Hodgson said it would be desirable for the Registrar to write again to Mr. Pim, as his letter did not coincide with the printed regulation. It would be hard that the young men of that Society should be excluded from these examinations, when they could learn their business better in three months by service with a pharmaceutical chemist than they could in an hospital in twelve.

On the motion of Mr. Hodgson, seconded by Mr. Wells, the Registrar was instructed to write to Mr. Pim, calling his attention to the fact that his letter did not coincide with the printed regulations, the provision in favour of pharmaceutical chemists not being mentioned in the former.

Letters were read from Messrs. Clark and Gilbert enclosing certificates of practical pharmacy in lieu of documents which they had previously lodged.

The President: Should there not be a general rule requiring the students to send in copies of their original certificates along with the certificates themselves—so that when we had compared the one with the other we could keep the copies and send back the originals?

Mr. Wells said it would be better to keep the original documents in the first instance, and let the students afterwards send in copies when the originals could be returned.

Mr. Hayes said he did not see the use of keeping original documents.

Mr. Wells: A resolution was passed by the Council that we should keep the original certificates.

It was ordered that the original indenture and certificate sent by Messrs. Clark and Gilbert should be returned to them.

A letter was received from Messrs. Casey and Clay enclosing a detailed account of their charges in connection with the Pharmacy Bill of 1888. A cheque was ordered to be forwarded to Messrs. Casey and Clay.

A letter was received from the "Live-and-let-Live Association of Pharmaceutical Chemists," which had lately styled itself the "Liberal Pharmaceutical Association," representing that the Council had misapprehended the sense in which they had used the word "liberal" in their title, and renewing under their changed name their request to be allowed the use of the Council room for their meetings.

The President: Gentlemen, what is your wish as to this?

Mr. McCormack: I should be very much inclined to let them live outside.

Mr. Hayes: The simplest way is to say that the Council do not see their way to granting the request.

The Registrar was decided to write accordingly.

A letter from Mr. Downes on the subject of a question which he had raised as to the suspension of standing orders was read. The Registrar was directed to reply that his request could not be granted.

A letter was read from Mr. J. H. Henry, Cookstown, forwarding an Intermediate Education Board certificate of proficiency in certain subjects, with a request that the Council would accept it in lieu of the Preliminary examination.

Professor Tichborne: It will be for the Registrar to see that it includes all the subjects. With that proviso I move that the certificate be accepted.

Mr. Hayes seconded the motion, which was agreed to.

A letter was received from Mr. Hill complaining that certain licentiates whose admission as members of the Society he had seconded at the meeting of the Council preceding the last one, should have been renominated at the last meeting.

The President said there was a misunderstanding on Mr. Hill's part about this matter.

Mr. Wells said the regulations provided that members of the Society might be present at meetings of the Council, but could not "take any part in its proceedings." Therefore a member of the Society could not second the nomination of a licentiate for membership.

It was ordered that Mr. Hill should be referred to the regulations on the subject.

A letter was received from the editor of the *British and Colonial Druggist* calling attention to some inaccuracies in the calendar with respect to the addresses of members.

Professor Tichborne said they were obliged to the Editor for his kindness in the matter.

The Registrar was directed to write to the Editor of the journal named, thanking him for his information.

A report was read from the Law Committee which recommended a prosecution in a particular case.

Mr. Wells: We have got a number of new members and we should show them that we mean to do something for them.

The report was adopted.

On the motion of Mr. Wells, seconded by the Vice-President, the following gentlemen were elected members of the Society:—Mr. Robert Jones, L.P.S.I., Cavan, Mr. Thomas Dawson Tate, L.P.S.I., 33, Berkeley Road, Dublin, Mr. Henry Conyngham, L.P.S.I., 11, Upper Baggot Street, Dublin, Mr. John Isaac Bernard, L.P.S.I., Merrion House, Booterstown, Dublin, Mr. Thomas James English, L.P.S.I., 15, Rathgar Road, Dublin, Mr. Adam Rankine Gibson Clark, L.P.S.I., 89, Amiens Street, Dublin, Mr. John Edgar Connor, L.P.S.I., 79, Hill Street, Newry, Mr. George Brown, L.P.S.I., 20, Wexford Street, Dublin, Mr. John Nugent Harris, L.P.S.I., 3, Knox's Street, Sligo, Mr. Bernard J. Costello, L.P.S.I., 8, Christchurch Place, Dublin.

On the motion of Mr. Beggs, seconded by Mr. McCormack, Mr. Arthur Raynor, of Love Lane West, Dublin, was admitted a member of the Society.

On the motion of the President, seconded by the Vice-President, Mr. Joseph John Macaulay, of Hollywood, Belfast, was admitted a member of the Society.

On the motion of Mr. Wells, seconded by Mr. Hayes, Mr. Hugh Montgomery was nominated for membership.

On the motion of Mr. Wells, seconded by Professor Tichborne, Mr. Rudolph A. C. Burns was nominated for membership.

The Council then adjourned.

British Pharmaceutical Conference.

MEETING AT NEWCASTLE-UPON-TYNE.

The business of the twenty-sixth annual meeting of the British Pharmaceutical Conference commenced on Tuesday morning in the beautiful and commodious new building of the Durham College of Science, Barras Bridge, Newcastle-on-Tyne, Mr. C. Umney, F.I.C., F.C.S., President for the year, in the chair. There was a large attendance, a goodly number of ladies being present.

Welcome to the Conference.

Professor Garnett, Principal of the College, commenced the proceedings by welcoming the Conference in the name of the President and Council of the Durham College of Science. He said that in the erection of that structure it had been the hope of the College Council and Governors that it should prove to be a centre from which literary and scientific education might radiate over the north of England and a home towards which the literary and scientific institutions of the district might naturally converge. In that hope they had not been disappointed, for during the short time that that building had been in existence it had been used by a large number of the scientific societies of the town. The Pharmaceutical Conference had already done much valuable work, but there still remained much for it to do, especially in the direction of systematizing the scientific education of candidates for the position of pharmaceutical chemist. The President had conferred upon science and on his profession, by his researches into the chemistry of drugs, such benefits, that if this meeting were the means of inducing some few others to follow in his steps, the College authorities would feel they had done really valuable work in inviting the Conference to assemble in the premises. Professor Garnett then gave a brief *résumé* of the history of the College of Science, which was formed eighteen years ago, but which had only recently been able to secure ground and buildings of its own, the latter being at present still far from complete, though thoroughly so in the departments of chemistry and physics, and there being also a building which was largely used for technical classes for the museum and fine art department, and which was also used by the North of England Pharmaceutical Association. The members of the Conference would be welcome to inspect the building and arrangements of the College, and in conclusion he repeated the welcome he had offered in the first instance to the Conference.

Mr. W. H. Martin, Vice-President, having thanked Professor Garnett for the interest and kind courtesy which he had always shown in and towards pharmacists, and the facilities he had placed at their disposal on all occasions, welcomed the Conference to Newcastle, on behalf and in the name of the pharmacists of the North of England. Newcastle was its old home, and though some present visited the town for the first time they were happy in bringing with them three of the fathers of the Conference. He referred to him in whose brain first sprang the germ of the idea of an annual conference, Mr. Schacht; to him who some few years afterwards gave it practical shape, Mr. Reynolds; and thirdly, to him in whose enthusiasm the germ came to life, and the Conference was born in Newcastle, Mr. Brady. All these were still with them, but in twenty-six years it was inevitable that some gaps would occur, and he might be excused for alluding especially to the first President, Henry Deane, who perhaps did more to make the Conference a success, from the pharmaceutical point of view, than any other man. In conclusion he desired to say that the whole of the pharmacists of the district had worked heartily with the Executive in making preparations for the Conference, and he hoped that though the arrangements might have some imperfections they would be on the whole satisfactory, and that the visit to Newcastle would prove a great success.

Reception of Delegates.

Dr. Thresh (Honorary Secretary) then read the following list of delegates who had been appointed to attend the Conference on behalf of various Associations.

Pharmaceutical Society of Great Britain:—The President, Vice-President, Treasurer, Messrs. Allen, Atkins, Cross, Gostling, Leigh, Martindale, Newsholme, Schacht, Watt, and the Editor, Sub-Editor, and Secretary.

Pharmaceutical Society of Great Britain (North British Branch):—Messrs. W. Gilmonr, D. B. Dott, Kinninmont, Maben, Nesbit, and J. Mackenzie.

Pharmaceutical Society of Ireland:—Messrs. G. D. Beggs and W. F. Wells, jun.

Aberdeen and North of Scotland Society of Chemists and Druggists:—Messrs. Broomhead, Giles, Johnston, Kay, and Paterson.

Birmingham and Midland Counties Chemists' Association:—Mr. Thomas Barclay.

Brighton Association of Pharmacy:—Messrs. Marshall Leigh and W. D. Savage.

Dundee Chemists' Association.—Messrs. Anderson, Kerr and Russell.

Hull Chemists' Association:—Messrs. C. B. Bell and W. H. Hammond.

Leeds Chemists' Association:—Messrs. F. W. Branson, P. Jefferson, R. Reynolds, Ward and Worfolk.

Leicester and Leicestershire Chemists' Association:—Mr. J. W. Clark.

Liverpool Chemists' Association:—Messrs. A. N. Samuel, A. C. Abraham, John Bain, M. Conroy, C. Symes and W. Wellings.

London Chemists' Assistants' Association:—Messrs. T. A. Ellwood, E. J. Millard, E. Richards and C. J. Strother.

Manchester Chemists' Association:—Messrs. T. B. Benger and G. S. Woolley.

Sunderland Chemists' Association:—Messrs. Askew, Fowler, Harrison, Mitchinson, Ranken, Todd and Turnbull.

Letters of apology and regret at not being able to be present had been received from Professor Bentley, Professor Attfield and Messrs. Bottle, Symes, Brunker (Dublin), T. Greenish, Stephenson, Davies (London), Wylie, C. Thomson, John Moss and Thomas Tyrer.

Report of the Executive.

Mr. Naylor (Hon. Sec.) next read the Report of the Executive Committee, as follows:—

Report of the Executive Committee.

Your Committee in presenting a summary of the business it has transacted during the year, is glad to be able to report that the numerical strength of the Conference has been more than maintained, and that there are not wanting signs of increased activity.

The results of the biennial whip issued two years ago having fallen short of the success it was expected to achieve, your Committee deemed it advisable to try some other mode of appeal. After much deliberation it was agreed that the best form the appeal could take would be that in which the personal element was prominent. It was ultimately resolved that the Honorary Secretaries should address, in due course, a communication to the Secretaries of the various Local Associations to which Year-Books are annually sent, requesting their co-operation in obtaining additional members. This resolution will be carried into effect at an early date, when it is hoped it will elicit a hearty and general response. In this connexion it may be usefully pointed out that the principle involved in this tentative scheme is not new, but one that commands only a too limited practice. Its application in the direction of securing nominations for membership is commended to every member of the Conference. It is a pleasure to your Committee to supplement the announcement made last year of the resignation of Mr. A. H. Mason, F.C.S., as Honorary Secretary for Canada, by the further statement that Mr. Joseph Bemrose, F.C.S., of Montreal, Canada, has consented to act as his successor.

In order to assist willing workers in the choice of suitable subjects requiring investigation, the familiar Blue List has been subjected to a painstaking and extensive revision. It is gratifying to find that of the papers to be read at this meeting a not unimportant proportion afford proof of the indebtedness of the authors to the suggestions therein contained. That the number is not larger may be reasonably attributed to the shortness of the interval between its issue and the present gathering.

The absence during the year of any application for a money grant in aid of research is a subject of regret. Your Committee would improve the occasion by reminding capable contributors of its readiness to provide funds to assist in defraying the cost of materials connected with the conduct of original researches suitable for reports to Conference.

The Committee of the Unofficial Formulary has, through its Chairman, reported to the Executive Committee that the work it has in hand has not reached a sufficiently advanced stage to justify a recommendation for its publication this year.

The Honorary Treasurer of the Conference, with the sanction of your Committee, has effected a change in the consols of the Bell and Hill Fund, a step necessitated by the conversion scheme of the Government.

Mr. Louis Siebold, F.I.C., F.C.S., was last December reappointed Editor of the 'Year-Book.' The manuscript of Parts I., II., III. and IV. of the 1889 volume is now in the hands of the printers.

It is the painful duty of your Committee to report officially the death of Mr. John Williams. Five years ago he honoured our Association by his occupancy of the Presidential chair, and for three consecutive years he filled the office of President of the Pharmaceutical Society of Great Britain. To the latter body and the Conference he was a liberal contributor. Mr. Williams in his career supplied added proof of the possibility of a practical pharmacist being also a sound chemist. He was possessed of a kindliness of disposition, the depth of which only those could form an approximate estimate whose privilege it was to know him intimately, whilst he was also unobtrusively generous, a characteristic which induced him to impart freely knowledge which had taken him long years of patient toil to acquire.

The number of Notes and Papers which have been received for this meeting is larger than in any previous year since 1885. From the standpoints of usefulness and suitability they fulfil in an admirable degree the scientific requirements of the Conference. Among the contributors are to be found old friends whose productions are ever welcome, and these will join heartily in the congratulation due to the fact that several of the papers represent maiden presentations to the Conference, a circumstance which augurs well for its future.

The Reception last evening by the President and officers of the Conference and the Conversazione which followed may be pronounced not only a well-deserved but a brilliant success.

Your Committee cannot conclude its Report without a reference to the loss the Conference is about to sustain in the departure of its late senior honorary secretary to Melbourne, to undertake the responsible duties of Lecturer on Chemistry and Materia Medica in the College of Pharmacy, Melbourne, and Demonstrator of Pharmacy to the University of Melbourne. It congratulates Mr. Plowman on his appointment and elevation, and is assured that the best wishes of every member of this Conference will accompany him to his new sphere of labour. It also feels, in wishing him health and success, that he will do much by his presence and personal endeavour towards strengthening the attachment to this Conference of our fellow members in Victoria, which he successfully initiated five years ago.

FINANCIAL STATEMENT.

Mr. MARTINDALE (Hon. Treasurer) read the following Financial Statement:—

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1889.

THE HON. TREASURER IN ACCOUNT WITH THE BRITISH PHARMACEUTICAL CONFERENCE.

July 1, 1888. *Dr.*	£	s.	d.	£	s.	d.
To Assets forward from last year—						
„ Balance in hand at Bank				105	0	3
„ Cash in Secretary's hands				2	9	6
„ Messrs. Churchill's Account				154	0	11
June 30, 1889.						
To Sale of Year-Book by Publishers				18	13	4
„ Advertisements, 1888 volume	107	7	11			
„ „ 1887 „	1	16	0			
				109	3	11
„ Members' Subscriptions, Amount received for year ending July 1, 1888, to June 30, 1889				538	10	4
„ Index to Year-Book, sale by Secretary				1	10	0
„ Outstanding Liabilities, Messrs. McCorquodale and Co.				6	17	9
„ Unofficial Formulary, sale by Publishers				30	12	0
				£966	18	0

June 30, 1889. *Cr.*	£	s.	d.	£	s.	d.
By Expenses connected with Year-Book:—						
Printing, Binding, Publishing, etc.	280	6	9			
Postages and Distribution	24	8	9			
Advertising and Publishers' charges	30	13	0			
Editor's Salary	150	0	0			
Foreign Journals for Editor	5	15	6			
				491	4	0
„ Unofficial Formulary:—						
Printing and Binding	16	12	0			
Advertising and Postage	7	6	6			
Publisher's Commission	3	1	0			
				26	19	6
„ Sundry Expenses:—						
Grant to Formulary Committee	10	0	0			
Expenses of Assist. Sec. at Bath	10	0	0			
				20	0	0
„ Assist. Sec.'s Salary from July 1, 1888, to June 30, 1889	40	0	0			
„ Rent of Office	10	0	0			
				50	0	0
„ Blue Lists	3	16	6			
Postages of	3	4	0			
				7	0	6
„ Postages				25	11	2
„ Printing and Stationery, from July 1, 1888, to June 30. 1889				14	18	9
„ Bank Charges, as per Bank Book				1	5	11
„ Petty Cash				5	2	9
„ Liabilities of last year, since paid—						
Messrs. Butler and Tanner	131	11	4			
„ McCorquodale and Co.	7	6	6			
				138	17	10
„ Outstanding Assets—Messrs. Churchill's Account				117	8	9
„ Balance at Bank	64	17	3			
„ Balance in Secretary's hands	*3	11	7			
				68	8	10
				£966	18	0

* For Postages, £1 4s. 10d.; Petty Cash, £2 6s. 9d.

THE BELL AND HILLS FUND.

			£ s. d.	£ s. d.
1888.				
July 1.	Balance in hand		21 1 4	
Aug. 9.	Dividend on Consols, £350, due July 6, 1888 . . .		5 2 5	
1889.				
Jan. 14.	” ” ” July 6, 1889 . . .		5 2 5	
May 15.	” ” ” May 15, 1889 . .		4 11 0	
1888.				35 17 2
Aug. 31.	By Purchase of Books from Kimpton for Bath . .		10 12 6	
1889.				
May 15.	To Sale of £350 3 per Cent. Consols . .	350 0 0		
May 29.	By Purchase of 2¾ per Cent. Consols . .	357 15 6		
	By Difference on Purchase		7 15 6	
				18 8 0
	Balance			£17 9 2
	Assets—			
	Cash—Balance at Bank			17 9 2
	Consols			360 0 0

Audited and found correct. Security (Consols, £360) viewed.

J. WILSON, 11, George Street, Bath, } *Auditors.*
T. RHEEDER, Newcastle-on-Tyne. }

Mr. RHEEDER (Newcastle), one of the auditors, having testified to the correctness of the accounts and to the securities being all in order,

The PRESIDENT moved that the report of the Executive and the Balance Sheet be received and adopted.

Mr. C. B. ALLEN seconded the motion, which was at once agreed to.

The PRESIDENT then delivered the following address:—

THE PRESIDENT'S ADDRESS.

It was at Newcastle after the meeting of the British Association in 1863 that a few leading pharmacists met with the object of inaugurating an annual Pharmaceutical Conference.

At this first meeting the desirability of having at intervals an opportunity of conferring upon matters of interest and importance to pharmacists was shown, and it was thought that a stimulus to intellectual exertion would be given by the prospect of periodical gatherings, and that many who had time and opportunity for research would be induced to contribute papers, while the majority when associated would look forward to an annual gathering as an opportunity of good fellowship.

We are indebted to Schacht for the idea of our annual Conference; to Attfield, Brady and Reynolds for our excellent organization, and to the indefatigable Secretaries for the success of our annual meetings through a series of years.

Reference to the list of members who have been called to the Presidential chair reminds me not only of the honour you have done me in electing me to this office, but fills me with misgivings lest I should unworthily occupy the post which has been so ably filled by my predecessors.

It is to be regretted that death removed some of our Presidents while capable of active work, but gratifying to know that their labours live after them, and that their published researches are ornamental to our 'Year-Books of Pharmacy,' and of great practical value to medicine and commerce.

Presidents Deane, Hanbury, Stoddart, Southall and Williams took the greatest interest in this Conference, and other Presidents who are happily among us to-day, as well as those that are absent, are still in sympathy with this Association and its objects.

We who have seen the "blue ribbon" that it is customary for the Royal Society to confer on workers in science, given to some of our past Presidents, have reason to feel proud of the distinction conferred upon pharmacy through them.

Your late President, when speaking at Bath of the "silver wedding" of the Conference, had a most felicitous topic. I am fortunate in having what should prove an attractive occasion, one indeed which should enlist an enthusiasm equal to that of last year's meeting, arising out of the fact that it was in this very town twenty-six years ago that the British Pharmaceutical Conference had its birth.

> "Breathes there the man, with soul so dead,
> Who never to himself hath said,
> This is my own, my native land!"

The Conference as you are aware has met in many important cities and towns in England, Scotland and Ireland, and on this occasion we are responding to an invitation given twenty-six years ago, when Brady expressed his satisfaction that Newcastle had had the privilege of receiving the first meeting of the Conference, and promised a hearty welcome whenever its members were again disposed to visit his town.

Those good friends I see around me to-day evidently had not forgotten the past, and thus it was that at Bath their colleagues said, "that the heart of Newcastle beat with parental affection to the Conference," and, as if to remind us of the geographical position of their town, and to entice our North British friends to come over the border, they said—

> "Better loved ye canna be
> Will ye no come back again?"

The subjects upon which my predecessors have addressed you have been most varied. Some Presidents reviewed researches in those sciences having a direct bearing upon pharmacy which had been published during their year of office; others spoke to you upon pharmaceutical ethics and politics; some upon revision of the British Pharmacopœia; while others directed your attention to the study of some particular science upon which they spoke as experts.

In casting about for a topic upon which I might address you, I came to the conclusion that one of the articles of association of the British Pharmaceutical Conference agreed to in this town in 1863, viz., "*That one object of the Association should be to maintain uncompromisingly the principle of purity of medicine,*" would not be an inappropriate theme on which one might say something concerning our every day life that would lead to fresh lines of thought, and such a modelling of our ideas and actions that might tend to make us more accomplished pharmacists and not less successful men of business.

In the days when sophistication was rampant there were to be found a few at any rate who prized the judicious selection of substances for use in medicine. That the choice was not always used and approved by the physician is shown by the history of the conflicts between physician and apothecary as far back as the reign of Henry VIII., when physicians were empowered to "search, view and see the apothecaries wares, drugs and stuffs," and to destroy such as they found unfit for use. This power eventually passed from the hands of the physicians to the Society of Apothecaries, who separated themselves from the grocers with whom they were by charter incorporated, and against whom they made bitter complaints on account of the frauds that the latter would persist in practising.

To remedy this evil, in the year 1623 the Society of Apothecaries founded an institution for the purpose of making some of the most important preparations for the use of their own members, and although at first operations were on a small scale, being confined to the manufacture of a limited number of preparations, their products were gradually increased both in number and quantity, and eventually we find two centuries later this institution in the foremost rank as producers of medicines of a high standard of purity.

The medicinal compounds in vogue in the seventeenth century were chiefly empirical nostrums or mixtures of substances, some of which neutralized others, and compounding prescriptions and manufacturing medicines was carried on without any reference to scientific principles. While it is true that prior to the organization of the Society of Apothecaries, two editions of the London Pharmacopœia were published, still the science of chemistry had so little advanced that it was not until about the time of the tenth edition of the London Pharmacopœia that there was any real knowledge of manufacturing pharmacy.

The signs of the times were not without their lesson to some keen business men in the early part of this century; for it became obvious that traffic in drugs, whether in the condition as imported, powdered, or manufactured into galenicals, might in the future be more successfully carried on by due regard being paid to purity.

There was a new departure, and London wholesale druggists were not handicapped in their start, for their city was the drug market of the world, and the importation and sale of raw drugs had given them great experience and pecuniary profit. The dissatisfaction of the compounders of medicines no doubt gave rise to this new departure, for the continued complaints of the physician made them aware that for anything other than crude or garbled drugs, but little reliance could be placed in the wholesale druggist, and thus it was, notwithstanding mechanical applicances were vastly improved for pulverization and other processes, the dispenser had to produce his powders by pestle and mortar if the physician's prescriptions were to be reliably dispensed.

Now in those days it was the practice of the wholesale druggist to send his drugs to a drug miller, who, it is to be regretted, was not so scrupulous of the purity of his products as are the firms who carry on similar businesses to-day, and it is certain, moreover, that the wholesale druggist set a bad example to the miller, for it was not an uncommon practice (as I was once informed by a wholesale druggist who was in business at the end of last century) to send comparatively inert substances to the mill to be ground and mixed with potent drugs.

Early in this century guaranteed powdered drugs were introduced in trade by Thomas Herring, who claimed that his soft, impalpable, bright looking vegetable powders were as pure as the unsightly powders that compounders were then producing for themselves by pestle and mortar.

Others followed upon parallel lines with marked success, and the good example of several well-disposed men, striving for excellence, was one of the important steps which have been instrumental in producing the purity, uniformity and perfection so generally to be met with in the powdered drugs of to-day.

Compounded medicines at this period consisted largely of galenicals; and notwithstanding chemical substances were used in medicine, their preparation was imperfectly understood.

Chemical science, it is true, had already started on its triumphant march, for Phillips, when reviewing the Pharmacopœia of his time, wrote most ably thirty pages upon the preparations of antimony.

Tricks were resorted to in the adulteration of simple chemical substances which leave but little doubt that notwithstanding there was a want of chemical knowledge and manipulative skill, there was no lack of deliberate intention to defraud.

The success attendant upon the production of pure powdered drugs was an incentive to some of our historic houses, and it came about that not only were chemical substances prepared with due regard to their medicinal purity on a larger scale than heretofore, but organic novelties such as quinine, morphia, strychnia, which were now finding uses in medicine, were produced on a manufacturing scale of a purity, which, considering the chemical knowledge of the manipulators, was highly creditable.

For half a century prior to our first Conference a gradual but steady advance in the direction of purity for medicinal substances was made, and the pharmacists of 1863 did not fail to take cognizance of this; moreover, they saw that the sphere of their labours was being constantly enlarged, and if pharmacy in the future was in any way to be a credit then their work as chemists and pharmacologists must be unceasing.

Since the first Newcastle meeting the rival pharmacopœias of London, Edinburgh and Dublin have been fused into a national pharmacopœia. This has been advantageous in helping forward and maintaining uniformity and purity in medicine. Those of us who have been in harness during the publication and use of three or four pharmacopœias know the effect a well-revised edition has upon the commercial standard of crude and manufactured drugs. The British Pharmacopœia, 1885, is an excellent type of what such a book should be, for it adopts a standard that ensures efficiency, and does not attempt to introduce rare and exceptional quality that is only occasionally obtainable to the exclusion of that which is to be had of uniform excellence without difficulty.

There is perhaps no work upon which an expert has to use his judgment with so much tact and skill, so that he may keep both in touch and tune with the medical profession, the pharmacist, the drug merchant and manufacturer, as when he is called upon to edit a national pharmacopœia. He may be misled by statements based on imperfect information, or defective manipulation, and he cannot in all cases obtain facilities for checking the accuracy of published results. The suitable editing of a pharmacopœia becomes apparent when the Editor, knowing the requirements of the medical profession and the capabilities of pharmacists and manufacturers, adopts standards and frames "characters and tests" which are acceptable to all concerned, and this without in any degree imperilling that principle which this Association has at heart, viz., to maintain without compromise the purity of medicine.

Pharmacists should do all in their power not only when in their own business premises, but also in their public and private capacities, etc., to impress upon the public that household remedies should invariably be purchased of a similar strength and quality to those medicines physicians direct to be used in compounding their prescriptions.

If pharmacists would thus aid in educating the public they would rid themselves of much outside competition in which weaker and inferior preparations are sold in lieu of the preparations of a higher standard vended by themselves; and this might be done quite apart from the question as to whether, legally, it is compulsory to retail British Pharmacopœia preparations or not.

Is it not also desirable that pharmacists should cooperate with the Medical Council in their desire to make the British Pharmacopœia preparations legal for sale, and those of old Pharmacopœias obsolete and illegal? In my opinion it is most desirable.

The Sale of Food and Drugs Act has materially aided in maintaining and advancing purity in medicine.

As a rule it is a thankless and almost hopeless task to make communities good by Act of Parliament, and oftentimes the striving of the few will act more beneficially as an incentive to the attainment of a higher standard than any coercion that can be devised. There is a residuum nevertheless holding either different or no definite views that prefers not to take action unless under compulsion.

This must have been true in reference to traffic in medicines in the past, or "Drugs" would not have been tacked on to the Sale of Food Act, and our business signalled out as one in which it was necessary that supervision should be exercised for the public good.

The working of this Act, in so far as it concerns the drug trade, has not been without friction, due in many cases to the imperfect knowledge of officials, but the novelty now having passed away and the superabundant zeal toned down to a reasonable pitch, only those cases are heard of which indicate fraud on the public. One often wonders when one reads of the number of samples of drugs that have been purchased for chemical examination, most of which seem to turn out satisfactorily judging from the absence of prosecutions, whether in all districts the analysts are so conversant with the characters and tests and commerce of drugs as to enable them to efficiently test substances submitted to them, or to advise the authorities when prosecutions should be unflinchingly carried out or not instituted.

The highly trained pharmacist has neither sought or obtained the post of Public Analyst in anything like the number of instances he should have done.

It may be that, notwithstanding his acquaintance with pharmacy, he lacks chemical and microscopical skill. If this be so, more complete instruction should be given in these subjects, and students should give themselves up to systematic instruction for a period of two or three years at least, otherwise they cannot expect to become competent to fill the post of Public Analyst. Possibly the clause in the Sale of Food and Drugs Act which provides that no person shall be appointed as analyst for any place who shall be engaged directly or indirectly in any trade or business connected with the sale of food or drugs in such place has prevented pharmacists from seeking the appointment, obviously they are at a disadvantage as compared with professional men under this regulation.

Surely there cannot be two opinions upon the desirability of impressing the public that the trained pharmacist is not on the same dead level as the traders with whom he is surrounded, and with whom in selling simple commodities he has unfortunately to compete.

Could any better indication of the superiority of his training, and a fitness for the confidence of the public be found than his appointment as Public Analyst?

The public is not slow in taking note, and would not fail to observe that similar appointments were held by medical practitioners, and such observation would in due course necessarily tend to the better recognition of the pharmacist as an educated man, for whose superior knowledge even in trading it would rather pay an extra fee, as compared with the drug grocer who had no information to part with.

It is none the less true now than it was at the commencement of this century, that in order to guarantee one's manufactures there is nothing compared with the simplicity of producing them for oneself.

The regulations with which the Excise have surrounded our manufactures, and which are unequalled in number and stringency in any country in Europe, have been thought necessary in the past in order that the duty upon alcohol may the more easily and accurately be collected. This impost has produced a depressing effect upon the manufacturing pharmacy of this country, which cannot have advanced either the purity of medicine, or our position commercially.

For England to have been compelled to purchase in the markets of Germany her alcoholic medicinal preparations, which the exigencies of her trade required should be exported in bond to her colonies and elsewhere, was most humiliating. We were more to blame than those who continued this part of our fiscal system, inasmuch as we submitted to the yoke for years without complaining or moving in our own interest, and, as a matter of fact, until recently the authorities were not aware that the manufacturer of medicines had any grievances to be redressed.

Happily, within the past year, on account of the broader views prevailing, and the interest taken in our work by the practical men at the head of the Inland Revenue department, there has been an amendment, and the Excise regulations which so trammelled us in the past have now to some extent been removed, and at last there is an opportunity of producing most of our alcoholic medicinal preparations, with permission to export them under suitable drawbacks. These concessions will be of commercial value, and the manufacturing pharmacist will have an opportunity in the future of guaranteeing that his products are what they profess to be, and the standard of purity in medicine will thereby be legitimately maintained and advanced.

The Board of Inland Revenue has taken a good work in hand and it must not look back.

England produces chloroform, ether and other substances from alcohol without opportunity of competing with Germany and other countries, for the Excise take no account of the heavy pecuniary loss entailed in manufacturing such liquids from duty-paid alcohol, and give no rebate either for loss, or for duty, to the manufacturer on exportation.

Why England should be driven to Germany and elsewhere for so many of its alcohol derivatives, of which hydrate of chloral is an excellent type, and why alkaloids, as atropine, veratrine, aconitine, and a legion of other preparations should be imported to the detriment of our trade, and the demoralization of our rising chemists and pharmacists as manufacturers I cannot conceive.

In my opinion, alcohol free of duty for medicinal purposes, or some facility to work with pure alcohol under supervision, is a most serious and urgent necessity. We are surely all desirous that we may not continue mere purveyors of potent remedies, but that we may be producers also, with a complete knowledge of the products we handle, whether as dispensers or traders.

There should be no attempt in the direction of obtaining concessions from the Inland Revenue that are impracticable. The department has recently shown a desire to aid rather than to hamper our manufactures, and there must not now be permitted, even if it should be wished, any lethargy or retrograde movement. Did not Germany for years take tea (valueless for dietetic purposes) out of our bonded warehouses without paying duty, and extract caffeine therefrom, selling it to the world, England included? and has it not been from recent concessions of our Customs authorities that we (thanks to the agitation of a shrewd business man) are now in a position to manufacture caffeine as advantageously as our continental opponents?

The late President of the Chemical Section of the British Association referred at the Bath meeting to the decline of chemistry in this country. While I am not in a position to give an opinion on this subject, as a whole, I fully concur in Professor Tilden's views in so far as the study of chemistry and its application to the manufacture of substances for use in medicine is concerned.

If one seeks the reason why in medicine this has come about, when a generation ago England was quite abreast of other nations in the production of inorganic and even organic medicinal substances, one can only come to the conclusion that something must have militated against advancement.

In my opinion two causes at least have been at work, viz., the stringent regulations with which we have been hemmed in by the Excise and the meagre opportunities of education in research that have, up to a very recent date, been afforded in this country.

Our historic drug houses, who have always acted more or less as manufacturers, have, much to their own detriment, neglected research. Each establishment should have had its chemist engaged in the chemical examination of new remedies for the discovery of active principles, etc., which must have tended to have kept us out of the arms of foreigners for most of our alkaloids and other organic substances now in such increasing demand in medicine.

Manufacturers may state that had men educated for such purposes been forthcoming, they would have gladly embarked capital, with the objects of research and manufacture in view, rather than have remained apathetic; and to some extent this is true. In the future, however, such an excuse ought not to hold good, inasmuch as the Pharmaceutical Society has at a considerable cost equipped a research laboratory, which should before this century closes produce many men competent to undertake research and manufacture.

There should be no lack of students in the Society's research laboratory; applications should outnumber vacancies, and men when trained need have but little fear of a demand for their skilled labour.

The Pharmaceutical Society has not unlimited funds, and its moneys cannot all be spent to aid research, but "ways and means" would be no barrier if men were forthcoming.

Let this laboratory be in such demand that there be no vacancies, and the research of such a nature as to be of benefit to medicine and pharmacy, and I have but little doubt that the good friends who honour us by delivering annual addresses to our students, and who hold positions in the House of Commons, our universities and elsewhere, would co-operate to obtain pecuniary aid in furtherance of our object, and it is not at all likely that our rich city companies, who do so much for education, endow scholarships and vote funds for special researches connected with medicine and surgery would stand aloof.

One would imagine, if one did not know to the contrary, that we were all agreed upon the desirability of a good scholastic and scientific education, backed by business training for those who practise pharmacy. In my opinion no simpler method can be devised in aiding pharmacists as a body to maintain the excellent principles of this Association, as this thorough training, accompanied by the higher education of some in its ranks in research.

It is quite certain that the pioneers of the British Pharmaceutical Conference had not two opinions on this point, and while it is true that few of the black clouds which threaten us as a trade to-day had gathered in their time, still the path is now, as then, in the direction of education, and I hold that our juniors must have every facility for such a training and thorough education in all those sciences having a direct bearing on pharmacy, as will enable them to take up their proper position with the medical profession and the public.

It was not required of the men who met at Newcastle, in 1863, that they should prove their qualification by the possession of the Pharmaceutical Society's diploma. In those days there were no compulsory examinations, as you are aware.

Examinations are not an unmixed blessing, subject as they are to no inconsiderable abuse, and the craze to pass examinations against time has created a state of things which may in the end prove anything but a boon to the pharmaceutical body of the future. It is to be feared that if the students of to-day were asked why they studied, that by far the larger proportion would be bound to acknowledge that they were only occupied in cramming into themselves in the most rapid and easy fashion the minimum amount of information that would help them to pass their examinations.

One cannot help regretfully remarking upon this abuse of education, and the failure of the majority to thirst after knowledge for its own sake.

When one reminds the average modern student that "knowledge is power," he seems sceptical, and often replies that the information obtained in pharmacy is much too narrow in its scope to lead to reward, and he invariably treats with indifference statements that may be made in reference to the influence that applied chemical and botanical knowledge has upon the world's commerce. He fails to grasp the lessons that are to be found on all sides, and only the thoughtful few are impressed when one gives palpable examples, with the object of proving the marvellous effect science has upon commerce.

The pharmacists of Newcastle can point with sorrow to a vast industry of the Tyne which has been partially dislodged and well nigh ruined, solely as a result of applied chemical knowledge. I refer to the manufacture of alkali by the Leblanc method and its present production by the ammonia process.

Since the time also when the Conference held its first meeting in this town, and at which period our supplies of cinchona were drawn almost wholly from the South American Continent, what a change has come about.

Who could have thought when botanists and planters experimented in Ceylon, the Nilgiris and Java, that in less than one short generation we, who at one time contemplated a cinchona famine, should now be constantly heard to say, "Hold—enough?"

Are not these good illustrations of the working of science? Examples might be multiplied and men named to show that the able pharmacologist can leave footprints that extend not only to medicine, but also to commerce.

Did not Daniel Hanbury make an indelible mark? Those who knew this past President of our Association are aware that 'Pharmacographia,' compiled, as it was, after years of laborious research (looked upon as a labour of love), has been not only a boon and a guide to students of materia medica, but a material help to those who grow, collect, ship or import drugs; few publications have done more to aid that one object of this Association, viz., the maintenance of the purity of medicine, than this work of Hanbury and Flückiger.

I regret my inability to address you upon topics with which you as dispensers of medicine are more immediately concerned; but as several of my predecessors have done this most ably, and as I from the nature of my business am only imperfectly acquainted with this aspect of pharmacy, I trust that this reference will be accepted as an apology for not having followed the beaten track.

I have passed in rapid review a few of the leading features connected with the purity of medicine during this century, and in my divergence to matters connected with or around the subject I have endeavoured to show what has been done spontaneously, and under coercion, and from force of good example, together with the commercial results of applied botanical and chemical knowledge.

Nothwithstanding the divergence of the various paths over which pharmacy has been trodden during the last three quarters of a century, most of the roads have finally led to one goal, around which there is one of the fairest portions specially and attractively laid out for the maintenance of the purity of medicine. We who are assembled on this pleasant and reputable spot to-day have gained more speedy access than we should otherwise have done, had not steps on easy paths been thoughtfully hewn for us.

Let us not "rest and be thankful" for the small advance we have made, but rather use our position as a ledge upon which we may firmly plant ourselves, with a determination to advance to heights which, without our present vantage ground, would have been inaccessible, and may we zealously toil to so maintain and advance pharmacy as to be worthy of those who at Newcastle twenty-six years ago founded the British Pharmaceutical Conference.

Mr. ATKINS (Salisbury) proposed a cordial vote of thanks to the President for the admirable, thoughtful and instructive address he had delivered. It was highly important on the historic occasion of the revisit to Newcastle that there should be a President worthy of the occasion, and though he could have said more on this point in the absence of Mr. Umney, he might say that he regarded him as a typical, ideal pharmacist; a man who had a broad sweep of his subject, with a good knowledge of detail; a chemist, a pharmacist, a man of business, and a man of boundless energy; and possessing these qualities he need not say how confident all who knew the history of the Conference were, that its traditions would be safe in his hands. As an early student of the Pharmaceutical Society Mr. Umney had done work in its laboratories, museums, evening meetings, and literature, which had been of the greatest value, and coming to the practical side of life, in that direction also they were much indebted to him. In the concessions obtained from the Inland Revenue for the use of spirit for export he had done great service; and also in the Drug Committee of the London Chamber of Commerce with reference to the new Railway Rates Bill. With reference to the address itself, and the variety of topics which it treated, the thoughtful *résumé* of the past and the investigation of the present aspect of science, education, and commerce, he thought they could not do better than thoughtfully peruse it and well weigh its suggestions. To the young men who were so largely represented that morning it would be an incentive to follow in the steps laid down, and to the seniors it would be a subject of constant refreshment in perusal.

Mr. T. M. Clague esteemed it a great honour to be allowed as Local Secretary to second the proposition. As practical north countrymen they were all very glad to have just the very man they wanted for President. Although a chemist of very considerable ability and a pharmacist who had laid them under great obligations, Mr. Umney was also a first rate man of business, and the assistance he had given to the manufacturers of pharmaceuticals in the matter to which a brief reference was made in the address—only leaving his own efforts out of sight—was of great value. He had recently come across a curious and interesting fact. As they had already heard, the Conference was established in Newcastle in the year 1863, and he found that in the same year Michael Carteighe and Charles Umney were bracketted together as prizemen at Bloomsbury Square. Since then, Mr. Umney had never slackened rein, but had gone on from year to year doing good work in pharmacy. All north countrymen were glad to see him in the Presidential chair, and to thank him for the earnest, practical, and sensible address with which he had inaugurated the session.

Mr. Brady as Senior Vice-President put the motion, which was carried by acclamation.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-EIGHTH ANNUAL MEETING.

The fifty-eighth annual meeting of the above Association commenced on Wednesday, September 11, at Newcastle-upon-Tyne, under the presidency of Professor W. H. Flower, C.B., LL.D., F.R.S., F.R.C.S., Pres.Z.S., F.L.S., F.G.S.

The President's Address.

It is twenty-six years since this Association met in Newcastle-upon-Tyne. It had then the advantage of being presided over by one of the most distinguished and popular of your fellow-townsmen.

Considering the age usually attained by those upon whom the honour of the presidency falls, and the length of time which elapses before the Association repeats its visit, it must have rarely happened that any one who has held the office is spared, not only to be present at another meeting in the town in which he has presided, but also to take such an active part in securing its success, and to extend such a hospitable welcome to his successor, as Lord Armstrong has done upon the present occasion.

The address which was delivered at that meeting must have been full of interest to the great majority of those present. It treated of many subjects more or less familiar and important to the dwellers in this part of the world, and it treated them with the hand of a master, a combination which always secures the attention of an audience.

When it came to my knowledge that in the selection of the President for this meeting the choice had fallen upon me, I was filled with apprehension. There was nothing in my previous occupations or studies from which I felt that I could evolve anything in special sympathy with what is universally recognized as the prevailing genius of this district. I was, however, somewhat reassured when reminded that in the regular rotation by which the equal representation in the presidential office of the different branches of science included in the Association is secured, the turn had come round for some one connected with biological subjects to occupy the chair, which during the past seven years has been filled with such distinction by engineers, chemists, physicists, mathematicians, and geologists. I was also reminded that the Association, though of necessity holding its meeting in some definite locality, was by no means local in its character, but that its sphere was co-extensive, not with the United Kingdom only, but with the whole of the British Dominions, and that our proceedings are followed with interest wherever our language is understood—I may say, throughout the civilized world. Furthermore, although its great manufacturing industries, the eminence of its citizens for their skill and intelligence in the practical application of mechanical sciences, and the interesting and important geological features of its vicinity, have conferred such fame on Newcastle as almost to have overshadowed its other claim to distinction in connection with science, this neighbourhood is also associated with Bewick, with Johnson, with Alder, Embleton, Hutton, Atthey, Norman, the two Hancocks, the two Bradys, and other names honoured in the annals of biology; it has long maintained a school of medicine of great repute; and there has lately been established here a natural history museum, which in some of its features is a model for institutions of the kind, and which, I trust, will be a means of encouraging in this town some of the objects the Association was designed to promote.

There can be no doubt that among the various methods by which the aims of the British Association (as expressed in its full title, the *advancement of science*) may be brought about, the collection and preservation of objects available for examination, study, and reference—in fact, the formation of what are now called "museums"—is one of very great practical importance; so much so, indeed, that it seems to me one to the consideration of which it is desirable to devote some time upon such an occasion as this. It is a subject still little understood, though, fortunately, beginning to attract attention. It has already been brought before the notice of the Association, both in presidential and sectional addresses. A committee of our members is at the present time engaged in collecting evidence upon it, and has issued some valuable reports. During the present year an association of curators and others interested in museums has been founded for the purpose of interchange of ideas upon the organization and management of these institutions. It is a subject, moreover, if I may be allowed to mention a personal reason for bringing it forward this evening, which has more than any other occupied my time and my attention almost from the earliest period of my recollection, and I think you will agree with the opinion of one of my distinguished predecessors in this chair, "that the holder of this office will generally do better by giving utterance to what has already become part of his own thought than by gathering matter outside of its habitual range for the special occasion. For," continued Mr. Spottiswoode, "the interest (if any) of an address consists not so much in the multitude of things therein brought forward as in the individuality of the mode in which they are treated."

The first recorded institution which bore the name of museum, or temple or haunt of the Muses, was that founded by Ptolemy Soter at Alexandria about 300 B.C.; but this was not a museum in our sense of the word, but rather, in accordance with its etymology, a place appropriated to the cultivation of learning, or which was frequented by a society or academy of learned men devoting themselves to philosophical studies and the improvement of knowledge.

Although certain great monarchs, as Solomon of Jerusalem and Augustus of Rome, displayed their taste and their magnificence by assembling together in their palaces curious objects brought from distant parts of the world—although it is said that the liberality of Philip and Alexander supplied Aristotle with abundant materials for his researches—of the existence of any permanent or public collections of natural objects among the ancients there is no record. Perhaps the nearest approach to such collections may be found in the preservation of remarkable specimens, sometimes associated with superstitious veneration, sometimes with strange legendary stories, in the buildings devoted to religious worship. The skins of the gorillas brought by the navigator Hanno from the West Coast of Africa, and hung up in the middle at Carthage, afford a well-known instance.

With the revival of learning in the Middle Ages, the collecting instinct, inborn in so many persons of various nations and periods of history, but so long in complete abeyance, sprang into existence with considerable vigour, and a museum, now meaning a collection of miscellaneous objects, antiquities as well as natural curiosities, often associated with a gallery of sculpture and painting, became a fashionable appendage to the establishment of many wealthy persons of superior culture.

All the earliest collections, comparable to what we call museums, were formed by and maintained at the expense of private individuals; sometimes physicians, whose studies naturally led them to a taste for biological science; often great merchant princes, whose trading connections afforded opportunities for bringing together things that were considered curious from foreign lands; or ruling monarchs in their private capacity. In every case they were maintained mainly for the gratification of the possessor or his personal friends, and rarely, if ever, associated with any systematic teaching or public benefit.

One of the earliest known printed catalogues of such a museum is that of Samuel Quickelberg, a physician of Amsterdam, published in 1565 in Munich. In the same year Conrad Gesner published a catalogue of the collection of Johann Kentmann, a physician of Torgau, in Saxony, consisting of about 1600 objects, chiefly minerals, shells and marine animals. Very soon afterwards we find the Emperor Rudolph II. of Germany busily accumulating treasures which constituted the foundations of the present magnificent museums by which the Austrian capital is distinguished.

In England the earliest important collectors of miscellaneous objects were the two John Tradescants, father and son, the latter of whom published, in 1656, a little work called 'Musæum Tradescantianum; or a Collection of Rarities Preserved at South Lambeth, neer London.' The wonderful variety and incongruous juxtaposition of the objects contained in this collection make the catalogue very amusing reading. Under the first division, devoted to "Some Kindes of Birds, their Egges, Beaks, Feathers, Clawes and Spurres," we find "Divers sorts of Egges from Turkie, one given for a Dragon's Egge," "Easter Egges of the Patriarch of Jerusalem;" "Two Feathers of the Phœnix Tayle;" "The Claw of the bird Rock, who, as Authors report, is able to trusse an Elephant." Among "whole birds" is the famous "Dodar from the Island Mauritius; it is not able to flie, being so big." This is the identical specimen, the head and foot of which has passed through the Ashmolean into the University Museum of Oxford; but we know not what has become of the claw of the rock, the phœnix tayle, and the dragon's egg. Time does not allow me to mention the wonderful things which occur under the head of "Garments, Vestures, Habits and Ornaments," or the "Mechanick, Artificial Workes in Carvings, Turnings, Sowings and Paintings," from Edward the Confessor's knit gloves, and the famous "Pohatan, King of Virginia's habit, all embroidered with shells or Roanoke," also still at Oxford, and lately figured and described by Mr. E. B. Tylor, to the "Cherry-stone, upon one side S. George and the Dragon, perfectly cut, and on the other side 88 Emperours' faces;" or the other "cherry-stone, holding ten dozen of tortois-shell combs made by Edward Gibbons." But before leaving these private collections I cannot forbear mentioning, as an example of the great aid they often were in advancing science, the indebtedness of Linnæus in his early studies to the valuable zoological museums, which it was one of the ruling passions of several kings and queens of Sweden to bring together.

Upon the association of individuals together into societies to promote the advancement of knowledge, these bodies in their corporate capacity frequently made the formation of a museum part of their function. The earliest instance of this in our country was the museum of the Royal Society in Crane Court, of which an illustrated catalogue was published by Dr. Grew in 1681.

The idea that the maintenance of a museum was a portion of the public duty of the State or of any municipal institution had, however, nowhere entered into the mind of man at the beginning of the last century. Even the great teaching bodies, the Universities, were slow in acquiring collections; but it must be recollected that the subjects considered most essential to the education they then professed to give were not those which needed illustration from the objects which can be brought together in a museum. The Italian Universities, where anatomy was taught as a science earlier and more thoroughly than anywhere else in Europe, soon found the desirability of keeping collections of preserved specimens, and the art of preparing them attained a high degree of excellence at Padua and Bologna two centuries ago. But these were generally the private property of the professors, as were nearly all the collections used to illustrate the teaching of anatomy and pathology in our country within the memory of many now living.

Notwithstanding the multiplication of public museums during the present century, and the greater resources and advantages which many of these possess, which private collectors cannot command, the spirit of accumulation in individuals has happily not passed away, although usually directed into rather different channels than formerly. The general museums or miscellaneous collections of old are now left to governments and institutions which afford greater guarantee of their permanence and public utility, while admirable service is done to science by those private persons with leisure and means who, devoting themselves to some special subject, amass the materials by which its study can be pursued in detail either by themselves or by those they know to be qualified to do so; which collections, if they fulfil their most appropriate destiny, ultimately become incorporated, by gift or purchase, in one or other of the public museums, and then serve as permanent factors in the education of the nation, or rather of the world.

(*To be continued.*)

ANSWERS TO CORRESPONDENTS.

Telephone.—We must refer you to the advertisement pages. We cannot undertake to recommend particular houses.

Inquirer.—The compound is stated to have been prepared synthetically, but we have not seen any information as to how this has been effected.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Fairburn, Robinson, Welborn, Tharratt, Gorfeet, Beck, Fann, Smith, Wright, Alcock.

BOTANY BAY OR EUCALYPTUS KINO.

BY J. H. MAIDEN, F.L.S., F.C.S., ETC.,
Curator of the Technological Museum of New South Wales, Sydney.

1. COMMERCE AND USES OF EUCALYPTUS KINOS.

Kinos are the most important exudations yielded by Australian indigenous trees. They are exceedingly abundant, and in the future, when they shall have been discriminated and put to a fair trial, they will be found to be the most valuable of all. There is no reason at all why the freshly exuded kinos of certain specified eucalypts should not drive that of *Pterocarpus Marsupium* and other species out of the market. The world's demand for kino for medicinal purposes is, however, not very large, and the use of this substance for tanning and dyeing is but in its infancy. Extracts for these latter purposes being made with water, the "gummy" kinos which are not available for tinctures may be utilized, and the very gum they contain is an advantage. Tanners are at their wit's end to obtain new astringent substances, and the industry I have indicated is capable of indefinite expansion. It does seem a waste of a colony's resources that thousands of tons of a valuable commodity should be allowed to be washed off the trees, simply because no attempt is made to create and foster markets for it. In India, kino-getters pay a tax to enter Government forests to ply their calling, and the time will come when a tax on the gatherers of eucalyptus kino on Crown lands will form no insignificant item in the revenues of the colonial governments.

In Australia, kinos are largely used in rural medicine, on account of their astringent properties, aqueous solutions being almost invariably made. Some of them are used by the settlers for ink, or for staining leather black, the process simply consisting in boiling the kino in an iron saucepan.

The expert appointed to examine the gums and resins at the Colonial and Indian Exhibition suggested the use of kinos for staining wood, and at the same time varnishing it, but they would be useless for varnishing, as they are all more or less soluble in water.

The commerce with Europe and America in eucalyptus kino has never been important, for the reasons given below. Soon after the foundation of New South Wales, a quantity was sent to England, but Mr. Redwood (*Pharm. Journ.*, vol. 1), speaking in 1841, stated that "Botany Bay kino appeared not to be at that time introduced into the English market, and Dr. A. T. Thomson says he has been informed that little of it has been brought to this country since 1802." Kino deteriorates on keeping, and if inquiries for it were met with supplies which had been in stock for years, it is no wonder that it would be reported as an inferior substance. The subject will be again referred to under "Gelatinization of Tincture of Kino."

Since 1840 the use of eucalyptus kino has been somewhat spasmodic. It is chiefly alluded to in pharmaceutical journals in connection with this subject of gelatinization, and on this account there is certainly a prejudice amongst English pharmacists which I hope these notes will help to remove. That pharmacists are willing to give eucalyptus kino a fair trial, is evident from the favour with which a good kino, of uniform composition, like that guaranteed by Mr. Bosisto to be from *E. rostrata*, is being received. It is gathered by men who know this species when they see it, and not by kino collectors, who, from sheer ignorance, mix half a dozen kinos, externally much alike, but very different in composition, in the same parcel.

It may be asked how, since there is so much similarity amongst eucalyptus trees and kinos, may those which are suitable be ascertained by the unscientific dweller in the country? I reply, by adopting the same precautions which would be used if the substance were of mineral origin. No man in his senses would begin to place on the market large quantities of stone without the preliminary assay to learn whether it would be payable or not. With a little practice, country people soon learn to distinguish, by peculiarities of bark, habit, place of growth, colour and quality of timber, the eucalypts in their neighbourhood, which of them yield kino, and how abundantly. Then an assay should be made of each kino. Any intelligent man will be able to apply the simple water and spirit tests referred to below, and thus ascertain whether it would probably pay to place the kino on the market. If an analysis be required the expense would be trifling. Then if care be taken to keep together the products of each species, the first step towards securing uniform kinos would have been achieved, and a market would inevitably follow.

2. COLLECTION OF EUCALYPTUS KINOS.

Pereira ('Vegetable Materia Medica') states that Botany Bay kino appears to be a kind of extract. It is, however, a perfectly natural exudation, and the supply is obtained by picking it from the trees. Heat is never employed. While wounding the bark stimulates the flow in some cases, I have never heard of such a practice being systematically resorted to, as in most districts the kino is abundant enough, and obtainable for the picking.

Usually it is collected from the outside, which accounts for its occasional admixture with particles of bark, but sometimes it is contained between the concentric layers of the wood (chiefly in the case of *E. corymbosa*). In the latter case it has communication with the outside of the tree, though frequently the passage is blocked with indurated kino, which has to be removed to enable the store inside to be drawn off.

Kinos should be gathered from the trees as fresh as possible, firstly, because they are so soluble in water that they are washed away in part by the rain, and secondly, the action of the sun and air contribute to alteration of their chemical composition, by which that portion not washed away tends to become black, and almost insoluble. This is mainly because of the conversion of the tannic acid they contain into phlobaphenes, and in the case of those which contain arabin, this tendency to insolubility is probably somewhat enhanced by the partial conversion of that substance into metarabin.

On account of the alteration which exposure to the atmosphere works in kinos, it is necessary to present several analyses of a species, if possible, in order that some idea of the composition of a particular kino may be obtained. It is obvious that the proportions of various constituents are not fixed quantities; in order to enhance the value of an analysis it is therefore most desirable, and even absolutely necessary, to give all particulars as to age of tree, date of collection, locality, approximate date of analysis, physical description of kino, etc., in order that one kino may be compared with another. Of all the analyses or partial analyses of kinos by different experimenters, to which the author has access, of not one solitary sample are these necessary particulars given.

Because of the difficulty of diagnosing most eucalypts, herbarium specimens should also be collected, wherever possible.

3. Use of the Word "Gum" or "Gum-Tree" in Australia.

The arboreal vegetation of Australia consists, as is well known, mainly of species of *Eucalyptus*, and an almost universal appellation of these trees (and sometimes the few species of the closely allied genus *Angophora* are included), is "gum trees." This is because they usually yield kinos, which to ordinary people in Australia are known as gums. Some botanists, and, it is to be regretted, some chemists, have made matters worse by alluding to them as resins or gum-resins. The first name is erroneous, and the second can only be applied say to *E. maculata*, and not to it in strictness.

There are, however, certain gum-trees which from the structure of their bark are called "Ironbarks" and "Stringybarks," and in regard to the true ironbarks and the true stringybarks (for there are many gradations of bark), the term gum is very rarely applied, except in a generic sense. Further, in order to discriminate locally between the various "gums," various species go under the name of "red gum," "white gum," "blue gum," etc.; in fact the adjectives are very numerous. But two circumstances tend to complicate matters. The first is that the adjective is in one district employed to describe the leaves, in another the bark, and so on. Thus a "white gum" may be intended to denote a tree with white leaves, white bark, etc. The second is that the same species varies more or less according to climate, soil, aspect, etc., and the term "white gum," which might in some way describe a species in one district, would be totally inapplicable in another. Again, the same tree strikes people from different points of view, and a host of names for one tree sometimes stand current in the same district. I do not intend to pursue the subject further here, and would only say that the names exist and persist, and we must make the best of them. They are utterly bewildering to a stranger, or a beginner, but with experience and caution, they may become, in time, a help to the botanist.

I have written with this detail to emphasize the fact that the adjectives denoting colour apply to the tree as a whole, to its general aspect, and are in no way intended to be descriptive of so comparatively minute a portion of the bulk of the tree as the kino ("gum"). Otherwise, since nearly all kinos are red, they should nearly all be called "red-gums," the few exceptions being yellowish. To emphasize the point, no kinos ("gums") are blue, white, grey, etc., and yet we have blue gums, etc., by the dozen.

To show that the above exposition is not superfluous, I have only to refer to a statement of Wiesner's which is in these words, "Bentham and Mueller give two different gums from the same tree, viz.:—A grey gum, very likely the true gum-resin, and a red gum, which no doubt is a species of kino." Pretty well all the colours of the rainbow are applied in different parts to some particular species, and the very pardonable error into which Wiesner has fallen is common enough in the colonies themselves.

(*To be concluded.*)

DISCOVERY OF URANIUM IN CORNWALL.

The discovery in Cornwall of a continuous vein of uranium is an event of more importance to the fortunate finders than to the world at large. For, though not without its uses, this once rare metal is not indispensable in the Arts. What might have happened had it originally been cheap enough for the purposes of the great industries, it is difficult to say. But for a century it has occurred so seldom, and then only in pockets or patches, that the current price has been something like twenty-four hundred pounds per ton. It will be understood, then, that although a good deal cheaper than either gold or silver, uranium is still valuable enough to render the ownership of a "true fissure vein" a position to be regarded with something like envy even by a reef-miner in Grass Valley, or by the millionaire who measures his wealth by "feet" on the Comstock Lode. In appearance, uranium is of a steel-white colour, and hitherto it has been extracted very sparingly from various ores. Of these, the only one which is practically available as a raw material is pitch-blende, the "uranpechers" of the German miners. This mineral is found, associated with lead and silver ores, in various parts of the world, especially in Bohemia, Saxony, and Hungary, in Connecticut, and in the Tincroft and Tol Carne Mines of Redruth, in Cornwall, where it occurs in the shape of greenish or brown-black masses clustering together like grapes. This pitch-blende is, however, almost invariably associated with a host of sulphides, arsenides, and other foreign metallic compounds, so that its extraction is necessarily a troublesome and expensive process. It is, therefore, curious that just one hundred years after Klaproth succeeded in isolating it under a name suggested by the newly-discovered planet Uranus, a lode of unprecedented promise should have been discovered at the Union Mine, Grampound Road, Cornwall. Here the ore, instead of being scattered in "pockets," fills a vein of more or less uniform breadth throughout the "country rock." How continuous it may be it is impossible to predict. But already the prospects are so good that several tons of ore have been banked, the assays reading as high as 12 per cent. of the pure metal, and, in some specimens, running up to 30 per cent. It is true that in Bohemia very rich samples have been known to yield 80 per cent., but this was in exceptional cases and in minute quantities, and should the new Cornish lode not run out, the fresh supplies may enable metallurgists to follow up some interesting experiments, which have previously been hampered, not so much by the cost as by the comparative scarcity of the metal.

The various oxides of uranium have long been employed in the Arts, more particularly in porcelain painting. Thus, uranic oxide imparts a beautiful golden or greenish-yellow hue to glass, while uranous oxide is used in producing the highly-valued black porcelain. In photography, various uranium compounds are in demand as substitutes for the still more costly chloride of gold, and as it forms with platinum and copper two alloys, each having the appearance of the most precious of all the metals, and, in one instance at least, capable of resisting the action of acids, it has been tried with perfect success as a cheap substitute for gold in electro-plating. Finally—and perhaps still more important—as uranium offers a high electrical resistance, it will, doubtless, when available in sufficient quantities, be eagerly seized upon as a useful aid in the electrician's work.—*Standard.*

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 21, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE BRITISH ASSOCIATION.

The length to which our report of the proceedings at the meeting of the British Pharmaceutical Conference extended last week, prevented more than a brief reference to the meeting of the British Association, which immediately followed it in the same town. This latter meeting also is now over, having proved fairly successful. The attendance reached 2436, which was in excess of that at Bath last year, and was almost identical with that at the previous meeting of the Association to Newcastle-upon-Tyne twenty-six years ago. This year the members were not tickled with the excitement of rival talking machines, neither was one subject so predominant, as electricity was last year, as to definitely characterize the meeting. But nevertheless the papers read in most of the sections seem to have been at least of average merit, and in the Chemical Section there were again discussions on the important questions of the nature of solutions and the teaching of chemistry. In the Presidential Addresses one noticeable feature was the extent to which reference was made to subjects that may be said to come fairly within the ken of the trained pharmacist. Professor Flower, somewhat unexpectedly, did not choose for his principal topic the science upon which he built up his reputation, but he nevertheless took one in respect to which he has had vast experience, namely, the arrangement of museums. This address, in accordance with our usual custom, has been reproduced *in extenso*, and need not be further referred to here.

In the Mathematical and Physical Section (A.), Captain Abney, prompted by the fact that this year is the jubilee of the practical introduction of photography by Daguerre and Fox Talbot, took for the theme of his presidential address the effect of light on matter. Captain Abney's enthusiasm for his subject is well known, but there is a *soupçon* of the "nothing like leather" sentiment in the assertion that there should be no stimulus to the study of science like the practice of photography, since chemistry, optics and mathematics are all required to enable it to be studied as it should be studied. Alas! here lies the crux, and Captain Abney confesses that the facts are against his theory, for that out of the twenty-five thousand people who take photographs, scarcely one per cent. of them know or care the why or the wherefore of the processes they practice. The address was an extremely interesting and instructive discussion of the action of light on silver salts and kindred topics, and incidentally an opinion was expressed upon a subject of considerable dispute, the possibility of photography in natural colours. To a certain extent Captain Abney says, this is not only possible, but has been effected; but the production of a negative in natural colours from which prints in natural colours might be produced appears to him to be impossible.

The choice by Sir Lowthian Bell, the President of the Chemical Section (B.), of the metallurgy of iron as a subject fitted to illustrate the aid which chemical science is able to afford to the progress of a great industry, was no doubt influenced by the speaker's intimate acquaintance with the details of the services rendered by the chemist to the ironmaster. Sir Lowthian concedes the value of the work done by those engaged in the manufacture of iron during the first half of the present century, which sufficed, without much thought being given to the laws of nature upon which the processes followed depended, to place the world in possession of iron in such abundance and at so low a cost that no engineering works were delayed during that period through deficiency of this material. On the other hand he claims that as a consequence of the ironmasters having since allied themselves with the chemists they have made more progress in thirty years than their predecessors did in three centuries. To mention one instance only, though an important one, among the many quoted, it is difficult to realize that only thirty-three years have elapsed since Henry Bessemer's paper on "a mode of making iron without the use of fuel" was received by the British Association with such incredulity that a record of the title alone was all the notice accorded to it in the official volume of "Transactions" for 1856. Nevertheless, the development of the process therein described has within that short interval revolutionized the iron industry, and to-day places abundance of steel at the disposal of the engineer at lower cost than was formerly incurred in the use of iron. Before concluding his address Sir Lowthian Bell referred to the subject of scientific and technical education in terms not quite in accordance with ideas prevalent in some quarters. Whilst admitting that British manufacturers no longer stand so far above those of other lands as they formerly did he maintained that in this result differences of education are in no way concerned. As to the technical side of the subject if it meant a system by which, along with some scientific instruction, manual dexterity in the use of tools, or a practical knowledge of manufacturing processes had to be acquired, he was not sanguine as to the results. He did not object to the rudiments of science being taught wherever possible, and he admitted that the knowledge so obtained might often give the future workman a more intelligent interest in his employment than he at present possesses; but he thought that those who expect much good to attend the putting on of such a thin veneer of chemistry or physics do not take sufficient account of the knowledge possessed by more highly educated men now directing the workshops of the world.

In the Geological Section (C.) Professor **Geikie** discoursed upon the results obtained during the last few years by continental workers in the domain of glacial geology. The Biological Section (D.) was debarred from the presence of its appointed president, Professor **Burdon Sanderson**, through illness, but he nevertheless contributed a profoundly interesting address on the present position of biological science. In this communication it was shown that the method of research based on the correlation of function with structure, on the principle that every appreciable difference of structure corresponds to a difference of function, has for the present at least been exhausted, a point having been reached where functional differences are observed with no apparent structural differences to explain them. The biological problems therefore which at present most urgently demand solution are held to be those that relate to the endowments of apparently structureless living matter. The address to the Geographical Section (E), by Sir **Francis de Winton**, opened with a reference to the science of applied geography, and then passed to a review of the most recent explorations and discoveries, whilst in the Economic Science and Statistics Section (F.) Professor **Edgeworth** dealt with the points at which mathematical reasoning is applicable to political economy. In the address to the Mechanical Science Section (G.) physics and chemistry, rather than mechanics, occupied the dominant position. The molecular structure of matter was the first topic descanted upon by Mr. **William Anderson**, his pretext being that it is imperatively necessary that mechanics should interest themselves more deeply in the internal structure of the materials they use and in the true meaning of the laws by which the properties of these materials are defined. Then followed a passage relating to the origin of petroleum, in which favour was accorded to **Mendelejeff**'s theory that its formation is due to the contact of water with incandescent metallic carbides, after which came a plea for the establishment of a standard "horse-power." Lastly, in the Anthropological Section (H.), Professor **Sir William Turner** delivered an interesting address on Heredity. The usual lectures were delivered to good audiences, the first, on Friday, the 13th inst., by Professor **Roberts-Austen**, the subject being the Hardening and Tempering of Steel, and the second on Monday last, by Mr. **Walter Gardiner**, on How Plants maintain themselves in the Struggle for Existence.

It only remains to say that Sir **Frederick Abel** has been chosen as President of the meeting of the Association to be held next year in Leeds, and that an invitation to meet in Cardiff in 1891 has been accepted.

At the last meeting of the Council of the Midland Counties Chemists' Association it was decided that classes for students should be held in connection with the Association during the forthcoming session, provided that a sufficient number of persons send in their names as being desirous of attending them. In a large town like Birmingham there ought not to be much doubt as to the fulfilment of such a condition, and it may be hoped that there will be a speedy and numerous response to the invitation of the Council. It was also resolved that the session should be opened towards the end of October by a Conversazione, at which the President will deliver an address.

* * *

At the recent International Congress on Forensic Medicine, held in Paris, a report was presented by Messrs. Lutaud and Descoust on the legal questions arising from the abuse of morphine, in which the question was discussed as to how morphiomaniacs obtain the poison. It was stated that there had been some severe sentences pronounced in France in recent years against pharmacists for illegally supplying the drug, but it was added that it has now been ascertained that in a great number of cases the morphine is obtained from wholesale druggists and commission agents, upon whom the only legal restriction imposed is that of entering in a book the name and address of the person to whom a sale is made. The astonishing statement was also made by one speaker that in the northern provinces of France it is becoming quite the fashion to give evening parties where the principal diversion is the administration of subcutaneous injections of morphine to the guests. A resolution was eventually passed by the Congress to the effect that wholesale druggists and manufacturers of chemicals ought not to supply morphine or cocaine to others than dispensing chemists, and that a prescription ordering either of these substances ought not to be made up more than once without the authority of the prescriber.

* * *

In a paper in the current number of the *Revue des Sciences Naturelles Appliquées*, on vegetation in Portugal, reference is made to an extraordinary dragon-tree (*Dracæna Draco*) growing in the garden attached to the royal palace at Ajuda, near Lisbon, which is supposed to have attained a development unequalled by any other similar tree in the world. The crown of the tree, the under part of which is scarcely two metres from the ground, is upwards of 36 metres in circumference (about 120 feet), and in its upper outline forms a perfect dome. There is a tradition that this tree was imported and planted in the garden when it was first created, upwards of three centuries ago.

* * *

It may interest some readers to learn that the *Scilla maritima* is now in flower in the Economic House, Kew Gardens.

* * *

We understand that the photograph taken at Hexham of the Conference excursion party has turned out very well, and that copies unmounted may be obtained from Mr. J. Pike, 1, New Bridge Street, Newcastle, price 2s. 1d., post free.

British Pharmaceutical Conference.

MEETING OF THE EXECUTIVE COMMITTEE.

A meeting of the Executive Committee was held at the Durham College of Science, Newcastle-on-Tyne, on Monday, September 9, 1889, at 10 p.m.

Present.—Mr. Umney (President) in the chair, Messrs. Atkins, Benger, Brady, Clague, Conroy, Dott, Gerrard, Maben, Martin, Reynolds, Schacht, Woolley, and Mr. Martindale (Hon. Treasurer), Dr. Thresh and Mr. Naylor (Hon. Gen. Secs.), and Mr. J. C. Nightingale (Asst. Secy.).

The minutes of the previous meeting were read and confirmed.

Intimations of inability to attend were announced as having been received from Professor Attfield, Messrs. Brunker, Davies, Greenish, Stephenson and Symes.

The Treasurer's financial statement for the year 1888–89 was read and approved.

A draft report for presentation at the annual meeting was submitted by the Hon. Gen. Secs., and after correction of a clerical error was agreed to.

The Hon. Gen. Secs. reported that with reference to two of the papers to be read at the general meeting, they had suggested that the authors should make certain alterations, so as to leave no doubt as to their suitability and their acceptance by the Committee. In each case the suggestions had been kindly received and promptly acted upon.

Copies of a draft programme of the business of the general meeting were placed before the members.

This was discussed and finally arranged.

Mr. Naylor then stated that the MS. of the 'Year-Book' for 1889, as far as it could be completed, was in the hands of the printers.

The place of meeting for 1890 was considered.

Mr. Reynolds announced that he had been deputed by the Leeds Association to extend to the Conference a cordial invitation to hold its next sessions in that town, and if the invitation were accepted he could bespeak for them a characteristic Yorkshire welcome.

The President commended this invitation to the members, who expressed it as their pleasure that it should be recommended to the meeting for acceptance.

Mr. Martin informed the Committee that Principal Garnett would attend the meeting at ten o'clock in the morning to welcome the members of the Conference.

Nineteen gentlemen were duly nominated and elected to membership.

MEETING AT NEWCASTLE-UPON-TYNE.

FIRST DAY'S PROCEEDINGS.

Tuesday, September 10.

(*Continued from page* 219.)

Reading of Papers.

The reading of papers was then proceeded with, the first being a—

Note on Tincture of Senna.

BY B. S. PROCTOR, F.I.C.

At the last revision of the blue list I suggested the question as to the activity of the tincture of senna.

I consider that it is discreditable to the medical profession that an inert preparation of an active drug should remain in the Pharmacopœia, and discreditable to the pharmaceutical body that it should remain there without a protest.

Personally, I have been convinced for some years of the worthlessness of tincture of senna as now prepared, and have protested, though ineffectually, against its retention among the official preparations. My desire in bringing the subject before the Conference is that further experience and expression of opinion from our members may lead either to a modification of the formula or its deletion from the Pharmacopœia.

Christison in his 'Dispensatory,' says of senna: "Its active part is easily dissolved out by water, either cold or warm, by rectified spirit, and by proof spirit."

Flückiger and Hanbury quote the words of Dragendorff and Kubly: "The active substance is a colloid body, easily soluble in water, but not in strong alcohol. A syrupy aqueous extract of senna mixed with an equal volume of alcohol throws down mucilage; after this is removed a further addition of alcohol causes a precipitate of brown matter, almost tasteless, and possessing purgative properties, containing cathartic acid, which is almost insoluble in water in the absence of bases, and insoluble in alcohol; soluble in warm dilute alcohol."

Various other authorities might be quoted as to cathartic acid, or cathartogenic acid, as some call it, being the purgative principle of senna, and as to its insolubility in water and alcohol, coupled with the statement that its alkaline salts are soluble in water and are active cathartics. There would, however, be no great advantage in multiplying any testimony which was not a direct statement of the data upon which conclusions had been built. The use in the 'Pharmacographia' of the expressions "strong alcohol" and "dilute alcohol" leave us in doubt as to the meaning of the writer. Is "alcohol" rectified spirit or absolute alcohol? If we suppose the alcohol to be rectified spirit, an equal volume of which throws down the mucilage but not the active principle, we would conclude that the spirit for making tincture of senna might be equal volumes of rectified spirit and water. The further addition of "alcohol," which throws down the active matter, may be the quantity which is necessary to raise the strength up to that of proof spirit; and this would bring the statement of Dragendorff and Kubly into accordance with my experience, and confirm my impression that tincture of senna ought either to be abolished or made of a weaker spirit than that now official.

Some years ago, with the view of testing the solubility of the senna-purgative in rectified spirit, I percolated half an ounce of powdered senna with rectified spirit by the aid of pressure, till in the course of three days' slow percolation 1½ ounce of percolate was obtained, the last half ounce of which had but little taste of senna, though considerable colour. The percolate being evaporated yielded 36 grains of soft hygroscopic extract.

Percolation continued till a second percolate of 1½ ounce was obtained, which on evaporation yielded 6 grains of residue.

The first 36 grains of extract was rubbed up with water, in which it partially dissolved, producing a solution which had a full senna flavour. I took half of it for a dose, and the remainder a few hours after, with no effect.

The portion of alcoholic extract not soluble in water was made into an emulsion with gum and water and taken as a dose without any effect.

This I considered fairly disposed of the idea that rectified spirit extracts the purgative principle of senna, but to confirm my conclusion I took the senna marc which had been exhausted with spirit and made a draught of it with water.

It produced pretty strong catharsis with griping. Thus it appears, so far as my constitution may be taken as a guide, that rectified spirit does not remove from senna either its purgative or its griping qualities.

Proof spirit was next to be tried, and I took as a dose 1 ounce of the B.P. tincture of senna without any effect. My temperance habits stood in the way of my taking it by the pint, which would probably have been necessary to produce any results beyond those dependant upon alcohol.

In the spring of 1883 I published, in the second edition of my "Lectures on Practical Pharmacy," the results of the experiments just described. In June of the same year, at the suggestion of the Pharmacopœia Revision Committee of the Medical Council, I made many suggestions for alterations of official formulæ, including the following:—

"*Mist. Sennæ.*—Omit the tincture of senna, which is inert, or substitute for it a further addition of tincture of cardamoms. See below, and 'Pharmacy,' page 370."

"*Senna.*—The tincture of senna is inactive and useless, the active matter being insoluble in spirit. See 'Pharmacy,' page 370."

"*Tinctures.*—Tincture of senna is inactive and might be expunged."

These suggestions did not meet with the acceptance to which in my conceit I thought them entitled, and of which I still think them worthy.

My desire in bringing this subject before the present meeting is that others should experiment upon similar lines to those I have indicated, and by personal trial test the efficacy of senna preparations made with spirit, more or less dilute, and thus determine the question whether tincture of senna should be abolished or amended.

The PRESIDENT said this was a very practical subject, with which Mr. Proctor was well qualified to deal. He should be glad to know whether the variety of senna used was Tinnevelly or Alexandrian, as it was pretty generally agreed that the latter was the more active. He believed that was shown by Henry Deane many years ago.

Mr. GROVES (Weymouth) said he made a long series of experiments some years ago on senna and succeeded in isolating the active principle, but unfortunately for his priority, Prof. Dragendorff had done the same thing a few weeks earlier. He was rather surprised to hear that the tincture made with proof spirit was entirely inert, because he found that with equal measures of rectified spirit and water he succeeded in extracting the active principle very completely. The method in which he succeeded best in obtaining the mixed cathartates, was by making a strong tincture with equal measures of rectified spirit and water, and then adding to the tincture expressed from such a maceration an equal volume of rectified spirit. The cathartates were then thrown down in a state of purity, and quite free from odour. He could quite understand that treating senna with rectified spirit would fail to extract any of the active matter, but it would be very effective in removing the nauseous odour and taste of senna. When the cathartates were thrown down by alcohol, the nauseous odour and taste were retained in the supernatant fluid. He did not, however, think it would be wise to eliminate the tincture from the Pharmacopœia; such a measure would be too radical and unnecessary; it would be much better to dilute the spirit, using equal measures of spirit of wine and water. Senna was a useful drug, and a good tincture should be prepared. He believed the syrup was a worse preparation than the tincture, its efficacy being almost all destroyed by the boiling and stewing it underwent.

Mr. DOTT was rather surprised that no reference had been made to the work of Dr. Stockman, a distinguished member of the Conference, on senna. Dr. Stockman had found that a very powerful effect on small animals was produced by pure cathartic acid, which is soluble in alcohol. Mr. Proctor's results did not appear to be altogether in accordance with those of Dr. Stockman, but it was a very interesting and practical paper.

Mr. BALL said he had recently made some experiments on commercial cathartic acid, and found it inactive, but cathartate of soda or magnesia produced decided catharsis. He had taken 8 grains of ordinary commercial cathartic acid with no result at all. He should presume that in the ordinary tincture of the Pharmacopœia the cathartic acid was precipitated, and there was not sufficient water to dissolve it, nor sufficient alkali in the senna to form a cathartate of the alkali. This would to a great extent account for the inactivity of the product.

Mr. GERRARD said his experience of this tincture did not altogether agree with Mr. Proctor's. It was used occasionally in the institution to which he was attached, and he never heard any complaints of its action, but that might be from want of observation on the part of those prescribing it. They must, however, have an idea that the official dose was not sufficient where a purgative effect was required, as they invariably ordered half an ounce for a dose. One point of the paper was to show the necessity for having in the Pharmacopœia a greater variety of strength of alcohol, instead of only three, absolute alcohol, rectified spirit and proof spirit. In the American Pharmacopœia there was a "dilute alcohol," which contained 45 per cent. by weight (the English proof spirit containing 49 per cent.), and that was used in certain cases where a weak spirit was more efficient in extracting the active principle.

Mr. WRENN said Mr. Gerrard had anticipated what he was about to say as to the advantage of using a dilute alcohol for the manufacture of such tinctures as the one now under notice. Senna had already established a reputation for itself amongst the public, especially the aqueous preparations, and he believed that even a lower strength of spirit than Mr. Gerrard had suggested might be used, viz., 60 per cent. under proof, such as was universally used in the manufacture of concentrated infusions. There was a paper to be read on infusion of gentian, and then no doubt the question of concentrated infusions would be raised.

The PRESIDENT said there was no question that the rule of thumb had been very much followed in giving the directions in the Pharmacopœia as to the strength of alcohol. The suggestion of Mr. Gerrard was a very good one, and probably a mixture of half water and half rectified spirit, or 20 under proof, would be about right for the tincture of senna. It would not do for the Conference to recommend, however, that the tincture should be so made immediately, or they might get into difficulties with the excise, or with public analysts; still it was a matter which should be settled without delay. The Americans had made a great study of the particular strengths of alcohol which were best suited for the extraction of the medicinal properties of various drugs, and it might be well to take a leaf out of their book. The Conference was much indebted to Mr. Proctor for this paper.

Mr. PROCTOR in reply said he by no means wished what he had said to be taken as a settlement of the question, but rather as an opening of it. He did not consider that half and half spirit as taken by himself and some others should be taken as the right strength. His idea was that the right method would be to macerate senna with a small quantity of water, to make pressure first with the water alone, and then to add to the strong aqueous solution as much spirit as would throw down the mucilage, falling short of that which would precipitate the active principle, and then after filtration use that instead of the present tincture. He should have been disposed to experiment in that line, if he had not felt that if he commenced experimenting again he must try a dose; but he had already taken about plenty, including senna, aloes, scammony, *Rhamnus Frangula*, *Rhamnus Purshiana* and others, and he had suffered from it. He wished the subject should be taken up, and did not think it could be undertaken by a more competent body than the Formulary Committee. If the members of that Committee would take the doses he would make the drugs. He must not be supposed to say that cathartic acid was the native principle; probably it was a cathartate of some kind, possibly of lime, but the business of the pharmacist was to get the activity in solution, no matter whether it were cathartic acid, cathartate of lime, or of magnesia, soda, or anything else. They were perhaps rather too much inclined to refined chemistry where the practical results was the important thing; and they were so long settling the theory that in the meantime they lost the practice. It was for them to get the good practical result, and let the high scientific gentlemen who loved science for its own sake settle questions of theory. With regard to the activity of different kinds of senna, he had no special experience to offer, but he believed Professor Christison said Tinnevelly was quite equal to the Alexandria; but as doctors differed he took the precaution in his experiments to prove that the senna which had been operated on was a good purgative senna, and it mattered not to him where it came from. He had had in mind the question which Mr. Gerrard had raised as to the solvent powers of different strengths of alcohol, and he looked on senna as a matter which would help to bring about a reform in that direction. There were many things in the Pharmacopœia which might be made with advantage with a weaker spirit than was at present used. There was no need to fear the exciseman, as he had nothing to do with it.

The next paper read was on—

PAPAIN AS A DIGESTIVE AGENT COMPARED WITH COMMERCIAL PEPSINES.

BY A. BALL.

Papain or papayotin as supplied commercially is of a brownish white colour, sometimes free from smell, at others possessing a peculiar odour similar to that of indol. Commercial papain is prepared from the juice of the leaves and fruit of the *Carica papaya* (*Papaya vulgaris*, D.C.). It is stated to have been indigenous to the American continent, although it is now found in the tropical parts of Asia and Africa. The fruit is edible, and the bruised leaves of the papaw possess the remarkable property of causing a tough steak to become tender when wrapped in them for a few hours, the proteolytic ferment causing separation of the muscular fibres. Papain is usually prepared from the milky juice, fresh or dried, by solution in water and subsequent precipitation by alcohol of the papayotin. The purity of papain depends upon the number of times the process is repeated, the whiter samples appearing to possess the highest activity. The following three samples used for testing the digestive power were obtained from different houses of good repute.

Sample A, white in colour, possessing slight odour, was subjected to the following test:—Five grains of the papain were placed in 4 ozs. of a 1 per cent. per vol. of HCl in distilled water, to which was added 100 grains of finely divided fibrin, obtained from rump steak, the whole kept at a temperature of 110° F. in a water bath for three hours. The amount of fibrin dissolved was 60 grains.

Sample B, yellowish colour, possessing peculiar odour of indol, subjected to same test, digested 44½ grains of fibrin.

Sample C, light brown colour, distinct odour, when subjected to same test digested 22 grains of fibrin. The experiments were repeated with coagulated egg albumin; 100 grains of egg albumin, carefully cleared of any adhering yolk, were passed through a fine hair sieve, and placed in an acidified solution containing 1 per cent. per volume of HCl in distilled water, 1 grain of papain added, and the whole kept at a temperature of 100° F. in a water-bath for three hours.

Sample A dissolved 94 grains, B 80 grains, and C 30 grains. The action of the three samples with milk was marked in the same ratio, a quarter of a pint of fresh milk with 2 grains of the papain, to which was added 2 ozs. of distilled water, containing 1 per cent. per volume of HCl, the whole digested for two hours at a temperature of 100° F. in a water bath. In the case of sample A, the curd of casein formed when the acid solution was added commenced to dissolve slowly, and at the end of the time was all digested excepting a granular precipitate of the curd. The fat liberated by the digestion of the enveloping casein was not in the least emulsified. With sample B the digestive action was considerably less marked. With sample C hardly any action was exerted upon the curd of casein.

With regard to the digested product, when albumins are acted upon by papain in an acidified solution, the dried residue obtained by careful evaporation of the filtered solution does not appear to be readily soluble in water, and when mixed with water and placed upon a membranous dialyser, floated on distilled water, this product, unlike peptones obtained by the digestive action of pepsin upon proteids, does not in the least degree diffuse through the membrane into the water, but diffusion commences when acid or alkali is added; in this respect, it would seem to be more nearly allied to the globulin series.

Pepsin is prepared by a great variety of methods hereinafter detailed. The term "pepsina porci, B.P.," really means nothing, and as regards the proteolytic test prescribed by the British Pharmacopœia, viz., "2 grains of pepsin with an ounce of distilled water, to which 5 minims of hydrochloric acid have been added, forms a mixture in which at least 100 grains of hard boiled white of egg, passed through a wire gauze sieve of 36 measures per linear inch will dissolve, on their being well mixed, digested and stirred for about thirty minutes at a temperature of 130° F.," I suggest that the test should be 1 grain to digest 500 grains of coagulated albumin in the same acidulous medium. Insomuch that I have found 1 grain of the best pepsins in the market will digest from 500 to 1500 grains when subjected to the prescribed test, I am at a loss to understand why pepsins containing a variable amount of milk sugar and starch or peptones should be the only ones made official. Doubtless when a physician orders pepsin he means pepsin of the highest digestive power and most likely to give satisfactory therapeutic results. Some intelligent pharmacists do now dispense the pepsin guaranteed pure and free from any admixture, and it is sincerely regretted the majority do not do the same. The following table represents the activity of the various pepsins and papains in the market when coagulated albumin is to be digested.

No. sample.		Amount used.	Digested.
1 . . .	Pepsin	1 grain	1·308 grain
2 . . .	Pepsin	1 grain	1·200 grain
3 . . .	Pepsin	1 grain	1·105 grain
4 . . .	Pepsin	1 grain	·980 grain
5 . . .	Pepsin	1 grain	·430 grain
6 . . .	Papain	1 grain	·342 grain
7 . . .	Papain	1 grain	·108 grain
8 . . .	Pepsin	1 grain	·103 grain

In each case 5 ounces of distilled water containing 1 per cent. per vol. HCl was used, to which 2000 grains coagulated egg albumin, finely divided by passing through a hair sieve, were added, and the whole kept agitated in a water bath at 100° F. for three hours. The difference in amount of albumin dissolved by the papains is accounted for by the increased amount of surface exposed to the action of the ferment by the greater number of particles. The different amounts of proteolytic action exerted upon finely divided fibrin obtained from lean rump steak is shown in the photograph of the different bottles exhibited. In each case 9 drachms of fibrin, 6 ounces of distilled water with ½ a drachm HCl and 10 grains of the ferment were digested together for three hours in a water-bath at a temperature of 100° F.; the undigested fibrin is shown by the sediment in each bottle. Fibrin seems to me to be the most reliable test of the activity of a pepsin to be used in medicine, its action successfully performed upon derived albumin being more desirable than its activity upon native albumin when testing its activity as a medicine, the native albumin being generally converted into acid-albumin by the acid of the gastric juice. Further the activity of a digestive ferment should be estimated by the amount of pure peptones actually obtained, that is, peptones perfectly soluble and diffusible, the diffusibility being the chief test. If a solution containing peptones is placed in a membranous dialyser floated on distilled water the whole of the peptones will quickly diffuse through into the water. The product from papainized fibrin will not dialyse through. This goes to prove that papain does not wholly digest the fibrin whether in acid or alkaline media, but its action renders the fibrin more easily digested by the natural ferments.

The activity of pepsin is doubtless due in a great measure to the method adopted in its manufacture. The best pepsins are prepared by extracting the ferment from the secreting membrane through maceration in glycerine, but it is a method impossible excepting by experts in manufacturing operations. The solution is extremely difficult to filter, scale and pulverize, and finally to obtain a pepsin free from albuminous matter. Physiologists obtain a little pure pepsin experimentally by the employment of alcohol as a precipitant, allowing the membrane to stand in alcohol and then extracting the ferment with glycerine. This process is extremely unreliable, as strong alcohol exerts an injurious action upon the ferment. Another method is to precipitate the pepsin with salt; the magma which separates floats upon the macerating fluid and is largely impregnated with salt. This is partially removed by expression and by allowing the salt to effloresce upon the surface of the expressed magma cake. The entire purification can only be obtained by dialysis, and this washes away a good quantity of the ferment itself, therefore the process is not recommended for commercial use, and should the product not be entirely freed from salt it is unjust to place it upon the market as a pure pepsin, when a purchaser would be paying so much per ounce for salt. There is another process yielding what are termed peptone-pepsins, in which the lining membrane of the stomach is subjected to acidulous digestion with heat, when the whole tissue in which the pepsin is secreted is converted into peptones. The acid is precipitated in the form of a salt and the syrupy solution of peptones and pepsin clarified and reduced to a dry form; by this method a larger yield is obtained, consequently it can be supplied cheaper, the activity being reduced in the same ratio.

Scheffer's method is to precipitate the pepsin from solution in the form of a magma with salt. The whole is expressed, and while still containing a certain amount of moisture and salt is mixed with milk sugar, and the paste spread upon a glass plate is dried and then pulverised. The best sample of this kind does not contain more than 5 per cent. pure pepsin. There is another process, and the pepsin thus made has a large sale in this country. The magma is obtained as in the foregoing, is expressed, and mixed with 90 per cent. of starch as the least estimate. This amyllated magma is dried and reduced to powder. Dr. Pavey in 1863 stated that numbers of so-called pepsins were in the market and should be discarded. I mention that I find a simple test of the freedom of pepsins from admixture with starch, mucus, and peptones is the non-stickiness ᶠ really pure pepsin when exposed to the atmosphere.

The PRESIDENT, in inviting discussion, said Mr. Ball had a photograph which he would hand round, showing the amount of undissolved albumen in six different bottles, which would give some rough idea of his results.

Mr. BENGER said he had been interested in papain, and had tested samples several times from curiosity, but his results had been almost entirely negative, though he had tried it in acid, alkaline and neutral solutions, with coagulated albumen (white of egg). He tried it at different temperatures and for long periods. Different samples of pepsin differed very much, as could be easily proved even by the Pharmacopœia method, though it was by no means perfect. His plan was to stand a number of test tubes in a large beaker of water, each tube containing coagulated white of egg in acidulated water, and instead of keeping it at the temperature of the body, he raised it to about 120° or 130°, at which the activity of pepsin reached its maximum; carefully weighed quantities of pepsin or its preparations were then added to each tube, and the mixture stirred at regular intervals. It had been found by himself and others that those pepsins which were most active at 130° were also most active at the temperature of the body, and in this way much time was saved. Heating the different samples in this way you could see in ten minutes which was the most active. With fibrin it was not nearly so easy to see the result. Some pepsins possessed practically no activity whatever, whilst others were extremely active. If a large quantity of acid solution were used, an active pepsin would dissolve a very large quantity of white of egg or fibrin, so that the statement sometimes made in advertisements that 1 grain would dissolve so much white of egg meant almost nothing, because the conditions of the experiment were not given.

Mr. SCHACHT said he should be glad to know if any gentleman could afford any information as to the best way of determining whether the result of adding pepsin to white of egg was a peptone or not. Dissolved albumen was not necessarily peptone. The only available means of determining the quantity of peptone produced with which he was acquainted was by dialysing it, which was very troublesome, and he should be very glad to know if there were any better or more readily applicable method. Fehling's solution gave the colour, and so forth, but he had not satisfied himself that there was any process by which it could be readily ascertained whether a solution contained peptones, or was merely soluble albumen.

Mr. NAYLOR said the question in which he was most interested was this, that the author had had an opportunity of experimenting with a pepsin which he pronounced to be absolutely pure. He wished, therefore, to ask Mr. Ball how much fibrin or white of egg absolutely pure pepsin would dissolve. He begged to dissent mildly from the inference which Mr. Ball drew, that the intelligent pharmacist should discard altogether the Pharmacopœia article. So long as they had such an article in the Pharmacopœia and a test given for it he hoped they would be loyal to the Pharmacopœia, and where pepsin was ordered (apart from any particular make) would use it according to the authoritative standard. He did not quite catch whether the pepsins were tested by the Pharmacopœia method, or by the one in which 5 ounces of distilled water containing 1 per cent. by volume of hydrochloric acid was used. Had Mr. Ball found in the market pepsins which when tested by the Pharmacopœia method gave as a result that 1 grain would dissolve 1500 grains of white of egg?

Mr. MARTINDALE remarked that pepsina porci, B.P., had been spoken of, but there was no such thing in the Pharmacopœia; very often the official pepsin was not made from the pig. The pepsin of the B.P. seemed to be a different article altogether from that described in the paper. So long as there was an official article they should adhere to it, and if other modes of making pepsin were introduced, let them take different names.

Mr. **Gerrard** said he had had some experience in the use of pepsin and to some extent of papain, with regard to which he could confirm what Mr. Benger had said. It seemed to have an eroding action, breaking up the substance to which it was applied rather than dissolving it, in the way in which pepsin dissolved albumen or fibrin. Working with pepsin of good quality, which he prepared himself by scraping and roughly cleansing the complete stomach, drying it very carefully, or precipitating it by alcohol, he found that in a ·2 per cent. hydrochloric acid solution at a temperature of 130° F., which was a far better temperature to experiment with than anything below it, one grain would dissolve 1000 grains of white of egg. At 130° the process went on most rapidly, and what he had described would take place in fifteen minutes, but if it were desired to imitate the process of digestion and form a peptone, the process must be continued about three hours. The first action of pepsin on the acid mixture was to produce acid albumen, and then it went on to the gradual production of peptone, and as the peptone developed its presence could be indicated by a colour reaction, the intensity of which was a measure of the total peptonization. After digesting about half an hour, if you took a little of the peptone and added to it about an equal volume of solution of potash, Pharmacopœia strength, and one or two drops only of a 10 per cent. solution of sulphate of copper, it gave a fine pink tinge, and if tested from time to time every ten or twenty minutes the intensity increased until it reached the climax in about three hours. That was a test which anyone could apply, and he had demonstrated it to more than one gentleman present.

Mr. **Barclay** asked if Mr. Ball had tested any samples of commercial pepsin and found them to be of the Pharmacopœia standard? Also, if he had ascertained whether or not any change occurred on keeping.

Mr. **Wrenn** said some experiments he made a few years ago, when he read a paper before the Chemists' Assistants' Association, led him to confirm the opinion expressed in the paper that commercial pepsin was readily found of which 1 grain would dissolve 1000 grains of coagulated albumen. Papain was a commercial failure compared to pepsin. He agreed with Mr. Benger as to the temperature to be used; if the Pharmacopœia directions were followed much valuable time was wasted. In the preparation of pepsin he should not introduce glycerine, as Mr. Ball suggested, for how was it to be got rid of in preparing the pure pepsin. Some makers put on their labels, "This pepsin is guaranteed to be made from the stomach of a pig in our laboratory." Whether the pig was always there he did not know, but pepsina porci was certainly more active than that made from the stomach of a sheep.

The **President** said Mr. Ball had expressed himself at a loss to understand why pepsins containing a variable amount of milk of sugar and starch were the only ones official, but he did not remember any directions in the Pharmacopœia for the dilution of pepsin with these substances. Probably there were such pepsins, but he did not know that they were official.

Mr. **Martindale**: Not in the Pharmacopœia. There was one such in the French Codex.

Mr. **Ball** in reply to Mr. Naylor's question why he did not use the test of the B.P., could only say that he wished to test the activity of the pepsin at the temperature of the stomach, which was said to be 100°, and he continued the digestive process for a longer time, three hours in every case, instead of thirty minutes; he wished to have a parallel process to that which went on if pepsin were taken internally for medicinal purposes. In reply to Mr. Martindale he might say that he applied to four wholesale houses for Pharmacopœia pepsin, and in each case the bottle came to him labelled "Pepsina porci, B.P." On testing these he found in each case it contained starch, which he took to be an adulterant, as it was not generally found in the mucous membrane of the pig or any other animal. With regard to peptone, the test mentioned by Mr. Gerrard was an excellent test for the presence of peptone, but did not answer for quantitative purposes. If albumen were digested with pepsin in an acidulated solution, the resulting product filtered and the solution evaporated a dry residue was obtained; of course the heat must be kept very low, so that the product should not be burned. If this residue were then mixed with water and placed on a dialyser the whole of the peptones would dialyse through, but the albuminous and other intermediate bodies would not, and would be left on the membrane. This, therefore, was a good quantitative test. It was quite true that the B.P. did not contain such a process as he had described, but he maintained that starch or sugar of milk when added were simply adulterants, as they were not then there for any therapeutical purpose. If they did not aid the digestive process why were they added, except to increase the weight and the amount of profit attaching to the sale. It was suggested that they were added as a diluent to get the product to the Pharmacopœia strength, but if so, why could not the Pharmacopœia contain an article 1 grain of which would do as well as 5 grains of the one now placed there. It would at any rate economize space. He had not tested specially to see if pepsins recently prepared differed at all from those which had been kept some time, but he had repeated after an interval of time the tests of the specimens of commercial pepsins to confirm his previous results, and the difference was so slight as not to be worth noticing. Mr. Benger said fibrin was not a good indication of the digestive power of pepsin, but in his (Mr. Ball's) opinion it was so satisfactory that if a digested solution were left to stand for three days there would be a perfect precipitate of the undigested fibrin, which was insoluble in any menstruum; this could be dried and weighed, and the amount deducted from the original amount, which would indicate the amount of peptone in solution. Mr. Naylor asked how much white of egg pure pepsin would digest when submitted to the Pharmacopœia test, but he found the B.P. test faulty in this respect, that the gastric juice was never found so acid as was suggested in the test; ·1 or ·2 per cent. of hydrochloric acid was the highest of any such extract juice, but the B.P. test was 5 minims of hydrochloric acid to 1 ounce of distilled, which was equal to ·3 per cent. Most physiologists suggested that a ·2 per cent. solution was the highest that should be used, and the same amount of alkali in another medium for testing the activity of pancreatin.

The **President** asked if Mr. Ball had found that pure pepsin from the stomach of sheep was stronger or weaker than that made from the pig's stomach?

Mr. **Ball** said all which he had tested were said to be from the stomach of the pig.

The **President** said the Conference was much indebted to Mr. Ball for bringing forward this subject, on which a great deal of work had been done, but the more it was discussed the more they found how little they knew about it. There were, no doubt, pepsins containing sugar of milk and other diluents, but these ingredients were probably added to reduce the preparations to the B.P. strength.

The next paper read was—

ARE GLASS BOTTLES SOLUBLE?

BY R. REYNOLDS, F.I.C., F.C.S.

The *Pharmaceutical Journal* for August 31, 1889, p. 163, contained a somewhat startling statement as to the action of chloral hydrate upon a glass bottle in which it had been stored for a long time. The case was reported by Herr Reuter, who found the crystals of chloral hydrate lying next to the glass to be intensely blue. The colour was proved to be due to nickel, doubtless contained in the smalt employed in the manufacture of the blue glass.

Such an instance recalls the older illustrations of the liability of glass to attack by substances preserved in vessels of that substance. That strong alkaline solutions should attack flint glass does not cause us any surprise. The influence, too, of the prolonged action of a relatively weak volatile alkali in the atmosphere has long been known, and old glass windows in stables have been pointed to as examples of the action of air containing free ammonia.

Glass long submerged in water and mud may show the action of disintegrating influences. The most striking illustration of this which I have met with was a portion of an antique bottle taken from the moat of Walton Hall, near Wakefield, at the time when it belonged to the late Charles Waterton, the naturalist. The specimen had probably lain in the mud for two centuries. For still older illustrations of metamorphosed glass, as that recovered from buried cities, it is only needful to refer to our public museums.

The decomposition of hydrocyanic acid when kept in white flint bottles would appear to be due to the influence of the glass. It would be interesting to know if any of the troublesome cases of decomposition of organic solutions, such as those intended for hypodermic use, are in any instance referable to this cause. It will doubtless be necessary to recognize that there are bottles—and bottles. The more faulty sort may, fortunately, not be of everyday occurrence.

I recently met with a little evidence favouring the idea of the chemical interference of a bottle with its contents, and bring it forward as indicating one of the possible directions for further inquiry. This occurred in connection with the interesting subject of the acidity of the gastric juice. Professor Riegel, of Giessen, has undertaken the investigation of this subject clinically. He uses small sponges, encased in gelatine, one of which is swallowed, and is withdrawn in about ten minutes, when the gelatine will have dissolved. The sample of gastric fluid thus obtained is tested for HCl by Congo red paper. Congo red assumes a deep blue colour on contact with acids. This is much more pronounced in the case of inorganic than organic acids; acid salts produce no alteration of colour. It is stated that the delicacy of the test is such that 0·002 per cent. (= $\frac{1}{50000}$) of free HCl can be found. One minim of HCl in 20 fluid ounces of distilled water (or, say $\frac{1}{10000}$) is certainly appreciable. It was a solution of this strength, which, after keeping for a day in a flint-glass bottle, failed to give its previous reaction with Congo red paper. So far as I am aware, very weak solutions of HCl are supposed to be stable, and I did not think it unreasonable to refer the disappearance of the trace of acid to a possible action of the glass of the bottle. This line of inquiry may be worth the notice of anyone disposed to investigate the interesting and not unpromising question of what is the action of a glass bottle upon its contents.

Dr. **THRESH** said he had noticed a similar action some years ago when he was investigating the action of rain in a certain district on vegetation. It was supposed that some limekilns which had been recently erected materially affected the vegetation, and he collected the rainfall at many different points. When he collected the rain on litmus and other papers, he almost invariably found that it had an acid reaction, but strange to say, when collected in bottles, it was either neutral or distinctly alkaline. On investigating the cause of this he discovered that in all the bottles he employed—he tried all kinds and found the results the same—some decomposition took place in a very short time, and the free acid disappeared. His impression was that it was a decomposition of silicate of soda or of lime, in which the acid combined with the base, and the silica was thrown down. That this was the case was the more probable, because in evaporating samples of rain water he found that when collected in platinum dishes the solid residue per gallon was 1 to 4 grains less than when collected in glass, and this residue was chiefly silica. He also noticed in making further experiments that in titrating an acid solution if the acid were run in until a faint tint was produced with litmus, and then the liquid was boiled for a few minutes in a glass vessel, the colour would disappear. Upon adding acid the colour would again be obtained, which would again disappear on boiling, and so on; and he had seen students in the examination room go on repeating that process for an hour, thinking they were increasing the accuracy of the result, evidently not having observed that this naturally occurred when these solutions were boiled in glass flasks. Another thing still more interesting was this—if in one of these bottles (and they varied considerably though they were all acted upon) a mixture practically neutral and containing tincture of cardamoms was placed and kept in it for some time it would vary considerably in colour in the course of say a month, and it was quite possible that the complaints sometimes made as to the colour of such a mixture were due to this cause.

Mr. **LINFORD** said most chemists must have noticed that hydrochloric acid acted very considerably on the glass bottles in which it was kept, turning the glass white, while the sulphuric acid bottle was not affected so much. No doubt sulphuric acid must act on the glass in the same way, but the question was why the action ceased so much sooner.

Mr. **PROCTOR** had repeatedly observed that new bottles had an alkaline reaction in a much more marked degree than old ones. This probably arose from something on the surface, or else the solvent action of the water only penetrated a very short distance from the surface.

The **PRESIDENT** said it was necessary in these cases to be sure that the bottles had not been washed in alkaline solutions, such as washing soda, traces of which might be left behind.

Mr. **PROCTOR** said he referred to bottles which had come directly from the glasshouse. He attributed the smokiness to which he referred to the volatilization of something of an alkaline nature which was then condensed on the surface of the glass.

Mr. **MARTINDALE** remarked that osmic acid very much affected white glass bottles of English make, whilst foreign white glass bottles were comparatively unaffected, except the stoppers. He held this action was due to the presence of lead in the glass, and it was desirable, therefore, to avoid bottles of glass containing lead for such purposes.

Mr. **MABEN** remarked that the action of water and acid on glass might often be very well observed in syphon tubes.

Mr. **WEDDLE** thought perhaps the action of acids and alkalies on glass bottles might be due in part to the action of heat in annealing the glass. There was a slight efflorescence on new bottles, to which Mr. Proctor had referred, which might be caused by the annealing process, and render the glass liable to attack by substances placed in the bottle; and this might be partially washed away after a time. It would be well to ascertain whether glass bottles in such cases were of English or foreign make, the former containing lead, while the latter did not.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-EIGHTH ANNUAL MEETING.

THE PRESIDENT'S ADDRESS.

(*Concluded from page* 200.)

It would be passing beyond the limits of time allotted to this address, indeed going beyond the scope of the Association, if I were to speak of many of the subjects which have pre-eminently exercised the faculties of the collector and formed the materials of which museums are constructed. The various methods by which the mind of man has been able to reproduce the forms of natural objects or to give expression to the images created by his own fancy, from the rudest scratchings of a savage on a bone, or the simplest arrangement of lines employed in ornamenting the roughest piece of pottery, up to the most lovely combinations of form and colour hitherto attained in sculpture or in painting, or in works in metal or in clay, depend altogether on museums for their preservation, for our knowledge of their condition and history in the past, and for the lessons which they can convey for the future.

Apart from the delight which the contemplation of the noblest expressions of art must produce in all cultivated minds, apart also from the curiosity and interest that must be excited by all the less successfully executed attempts to produce similar results, as materials for constructing the true history of the life of man, at different stages of civilization, in different circumstances of living, and in divers regions of the earth, such collections are absolutely invaluable.

But I must pass them by in order to dwell more in detail upon those which specially concern the advancement of the subjects which come under the notice of this Association—museums devoted to the so-called "natural history" sciences, although much which will be said of them will doubtless be more or less applicable to museums in general.

The terms "*natural history*" and "*naturalist*" have become deeply rooted in our language, but without any very definite conception of their meaning or the scope of their application. Originally applied to the study of all the phenomena of the universe which are independent of the agency of man, natural history has gradually narrowed down in most people's minds, in consequence of the invention of convenient and generally understood and accepted terms for some of its various subdivisions, as astronomy, chemistry, geology, &c., into that portion of the subject which treats of the history of creatures endowed with life, for which, until lately, no special name had been invented. Even from this limitation botany was gradually disassociating itself in many quarters, and a "naturalist" and a "zoologist" have nearly become, however irrationally, synonymous terms. The happy introduction and general acceptance of the word "biology," notwithstanding the objections raised to its etymological signification, have reunited the study of organisms distinguished by the possession of the living principle, and practically eliminated the now vague and indefinite term "natural history" from scientific terminology. As, however, it is certain to maintain its hold in popular language, I would venture to suggest the desirability of restoring it to its original and really definite signification, contrasting it with the history of man and of his works, and of the changes which have been wrought in the universe by his intervention.

It was in this sense that, when the rapid growth of the miscellaneous collections in the British Museum at Bloomsbury (the expansion of Sir Hans Sloane's accumulation in the old Manor House at Chelsea) was thought to render a division necessary, the line of severance was effected at the junction of what was natural and what was artificial; the former, including the products of what are commonly called "natural" forces, unaffected by man's handiwork, or the impress of his mind. The departments which took cognisance of these were termed the "Natural History Departments," and the new building to which they were removed the "Natural History Museum."

It may be worth while to spend a few moments upon the consideration of the value of this division, as it is one which concerns the arrangement and administration of the majority of museums.

Though there is very much to be said for it, the objection has been raised that it cuts man himself in two. The illustrations of man's bodily structure are undoubtedly subjects for the zoologist. The subtile gradations of form, proportion and colour, which distinguish the different races of men, can only be appreciated by one with the education of an anatomist, and whose eye has been trained to estimate the value of such characters in discriminating the variations of animal forms. The subjects for comparison required for this branch of research must therefore be looked for in the zoological collections.

But the comparatively new science of "anthropology" embraces not only man's physical structure; it includes his mental development, his manners, customs, traditions, and languages. The illustrations of his works of art, domestic utensils, and weapons of war are essential parts of its study. In fact it is impossible to say where it ends. It includes all that man is or ever has been, all that he has ever done. No definite line can be drawn between the rudest flint weapon and the most exquisitely finished instrument of destruction which has ever been turned out from the manufactory at Elswick, between the rough representation of a mammoth, carved by one of its contemporary men on a portion of its own tusk, and the most admirable production of a Landseer. An anthropological collection, to be logical, must include all that is in not only the old British Museum but the South Kensington Museum and the National Gallery. The notion of an anthropology which considers savages and pre-historic people as apart from the rest of mankind may, in the limitations of human powers, have certain conveniences, but it is utterly unscientific and loses sight of the great value of the study in tracing the gradual growth of our complex systems and customs from the primitive ways of our progenitors.

On the other hand, the division first indicated is as perfectly definite, logical, and scientific as any such division can be. That there are many inconveniences attending wide local disjunctions of the collections containing subjects so distinct yet so nearly allied as physical and psychical anthropology must be fully admitted; but these could only have been overcome by embracing in one grand institution the various national collections illustrating the different branches of science and art, placed in such order and juxtaposition that their mutual relations might be apparent, and the resources of each might be brought to bear upon the elucidation of all the others—an ideal institution, such as the world has not yet seen, but into which the old British Museum might at one time have been developed.

A purely "Natural History Museum" will then embrace a collection of objects illustrating the natural productions of the earth, and in its widest and truest sense should include, as far as they can be illustrated by museum specimens, all the sciences which deal with natural phenomena. It has only been the difficulties, real or imaginary, in illustrating them which have excluded such subjects as astronomy, physics, chemistry and physiology from occupying departments in our National Natural History Museum, while allowing the introduction of their sister sciences, mineralogy, geology, botany and zoology.

Though the experimental sciences and those which deal with the laws which govern the universe, rather than with the materials of which it is composed, have not hitherto greatly called forth the collector's instinct, or depended upon museums for their illustration, yet the great advantages of collections of the various instruments by means of which these sciences are pursued, and of examples of the methods by which they are taught, are yearly becoming more manifest. Museums of scientific apparatus now form portions of every well-equipped educational establishment, and under the auspices of the Science and Art Department at South Kensington a national collection illustrating those branches of natural history science which have escaped recognition in the British Museum is assuming a magnitude and importance which brings the question of properly housing and displaying it urgently to the front.

Anomalies such as these are certain to occur in the present almost infantile though rapidly progressive state of science. It may be taken for granted that no scientific institution of any complexity of organization can be, except at the moment of its birth, abreast of the most modern views of the subject, especially in the dividing lines between, and the proportional representation of, the various branches of knowledge which it includes.

The necessity for subdivisions in the study of science is continually becoming more apparent as the knowledge of the details of each subject multiplies without corresponding increase in the power of the human mind to grasp and deal with them, and the dividing lines not only become sharper, but as knowledge advances they frequently require revision. It might be supposed that such revision would adjust itself to the direction taken by the natural development of the relations of the different branches of science, and the truer conceptions entertained of such relations. But this is not always so. Artificial barriers are continually being raised to keep these dividing lines in the direction in which they have once started. Difficulties of readjustment arise not only from the mechanical obstacles caused by the size and arrangements of the buildings and facilities for the allocation of various kinds of collections, but still more from the numerous personal interests which grow up and wind their meshes around such institutions. Professorships and curatorships of this or that division of science are founded and endowed, and their holders are usually tenacious either of encroachment upon or of any wide enlargement of the boundaries of the subject they have undertaken to teach or to illustrate; and in this way, more than any other, passing phases of scientific knowledge have become crystallized or fossilized in institutions where they might least have been expected. I may instance many European universities and great museums in which zoology and comparative anatomy are still held to be distinct subjects taught by different professors, and where, in consequence of the division of the collections under their charge, the skin of an animal, illustrating its zoology, and its skeleton and teeth, illustrating its anatomy, must be looked for in different and perhaps remotely placed buildings.

For the perpetuation of the unfortunate separation of palæontology from biology, which is so clearly a survival of an ancient condition of scientific culture, and for the maintenance in its integrity of the heterogeneous compound of sciences which we now call "geology," the faulty organization of our museums is in a great measure responsible. The more their rearrangement can be made to overstep and break down the abrupt line of demarcation which is still almost universally drawn between beings which live now and those which have lived in past times, so deeply rooted in the popular mind and so hard to eradicate even in that of the scientific student, the better it will be for the progress of sound biological knowledge.

But it is not of the removal of such great anomalies and inconsistencies which, when they have once grown up, require heroic methods to set them right, but rather of certain minor defects in the organization of almost all existing museums which are well within the capacity of comparatively modest administrative means to remedy, that I have now to speak.

That great improvements have been lately effected in many respects in some of the museums in this country, on the Continent, and especially in America, no one can deny. The subject, as I have already indicated, is, happily, exciting the attention of those who have the direction of them, and even awakening interest in the mind of the general public. It is in the hope of in some measure helping on or guiding this movement that I have ventured on the remarks which follow.

The first consideration in establishing a museum, large or small, either in a town, institution, society, or school, is that it should have some definite object or purpose to fulfil; and the next is that means should be forthcoming not only to establish but also to maintain the museum in a suitable manner to fulfil that purpose. Some persons are enthusiastic enough to think that a museum is in itself so good an object that they have only to provide a building and cases and a certain number of specimens, no matter exactly what, to fill them and then the thing is done; whereas the truth is the work has only then begun. What a museum really depends upon for its success and usefulness is not its building, not its cases, not even its specimens, but its curator. He and his staff are the life and soul of the institution, upon whom its whole value depends; and yet in many—I may say most of our museums—they are the last to be thought of. The care, the preservation, the naming of the specimens are either left to voluntary effort—excellent often for special collections and for a limited time, but never to be depended on as a permanent arrangement—or a grievously undersalaried and consequently uneducated official is expected to keep in order, to clean, dust, arrange, name, and display in a manner which will contribute to the advancement of scientific knowledge, collections ranging in extent over almost every branch of human learning, from the contents of an ancient British barrow to the last discovered bird of paradise from New Guinea.

Valuable specimens not unfrequently find their way into museums thus managed. Their public-spirited owners fondly imagine that they will be preserved and made of use to the world if once given to such an institution. Their fate is, unfortunately, far otherwise. Dirty, neglected, without label, their identity lost, they are often finally devoured by insects or cleared away to make room on the crowded shelves for the new donation of some fresh patron of the institution. It would be far better that such museums should never be founded. They are traps into which precious—sometimes priceless—objects fall only to be destroyed; and, what is still worse, they bring discredit on all similar institutions, make the very name of museum a byword and a reproach, hindering instead of advancing the recognition of their value as agents in the great educational movement of the age.

A museum is like a living organism—it requires continual and tender care. It must grow, or it will perish; and the cost and labour required to maintain it in a state of vitality is not yet by any means fully realised or provided for, either in our great national establishments or in our smaller local institutions.

Often as it has been said, it cannot be too often repeated, that the real objects of forming collections, of whatever kind (apart, of course, from the mere pleasure of acquisition—sometimes the only motive of private collectors), and which, although in very different degrees, and often without being recognized, underlie the organization of all museums, are two, which are quite distinct, and sometimes even conflicting. The first is to advance or increase the knowledge of some given subject. This is generally the motive of the individual collector, whose experience shows him the vast assistance in forming definite ideas in any line of research in which he may be occupied that may be derived from having the materials for its study at his own command, to hold and to handle, to examine and compare, to take up and lay aside whenever the favourable moment to do so occurs. But unless his subject is a very limited one, or his means the reverse, he soon finds the necessity of consulting collections based on a larger scale than his own. Very few people have any idea of the multiplicity of specimens required for the purpose of working out many of the simplest problems concerning the life-history of animals or plants. The naturalist has frequently to ransack all the museums, both public and private, of Europe and America in the endeavour to compose a monograph of a single common genus, or even species, that shall include all questions of its variation, changes in different seasons, and under different climates and conditions of existence, and the distribution in space and time of all its modifications. He often has to confess at the end that he has been baffled in his research for want of the requisite materials for such an undertaking. Of course this ought not to be, and the time will come when it will not be, but that time is very far off yet.

We all know the old saying that the craving for riches grows as the wealth itself increases. Something similar is true of scientific collections brought together for the purpose of advancing knowledge. The larger they are the more their deficiencies seem to become conspicuous; the more desirous we are to fill up the gaps which provokingly interfere with our extracting from them the complete story they have to tell.

Such collections, are, however, only for the advanced student, the man who has already become acquainted with the elements of his science and is in a position, by his knowledge, by his training, and by his observing and reasoning capacity, to take advantage of such material to carry on the subject to a point beyond that at which he takes it up.

But there is another and a far larger class to whom museums are or should be a powerful means of aid in acquiring knowledge. Among such those who are commencing more serious studies may be included; but I especially refer to the much more numerous class, and one which it may be hoped will year by year bear a greater relative proportion to the general population of the country, who, without having the time, the opportunities, or the abilities to make a profound study of any branch of science, yet take a general interest in its progress, and wish to possess some knowledge of the world around them and of the principal facts ascertained with regard to it, or at least some portions of it. For such persons museums may be, when well organized and arranged, of benefit to a degree that at present can scarcely be realised.

To diffuse knowledge among persons of this class is the second of the two purposes of museums of which I have spoken.

I believe that the main cause of what may be fairly termed the failure of the majority of museums—especially museums of natural history—to perform the functions that might be legitimately expected of them, is that they nearly always confound together the two distinct objects which they may fulfil, and by attempting to combine both in the same exhibition practically accomplish neither.

In accordance with which of those two objects, which may be briefly called *research* and *instruction*, is the main end of the museum, so should the whole be primarily arranged; and in accordance with the object for which each specimen is required, so should it be treated.

The specimens kept for research, for advancement of knowledge, for careful investigations in structure and development, or for showing the minute distinctions which must be studied in working out the problems connected with variations of species according to age, sex, season or locality; for fixing the limits of geographical distribution or determining the range in geological time, must be not only exceedingly numerous (so numerous, indeed, that it is almost impossible to put a limit on what may be required for such purposes), but they must also be kept under such conditions as to admit of ready and close examination and comparison.

If the whole of the specimens really required for enlarging the boundaries of zoological or botanical science were to be displayed in such a manner that each one could be distinctly seen by any visitor sauntering through the public galleries of a museum, the vastness and the expense of the institution would be out of all proportion to its utility; the specimens themselves would be quite inaccessible to the examination of all those capable of deriving instruction from them, and, owing to the injurious effects of continued exposure to light upon the greater number of preserved natural objects, would ultimately lose a large part of their permanent value. Collections of this kind must, in fact, be treated as the books in a library, and be used only for consultation and reference by those who are able to read and appreciate their contents. To demand, as has been ignorantly done, that all the specimens belonging to our national museums, for instance, should be displayed in cases in the public galleries, would be equivalent to asking that every book in a library, instead of being shut up and arranged on shelves for consultation when required, should have every single page framed and glazed and hung on the walls, so that the humblest visitor as he passes along the galleries has only to open his eyes and revel in the wealth of literature of all ages and all countries, without so much as applying to a custodian to open a case. Such an arrangement is perfectly conceivable. The idea from some points of view is magnificent, almost sublime. But imagine the space required for such an arrangement of the national library of books, or, indeed, of any of the smallest local libraries; imagine the inconvenience to the real student, the disadvantages which he would be under in reading the pages of any work fixed in an immovable position beneath a glass case; think of the enormous distances he would often have to traverse to compare a reference or verify a quotation, and the idea of sublimity soon gives place to its usual antithesis. The attempt to display every bird, every insect, shell, or plant which is or ought to be in any of our great museums of reference would produce an exactly similar result.

In the arrangement of collections designed for research, which, of course, will contain all those precious specimens called "types," which must be appealed to through all time to determine the species to which a name was originally given, the principal points to be aimed at are—the preservation of the objects from all influences deleterious to them, especially dust, light, and damp; their absolutely correct identification, and record of every circumstance that need be known of their history; their classification and storage in such a manner that each one can be found without difficulty or loss of time; and, both on account of expense as well as convenience of access, they should be made to occupy as small a space as is compatible with these requirements. They should be kept in rooms provided with suitable tables and good light for their examination, and within reach of the necessary books of reference on the particular subjects which the specimens illustrate. Furthermore, the rooms should be so situated that the officers of the museum, without too great hindrance to their own work, can be at hand for occasional assistance and supervision of the student, and if collections of research and exhibited specimens are contained in one building, it is obvious that the closer the contiguity in which those of any particular group are placed the greater will be the convenience both of students and curators, for in very few establishments will it be possible to form each series on such a scale as to be entirely independent of the other.

On the other hand, in a collection arranged for the instruction of the general visitor, the conditions under which the specimens are kept should be totally different. In the first place, their numbers must be strictly limited, according to the nature of the subject to be illustrated and the space available. None must be placed too high or too low for ready examination. There must be no crowding of specimens one behind the other, every one being perfectly and distinctly seen, and with a clear space around it. Imagine a picture-gallery with half the pictures on the walls partially or entirely concealed by others hung in front of them; the idea seems preposterous, and yet this is the approved arrangement of specimens in most public museums. If an object is worth putting into a gallery at all it is worth such a position as will enable it to be seen. Every specimen exhibited should be good of its kind, and all available skill and care should be spent upon its preservation and rendering it capable of teaching the lesson it is intended to convey. And here I cannot refrain from saying a word upon the sadly neglected art of taxidermy, which continues to fill the cases of most of our museums with wretched and repulsive caricatures of mammals and birds, out of all natural proportions, shrunken here and bloated there, and in attitudes absolutely impossible for the creature to have assumed while alive. Happily there may be seen occasionally, especially where amateurs of artistic taste and good knowledge of natural history have devoted themselves to the subject, examples enough—and you are fortunate in possessing them in Newcastle—to show that an animal can be converted after death, by a proper application of taxidermy, into a real life-like representation of the original, perfect in form, proportions, and attitude, and almost, if not quite, as valuable for conveying information on these points as the living creature itself. The fact is that taxidermy is an art resembling that of the painter or rather the sculptor; it requires natural genius as well as great cultivation, and it can never be permanently improved until we have abandoned the present conventional low standard and low payment for "bird stuffing," which is utterly inadequate to induce any man of capacity to devote himself to it as a profession.

To return from this digression, every specimen exhibited should have its definite purpose, and no absolute duplicate should on any account be permitted. Above all, the purpose for which each specimen is exhibited, and the main lesson to be derived from it, must be distinctly indicated by the labels affixed, both as headings of the various divisions of the series, and to the individual specimens. A well-arranged educational museum has been defined as a collection of instructive labels illustrated by well-selected specimens.

What is, or should be, the order of events in arranging a portion of a public museum? Not, certainly, as too often happens now, bringing a number of specimens together almost by haphazard, and cramming them as closely as possible in a case far too small to hold them, and with little reference to their order or to the possibility of their being distinctly seen. First, as I said before, you must have your curator. He must carefully consider the object of the museum, the class and capacities of the persons for whose instruction it is founded, and the space available to carry out this object. He will then divide the subject to be illustrated into groups, and consider their relative proportions, according to which he will plan out the space. Large labels will next be prepared for the principal headings, as the chapters of a book, and smaller ones for the various subdivisions. Certain propositions to be illustrated, either in the structure, classification, geographical distribution, geological position, habits, or evolution of the subjects dealt with, will be laid down and reduced to definite and concise language. Lastly will come the illustrative specimens, each of which as procured and prepared will fall into its appropriate place. As it is not always easy to obtain these at the time that they are wanted, gaps will often have to be left, but these, if properly utilized by drawings or labels, may be made nearly as useful as if occupied by the actual specimens.

A public exhibition which is intended to be instructive and interesting must never be crowded. There is, indeed, no reason why it ever should be. Every such exhibition, whether on a large or small scale, can only contain a representative series of specimens, selected with a view to the needs of the particular class of persons who are likely to visit the gallery, and the numbers of specimens exhibited should be adapted to the space available. There is, therefore, rarely any excuse for filling it up in such a manner as to interfere with the full view of every specimen shown. A crowded gallery, except in some very exceptional circumstances, at once condemns the curator, as the remedy is generally in his own hands. In order to avoid it he has nothing to do but sternly to eliminate all the less important specimens. If any of these possess features of historical or scientific interest demanding their permanent preservation, they should be kept in the reserve collections; if otherwise, they should not be kept at all.

The ideal public museums of the future will, however, require far more exhibition space than has hitherto been allowed; for though the number of specimens shown may be fewer than is often thought necessary now, each will require more room if the conditions above described are carried out, and especially if it is thought desirable to show it in such a manner as to enable the visitor to realize something of the wonderful complexity of the adaptations which bring each species into harmonious relation with its surrounding conditions. Artistic reproductions of natural environments, illustrations of protective resemblances, or of special modes of life, all require much room for their display. This method of exhibition, wherever faithfully carried out, is, however, proving both instructive and attractive, and will doubtless be greatly extended.

Guide-books and catalogues are useful adjuncts, as being adapted to convey fuller information than labels, and as they can be taken away for study during the intervals of visits to the museum, but they can never supersede the use of labels. Anyone who is in the habit of visiting picture-galleries where the names of the artists and the subject are affixed to the frame, and others in which the information has in each case to be sought by reference to a catalogue, must appreciate the vast superiority in comfort and time-saving of the former plan.

Acting upon such principles as these, every public gallery of a museum, whether the splendid saloon of a national institution or the humble room containing the local collection of a village club, can be made a centre of instruction, and will offer interests and attractions which will be looked for in vain in the majority of such institutions at the present time.

One of the best illustrations of the different treatment of collections intended for research or advancement of knowledge, and for popular instruction or diffusion of knowledge, is now to be seen in Kew Gardens, where the admirably constructed and arranged herbarium answers the first purpose, and the public museums of economic botany the second. A similar distinction is carried out in the collections of systematic botany in the natural history branch of the British Museum, with the additional advantage of close contiguity; indeed, as an example of a scheme of good museum arrangement (although not perfect yet in details) I cannot do better than refer to the upper story of the east wing of that institution. The same principles, little regarded in former times in this country, and still unknown in some of the largest continental museums, are gradually pervading every department of the institution, which, from its national character, its metropolitan position, and exceptional resources, ought to illustrate in perfection the ideal of a natural history museum. In fact, it is only in a national institution that an exhaustive research collection in all branches of natural history, in which the specialist of every group can find his own subject fully illustrated, can or ought to be attempted.

As the actual comparison of specimen with specimen is the basis of zoological and botanical research, and as work done with imperfect materials is necessarily imperfect in itself, it is far the wisest policy to concentrate in a few great central institutions, the number and situation of which must be determined by the population and the resources of the country, all the collections, especially those containing specimens already alluded to as so dear to the systematic naturalist, known as author's "types," required for original investigations. It is far more advantageous to the investigator to go to such a collection and take up his temporary abode there, while his research is being carried out, with all the material required at his hand at once, than to travel from place to place and pick up piecemeal the information he requires, without opportunity of direct comparison of specimens.

I do not say that collections for special study, and even original research, should not, under particular circumstances and limitations, be formed at museums other than central national institutions, or that nothing should be retained in provincial museums but what is of a directly educational or elementary nature. A local collection, illustrating the fauna and flora of the district, should be part of every such museum; and this may be carried to almost any amount of detail, and therefore in many cases it would be very unadvisable to exhibit the whole of it. A selection of the most important objects may be shown under the conditions described above, and the remainder carefully preserved in cabinets for the study of specialists.

It is also very desirable in all museums, in order that the exhibited series should be as little disturbed as possible in arrangement, and be always available for the purpose for which it is intended, that there should be, for the use of teachers and students, a supplementary set of common objects, which, if injured, could be easily replaced. It must not be forgotten that the zealous investigator and the conscientious curator are often the direst antagonists; the one endeavours to get all the knowledge he can out of a specimen, regardless of its ultimate fate, and even if his own eyes alone have the advantage of it; the other is content if a limited portion only is seen, provided that can be seen by everyone both now and hereafter.

Such, then, is the primary principle which ought to underlie the arrangement of all museums—the distinct separation of the two objects for which collections are made; the publicly exhibited collection being never a store-room or magazine, but only such as the ordinary visitor can understand and profit by, and the collection for students being so arranged as to afford every facility for examination and research. The improvements that can be made in detail in both departments are endless, and to enter further into their consideration would lead me far beyond the limits of this address. Happily, as I said before, the subject is receiving much attention.

I would willingly dwell longer upon it—indeed I feel that I have only been able to touch slightly and superficially upon many questions of practical interest, well worthy of more detailed consideration—but time warns me that I must be bringing this discourse to a close, and I have still said nothing in reference to subjects upon which you may expect some words on this occasion. I mean those great problems concerning the laws which regulate the evolution of organic beings, problems which agitate the minds of all biologists of the present day, and the solution of which is watched with keen interest by a far wider circle—a circle, in fact, coincident with the intelligence and education of the world. Several communications connected with these problems will be brought before the sectional meeting during the next few days, and we shall have the advantage of hearing them discussed by some of those who by virtue of their special attention to and full knowledge of these subjects are most competent to speak with authority. It is therefore for me rather delicate ground to tread upon, especially at the close of a discourse mainly devoted to another question. I will, however, briefly point out the nature of the problems and the lines which the endeavour to solve them will probably take, without attempting to anticipate the details which you will doubtless hear most fully and ably stated elsewhere.

I think I may safely premise that few, if any, original workers at any branch of biology appear now to entertain serious doubt about the general truth of the doctrine that all existing forms of life have been derived from other forms by a natural process of descent with modification, and it is generally acknowledged that to the records of the past history of life upon the earth we must look for the actual confirmation of the truth of a doctrine which accords so strongly with all we know of the present history of living beings.

Professor Huxley wrote in 1875: "The only perfectly safe foundation for the doctrine of evolution lies in the historical, or rather archæological, evidence that particular organisms have arisen by the gradual modification of their predecessors, which is furnished by fossil remains. That evidence is daily increasing in amount and in weight, and it is to be hoped that the comparisons of the actual pedigree of these organisms with the phenomena of their development may furnish some criterion by which the validity of phylogenic conclusions deduced from the facts of embryology alone may be satisfactorily tested."

Palæontology, however, as we all know, reveals her secrets with no open hand. How can we be reminded of this more forcibly than by the discovery announced scarcely three months ago by Professor Marsh of numerous mammalian remains from formations of the Cretaceous period, the absence of which had so long been a source of difficulty to all zoologists? What vistas does this discovery open of future possibilities, and what thorough discredit, if any were needed, does it throw on the value of negative evidence in such matters! Bearing fully in mind the necessary imperfection of the record we have to deal with, I think that no one taking an impartial survey of the recent progress of palæontological discovery can doubt that the evidence in favour of a gradual modification of living forms is still steadily increasing. Any regular progressive series of changes of structure coinciding with changes in time can of course only be expected to be preserved and to come again before our eyes under such a favourable combination of circumstances as must be of most rare occurrence; but the links, more or less perfect, of many such series are continually being revealed, and the discovery of a single intermediate form is often of immense interest as indicating the path along which the modification from one apparently distinct form to another may have taken place.

Though palæontology may be appealed to in support of the conclusion that modifications have taken place as time advanced, it can scarcely afford any help in solving the more difficult problems which still remain as to the methods by which the changes have been brought about.

Ever since the publication of what has been truly described as the "creation of modern natural history," Darwin's work on the "Origin of Species," there has been no little controversy as to how far all the modifications of living forms can be accounted for by the principle of natural selection or preservation of variations best adapted for their surrounding conditions, or whether any, and if so what, other factors have taken part in the process of organic evolution.

It certainly cannot be said that in these later times the controversy has ended. Indeed, those who are acquainted with scientific literature must know that notes struck at the last annual meeting of this association produced a series of reverberations, the echoes of which have hardly yet died away.

Within the last few months also two important works have appeared in our country, which have placed in an accessible and popular form many of the data upon which the most prevalent views on the subject are based.

The first is "Darwinism: an Exposition of the Theory of Natural Selection, with some of its Applications," by Alfred Russel Wallace. No one could be found so competent to give such an exposition of the theory as one who was, simultaneously with Darwin, its independent originator, but who, by the title he has chosen no less than by the contents of the book, has, with rare modesty and self-abnegation, transferred to his fellow labourer all the merit of the discovery of what he evidently looks upon as a principle of overwhelming importance in the economy of nature; "supreme," indeed, he says, "to an extent which even Darwin himself hesitated to claim for it."

The other work I refer to is the English translation of the remarkable "Essays upon Heredity and Kindred Biological Problems," by Dr. August Weissman, published at the Oxford Clarendon Press, in which is fully discussed the very important but still open question—a question which was brought into prominence at our meeting at Manchester two years ago—of the transmission or non-transmission to the offspring of characters acquired during the lifetime of the parent.

It is generally recognized that it is one of the main elements of Darwin's, as well as of every other theory of evolution, that there is in every individual organic being an innate tendency to vary from the standard of its predecessors, but that this tendency is usually kept under the sternest control by the opposite tendency to resemble them, a force to which the terms "heredity" and "atavism" are applied. The causes of this initial tendency to vary, as well as those of its limits and prevailing direction, and the circumstances which favour its occasional bursting through the constraining principle of heredity offer an endless field for speculation. Though several theories of variation have been suggested, I think that no one would venture to say we have passed beyond the threshold of knowledge of the subject at present.

Taking for granted, however, as we all do, that this tendency to individual variation exists, then comes the question, What are the agents by which, when it has asserted itself, it is controlled or directed in such a manner as to produce the permanent or apparently permanent modifications of organic structures which we see around us? Is "survival of the fittest" or preservation by natural selection of those variations best adapted for their surrounding conditions (the essentially Darwinian or still more essentially Wallacian doctrine) the sole or even the chief of these agents? Can isolation, or the revived Lamarckian view of the direct action of the environment, or the effects of use or disuse accumulating through generations, either singly or combined, account for all? or is it necessary to invoke the aid of any of the numerous subsidiary methods of selection which have been suggested as factors in bringing about the great result?

Anyone who has closely followed these discussions, especially those bearing most directly upon what is generally regarded as the most important factor of evolution—natural selection, or "survival of the fittest"—cannot fail to have noticed the appeal constantly made to the advantage, the utility, or otherwise of special organs or modifications of organs or structures to their possessors. Those who have convinced themselves of the universal application of the doctrine of natural selection hold that every particular structure or modification of structure must be of utility to the animal or plant in which it occurs, or to some ancestor of that animal or plant, otherwise it could not have come into existence; the only reservation being for cases which are explained by the principle which Darwin called "correlation of growth." Thus the extreme natural selectionists and the old-fashioned school of teleologists are so far in agreement.

On the other hand, it is held by some that numerous structures and modifications of structures are met with in nature which are manifestly useless; it is even confidently stated that there are many which are positively injurious to their possessor, and therefore could not possibly have resulted from the action of natural selection of favourable variations. Organs or modifications when in an incipient condition are especially quoted as bearing upon this difficulty. But here, it seems to me, we are continually appealing to a criterion by which to test our theories of which we know far too little, and this (though often relied upon as the strongest) is, in reality, the weakest point of the whole discussion.

Of the variations of the form and structure of organic bodies we are beginning to know something. Our museums, when more complete and better organized, will teach us much on this branch of the subject. They will show us the infinite and wonderful and apparently capricious modifications of form, colour, and of texture to which every most minute portion of the organization of the innumerable creatures which people the earth is subject. They will show us examples of marvellously complicated and delicate arrangements of organs and tissues in many of what we consider as almost the lowest and most imperfectly organized groups of beings with which we are acquainted. But as to the use of all these structures and modifications in the economy of the creatures that possess them, we know, I may almost say, nothing, and our museums will never teach us these things. If time permitted I might give numerous examples in the most familiar of all animals, whose habits and actions are matters of daily observation, with whose life-history we are as well acquainted almost as we are of our own, of structures the purposes of which are still most doubtful. There are many such even in the composition of our own bodies. How, then, can we expect to answer such questions when they relate to animals known to us only by dead specimens, or by the most transient glimpses of the living in a state of nature, or when kept under the most unnatural conditions in confinement? And yet this is actually the state of our knowledge of the vast majority of the myriads of living beings which inhabit the earth. How can we, with our limited powers of observation and limited capacity of imagination, venture to pronounce an opinion as to the fitness or unfitness for its complex surroundings of some peculiar modification of structure found in some strange animal dredged up from the abysses of the ocean, or which passes its life in the dim seclusion of some tropical forest, and into the essential conditions of whose existence we have at present no possible means of putting ourselves in any sort of relation?

How true it is that, as Sir John Lubbock says, "We find in animals complex organs of sense richly supplied with nerves, but the functions of which we are as yet powerless to explain. There may be fifty other senses as different from ours as sound is from sight; and even within the boundaries of our own senses there may be endless sounds which we cannot hear, and colours as different as red from green of which we have no conception. These and a thousand other questions remain for solution. The familiar world which surrounds us may be a totally different place to other animals. To them it may be full of music which we cannot hear, of colour which we cannot see, of sensations which we cannot conceive."

The fact is that nearly all attempts to assign purposes to the varied structures of animals are the merest guesses and assumptions. The writers on natural history of the early part of the present century, who "for every why must have a wherefore," abound in these guesses, which wider knowledge shows to be untenable. Many of the arguments for or against natural selection, based upon the assumed utility or equally assumed uselessness of animal and vegetable structures, have nothing more to recommend them. In fact, to say that any part of the organization of an animal or plant, or any habit or instinct with which it is endowed, is useless, or even injurious, seems to me an assumption which, in our present state of knowledge, we are not warranted in making. The time may come when we shall have more light, but infinite patience and infinite labour are required before we shall be in a position to speak dogmatically on these mysteries of nature—labour not only in museums, laboratories and dissecting-rooms, but in the homes and haunts of the animals themselves, watching and noting their ways amid their natural surroundings, by which means alone we can endeavour to penetrate the secrets of their life-history. But until that time comes, though we may not be quite tempted to echo the despairing cry of the poet, "Behold, we know not anything," a frank confession of ignorance is the most straightforward, indeed the only honest position we can assume when questioned on these subjects.

However much we may be convinced of the supreme value of scientific methods of observation and of reasoning, both as mental training of the individual and in the elucidation of truth and advancement of knowledge generally, it is impossible to be blind to the fact that we who are engaged with the investigation of those subjects which are commonly accepted as belonging to the domain of physical science are unfortunately not always, by virtue of being so occupied, possessed of that most precious gift, "a right judgment in all things."

No one intimately acquainted with the laborious and wavering steps of scientific progress (I can answer at least for one branch of it) can look upon that progress with a perfect feeling of satisfaction. Can it be said of any of us that our observations are always accurate, the materials on which they are based always sufficient, our reasoning always sound, our conclusions always legitimate? Is there any subject, however limited, of which our knowledge can be said to have reached finality?

Or if it happens to any of us as to

> "A man who looks at glass
> On it may stay his eye,
> Or if he pleases through it pass
> And then the heavens espy,"

are not those heavens which are beyond the immediate objects of our observation coloured by our prejudices, prepossessions, emotions, or imagination, as often as they are defined by any profound insight into the depth of nature's laws? In most of these questions an open mind and a suspended judgment appear to me the true scientific position, whichever way our inclinations may lead us.

For myself, I must own that when I endeavour to look beyond the glass, and frame some idea of the plan upon which all the diversity in the organic world has been brought about, I see the strongest grounds for the belief, difficult as it sometimes is in the face of the strange, incomprehensible, apparent defects in structure, and the far stranger, weird, ruthless savagery of habit, often brought to light by the study of the ways of living creatures, that natural selection, or survival of the fittest, has, among other agencies, played a most important part in the production of the present condition of the organic world, and that it is a universally acting and beneficent force continually tending towards the perfection of the individual, of the race, and of the whole living world.

I can even go further and allow my dream still thus to run:—

> "Oh yet we trust that somehow good
> Will be the final goal of ill,—
>
> "That nothing walks with aimless feet,
> That not one life shall be destroyed
> Or cast as rubbish to the void
> When God hath made the pile complete."

ADDRESS TO THE CHEMICAL SECTION.

BY SIR LOWTHIAN BELL, BART., F.R.S., F.C.S., D.C.L., M.INST.C.E.

It has occasionally been the practice of former occupants of this chair to devote a considerable portion of the presidential address to the more recent discoveries in chemical science. This branch of learning advances now with such rapid strides and covers so wide a field, that no one who has not made it the business of his life can hope to discharge this duty with even a moderate share of success.

My immediate predecessor, indeed, discouraged any further attempts in this direction on the ground of the impossibility of doing it justice within the limits of a short discourse, and his remarks were consequently directed to the best methods of teaching the science with which Section B is more directly concerned. I propose this morning to add my testimony to the importance of Dr. Tilden's recommendation, by comparing the rate of progress of one of our great national industries as it has been advanced with and without the aid which chemistry is capable of affording. For this purpose I have selected the metallurgy of iron, not only from my greater familiarity with its details, but because, in my judgment, it affords a suitable example for the object I have in view.

It is needless to insist on the disadvantage attending the application of a science to practical work, without a fair knowledge of the principles which regulate its action. At the same time it would be unfair to those who were engaged in the manufacture of iron during the first half of the present century to deny the value of the services they rendered to their art, without giving much thought to the laws of nature upon which their processes depended. The work so performed sufficed, nevertheless, to place the world in possession of the metal in such abundance and at so low a cost that no engineering works have been delayed on account of the high price of or absence of the required quality in the produce of our ironworks during the period in question. On the other hand it is not to be denied that since the iron-masters have allied themselves with the chemist they have made more progress in thirty years than their predecessors did in three centuries.

No one unacquainted with the archæology of the iron trade could suppose that the colossal furnaces pouring forth their streams of molten metal, followed by the rapid action of the Bessemer converter, were the modern representatives of the iron-making appliances of former days. Out of the latter, in a low hearth not larger than a domestic fire-place, often dependent on the wind for their blast, a few pounds of ore were at a considerable cost for labour, fuel, and waste of metal, converted into malleable iron. By means of a modern furnace, in an hour and a half a 10-ton converter can be filled with liquid cast iron, which in twenty minutes may be run into ingots cheaper, stronger, and more malleable than the best wrought iron of our ancestors, or indeed of our own manufacture.

How out of the small fire of the ancient ironworks the German Stück-Ofen was evolved is a matter of conjecture. In both, owing to the conditions under which the fuel was burnt, carbon dioxide was largely the product of its combustion. The oxidizing property of this gas was in each the cause of the waste of metal just spoken of. Probably, and for other reasons than avoiding this loss of iron, attempts were made to increase the dimensions of the Stück-Ofen. If this addition were one of limited extent, the smelter would find, to his cost, that a substance was obtained which no longer possessed the malleable property of that obtained from the lesser furnace. This change would be due to the absorption of carbon, but not in sufficient quantity to constitute that valuable form of the metal known as cast iron. With a material useless for the smith and incapable from its difficult fusibility of being run into moulds, we can understand the delay which took place in the introduction of the blast furnace which about the middle of the sixteenth century gave to cast iron a recognized and valuable position in the arts.

In those days there was no very exact science to appeal to, for two hundred and fifty years after the "high furnace" of the Germans and French had been set to work, Fourcroy in his 'General System of Chemical Knowledge and its Application to the Phenomena of Science and Art,' arrived at the conclusion that cast metal was erroneously supposed to be a mixture of slag and iron or a compound of arsenic or manganese and iron. This was written in 1804 in a work of five thousand pages, when he leant to the opinion that Monge and Berthollet were more correct in considering the product of the blast furnace as consisting of iron, oxygen and carbon.

When the malleable iron-maker had placed in his hands a material containing, as the pig did, more than 90 per cent. of metal, he found it greatly to his advantage to avoid having to deal with all the earthy matter contained in the ores, for it was the presence of silica and alumina which helped to add to the waste incurred in the old hearths. The object sought for in the old Catalan fires, as they were called, in treating ore was one of a reducing or deoxidizing character, whereas the reverse of this was required when ore was replaced by pig-iron. In the first, oxygen had to be removed from the oxide of iron, in the latter oxygen had to be united with the metalloids found in the pig. These were distinctions unknown in the days we are considering, and therefore did not trouble the minds of the iron-masters. In both cases there was a large formation of oxide of iron, and when pig-iron was handed over to the Catalan furnace man, it was the oxide of iron so generated which performed the desired duty, and thus this simple mode of procuring malleable iron remained undisturbed for upwards of two hundred years.

The discovery which led to the discontinuance of the low blast furnace as a means of procuring iron in its malleable form was that of puddling made by Cort in 1784. In point of fact Cort's process was merely doing in a reverberatory furnace that which was previously effected by means of compressed air. In an economic point of view, however, the difference is great, and its consequences were of immense importance, for to the puddling furnace we were first indebted for an ample supply of cheap iron by which, in a variety of well-known ways, the interests of the human race have been so largely promoted. As an indication of the indifference of those formerly engaged in industrial pursuits to the scientific aspect of their calling, may be mentioned the fact that puddling had been largely followed for upwards of half a century before it occurred to any one to examine the chemistry of the process.

Down to the beginning of the seventeenth century the only fuel used in the blast furnace, and, indeed, in the manufacture of iron generally, was charcoal. In 1620 Dudley made several attempts to substitute mineral coal for vegetable fuel in his smelting works, which, by the exhaustion of timber, had become very expensive. He failed in this, and in consequence the British iron trade gradually fell until it was not equal to the production of one modern blast furnace. This happened in 1740, when Darby, by treating pit coal in the same fashion as the charcoal burners had done with wood, *i.e.*, by charring it, restored vitality to an expiring industry. It is true the restoration must have been of a languid character, for in half a century afterwards it is said the weekly produce of a furnace did not exceed 15 or 16 tons.

Various changes were introduced into the manufacture of iron in the first quarter of the present century, but these were rather of a mechanical than of a chemical nature. They chiefly owed their origin to the lessons taught by the chemist Black to James Watt, who profited by them in the application of steam as a motive power. This brings us to the year 1828, a year which will always be distinguished in the annals of the iron trade, by the discovery of Neilson of the value of heated air in smelting the ores of this metal. I never heard it pretended that this inventor had any pretensions to be considered a man of science. Had it been otherwise, the knowledge of the virtues of the hot blast might have been indefinitely postponed, and this opinion is founded on the fact that for many a long year no satisfactory explanation was given why heat obtained by burning coal in the hot air apparatus was capable of saving three or four times its weight in the fuel consumed in the furnace itself. I propose, with your permission, to consider this subject with more attention than I shall devote to other portions of this address, and I am led to do this, not only because it is one of some scientific interest, but because its study seems to afford a solution to some questions in respect to which great differences of opinion prevailed among those whose daily work led them to pay much attention to their details. These questions have all a reference to the quantity of fuel consumed in smelting the ore, as this may be affected by the temperature of the blast and the dimensions of the furnaces employed for this purpose.

As is well understood, the heat excited in an iron furnace may be classified under three heads:—

First, that derived from the combustion of the coke at the point where the blast enters the furnace, the ultimate product being carbonic oxide.

Second, the conversion of a portion of this carbonic oxide into carbon dioxide.

Third, the heat carried into the furnace by the blast.

For the better illustration of the relations which the heat derived from these sources bear to each other, a table (No. 1) has been prepared in which the quantities of each are given in centigrade calories, and reckoned upon 20 units of iron to correspond with English weights. The information upon which the calculations are based is derived from actual observation gathered from furnaces of different sizes and fed with air at different temperatures.

A second table contains statements showing the manner in which the heat so generated is appropriated in the various divisions of the duty the furnaces had to perform, and for facility of comparison, alongside the quantities of heat so required, their equivalents in the coke used have been added.

In the Table No. II. the appropriation of the heat is separated into *Constants* and *Variables*. The first consists of items where the quantity of heat in making a particular quality of iron is only liable to alterations of trifling amount. On the other hand the variables exhibit in A and B differences so considerable that work which in the furnace blown with cold air absorbed 73,388 calories per 20 cwts. of pig-iron was done with 58,645 calories by merely raising the blast to 485°.

The cause of this great variation in the amount of heat required for a given weight of pig iron, produced under different circumstances as to temperature of blast and size of furnace, depends on changes in the actual amount of work to be performed. How this arises will be best seen in the description of the four examples set forth in the two tables.

Beginning with A, which is a furnace 48 feet in height, blown with cold air and consuming 45 cwts. of coke and 18 cwts. of limestone per ton of metal, the volume of gas produced may be taken at 14,460 cubic yards at ordinary temperatures and pressures. At the temperature at which they escape we may assume the volume per ton of iron to be about 36,000 cubic yards, passing out of the furnace at the rate of 357 cubic yards per minute.

Table. I.

—	A	—	—	—
Height of furnace in feet.	48	48	80	80
Calories—per unit of coke burnt to CO . .	2078	2028	2018	2045
Calories—from portion of this CO burnt to CO_2.	560	1059	1636	1463
Total calories from coke	2638	3087	3654	3508
Calories in blast. . .	—	508	534	732
Total heat per unit of coke	2638	3595	4188	4240
Temperature of blast C	0°	485°	485°	695°
Cwts. blast per ton of metal	228	128	103	94
Cwts. escaping gases per ton of metal . .	285	170	138	126
Cwts. slag per ton of metal	34	31	29	28

In comparing the consumption of coal formerly burnt in the hot-air stoves with the saving of coke in the furnace, account must be taken of the different conditions of the combustion. In Table I., owing to the small quantity of carbon dioxide formed, the heat evolved is only 2638 calories per unit of coke, whereas each unit of the coal consumed in heating the air afforded three times this quantity of heat. Doubtless there was a great loss in the operation of heating the air, for it would not appear that much above one-

Table II.—Showing the appropriation of Heat and its equivalent per ton Iron.

Appropriation of heat per 20 of pig iron.	A—Blast 0° C.		B—Blast 485° C.		C—Blast 485° C.		D—Blast 695 C.	
	Calories.	Cwts. coke.	Calories.	Cwts. coke.	Calories.	Cwts. coke.	Calories.	Cwts. coke.
CONSTANTS:—								
Reduction of Fe_2O_3 in ore	33,108	12·550	33,108	9·209	33,108	7·905	33,108	7·808
Reduction of metalloids in pig . . .	4,174	1·582	4,174	1·161	4,174	·996	4,174	·984
Dissociation of CO($2CO=C+CO_2$ . .	1,440	·546	1,440	·400	1,440	·344	1,440	·340
Fusion of pig-iron	6,600	2·501	6,600	1·836	6,600	1·576	6,600	1·557
Constant calories per 20 of pig . . .	45,322	—	45,322	—	45,322	—	45,322	—
Coke consumed per 20 of pig . Cwts.	—	17·179	—	12·606	—	10·821	—	10·689
VARIABLES:—								
Evaporation of water in coke. . . .	630	·239	411	·114	312	·074	298	·070
Decomposition of water in blast. . .	5,420	2·055	3,348	·931	2,720	·649	2,408	·568
Expulsion of CO_2 in limestone . . .	6,660	2·526	5,920	1·647	5,054	1·207	4,070	·961
Reduction of CO_2 in limestone to CO .	6,912	2·620	6,144	1·709	5,248	1·254	4,099	·962
Fusion of slag	18,590	7·045	17,325	4·819	16,720	3·993	15,565	3·673
Carried off in escaping gases	29,482	11·178	18,486	5·144	11,043	2·636	8,906	2·101
Heat in tuyère water at hot-blast furnaces, loss from walls, etc. .	5,694	2·158	7,011	1·950	7,057	1·686	9,389	2·216
Variables for 20 of pig	73,388	—	58,645	—	48,154	—	44,735	—
Variables for coke for 20 of pig . Cwts.	—	27·821	—	16·314	—	11,499	—	10·551
SUM OF CONSTANTS AND VARIABLES:—								
Calories for 20 of pig-iron	118,710	—	103,967	—	93,476	—	90,057	—
Cwts. of coke for 20 of pig-iron . . .	—	45·	—	28·92	—	22·32	—	21·24

fourth of the theoretical quantity of heat capable of being generated by the coal reached the furnace through the tuyères.

We have now to consider the nature of the change which is effected in a furnace where, for every 2638 calories generated by the combustion of the coke, 508 calories are carried in by the blast. It will be readily understood that with the velocity at which the gases are passing out of the cold-blast furnace they have but little time to impart their heat to the incoming solids, or to have the carbonic oxide they contain converted into carbon dioxide. The withdrawal of so much coke, and its place taken by heat contained in the blast, means that the 14,460 cubic yards of escaping gases are reduced to about 12,120 cubic yards. The effect of this is not only to alter the speed at which the gases are passing through the materials, but to alter the relation in point of quantity which the ironstone present in the furnace bears to the coke, so that in point of fact a larger space is occupied by the ore than was before, and a lesser one by the fuel. We have thus the carbonic oxide passing more slowly over the oxide of iron at the same time than there is a greater quantity of the oxide exposed to the influence of the reducing gas. To illustrate how this operates, a table has been prepared showing how each 1000 cubic feet of furnace space is occupied in the four cases we are considering:—

		A. 48 ft. cold blast.	B. 48 ft. hot blast.	C. 80 ft. blast.	D. 80 ft. blast.
Coke	cubic feet	786	686	590	590
Limestone	„	63	75	86	77
Ironstone	„	201	239	324	333
		1000	1000	1000	1000

The immediate effect of the introduction of the hot blast is to alter the spaces filled by the three minerals from those given in column A to coke 686, limestone 75 and ore 239 cubic feet. This is followed by a twofold advantage. Volume for volume, ore and limestone possess double the heat-intercepting power of coke, and there is 19 per cent. more ore ready to oxidize the carbonic oxide passing over it at a reduced speed of 16 per cent. than there was when using cold air. The increased efficiency of the coke, due to a more perfect cooling of the gases and higher oxidation of the carbonic oxide, permits its further suppression until the relative spaces filled by the materials are those shown under Column B. These advantages would not of themselves suffice to save 16 cwt. of coke or thereabouts out of 45 cwts., but the reduction in the coke consumed is followed by a diminution in the quantity of air used and in the weight of gases and slag produced. A reference to the appropriation of heat classified under the head of variables will show in consequence diminution from 73,338 to 54,643 calories.

It may be asked whether this prolonged exposure of the ore to the reducing gases could not be secured by driving the furnace at a slower speed. There is, however, a point which may be regarded as one of equilibrium, in which the quantity of cold material charged at the top just suffices to reduce the temperature of the gases, leaving it as far as is possible consistent with the dimensions of the furnace. If the volume of blast entering at the tuyères is lowered one-half it would mean that the materials would be exposed for twice the time to the hot gases they were previous to the alteration in the rate of driving. The elevation in the temperature of the coke would enable its carbon to act on the carbon dioxide, so that there would ensue as great a loss under the second head of heat evolution in Table I., as there is gained by a more perfect interception of the heat contained in the gases.

(*To be concluded.*)

Obituary.

Notice has been received of the death of the following:—

On the 30th of August, Mr. Thomas Samuel Saunders, Chemist and Druggist, 76, New Bond Street, London. Aged 38 years. Mr Saunders was an Associate of the Society in business.

On the 31st of August, Mr. Alfred Gower, Chemist and Druggist, Tunbridge, Kent. Aged 65 years. Mr. Gower had been a Member of the Pharmaceutical Society since 1871.

On the 1st of September, Mr. Alfred Ball, Pharmaceutical Chemist, High Street, Loughborough. Aged 48 years.

On the 3rd of September, Mr. John Thomas Abbott, Chemist and Druggist, Chelsworth House, Darlington. Aged 65 years.

On the 4th of September, Mr. John Clapton, Chemist and Druggist, Chester Street, Coventry. Aged 42 years.

On the 6th of September, Mr. John Davies, Chemist and Druggist, Claverton Street, Pimlico, London. Aged 68 years.

On the 14th of September, Mr. William Young, Pharmaceutical Chemist, Atlantic Road, Brixton. Aged 53 years. Mr. Young was a Life Member of the Pharmaceutical Society, having joined it in 1866.

On the 15th of September, Mr. Henry Sagar, Pharmaceutical Chemist, Caledonian Road, Leeds. Aged 74 years. Mr. Sagar had been a Member of the Pharmaceutical Society since 1853.

On the 17th of September, Mr. George Pearmain Chifney, Chemist and Druggist, High Street, Mildenhall, Suffolk. Aged 32 years. Mr. Chifney was an Associate of the Pharmaceutical Society.

On the 18th of September, Mr. Richard Shillito, Chemist and Druggist, Holbeck, Leeds. Aged 65 years.

On the 18th of September, at his residence, 38, Talgarth Road, West Kensington, Mr. John George Shirley, Pharmaceutical Chemist, of Westbourne Place, Bayswater. Aged 68 years. Mr. Shirley was a Life Member and a Founder of the Pharmaceutical Society, having joined it in 1841.

Correspondence.

THE ALCOHOLIC STRENGTH OF THE B.P. TINCTURES.

Sir,—In the discussion which followed the reading of Mr. Proctor's paper on "Tincture of Senna" at the Conference, more than one speaker made allusion to the need there is for the introduction of greater variety in the strength of the alcoholic menstrua employed in the preparation of the pharmacopœial tinctures.

Bearing upon this subject I may say that more than twelve months ago, I made every drug tincture in the B.P. with alcohol of four different strengths, with the object of ascertaining whether the strength of the alcohol employed might not in some cases be modified with advantage. Up to the present I have been unable from want of time to estimate more than a few of them, but propose now to continue my experiments, and publish the results when the investigation is complete. R. WRIGHT.

J. F. Smith.—We are unable to furnish you with the information asked for.

H. G. Robinson.—The 'Druggists' Circular' is published by W. O. Allison, 72, William Street, New York; the 'Western Druggist,' by Engelhard and Co., Chicago; and the 'Drug Clerk's Journal' at 175, Dearborn Street, Chicago.

Aiax.—No doubt such employment could be obtained, especially if you make use of the advertising sheets.

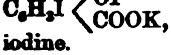
COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Twigg, Proctor, Thresh, Groves, Salmon, Dott, Reynolds, Clague.

"THE MONTH."

New Sugar Compounds.

A recent observation made by Professor E. Fischer appears to open up quite a new field for investigation in connection with the group of sugars. The reduction of a carboxyl group in an acid to an aldehyd group, through the agency of nascent hydrogen, has been frequently attempted without success. But Professor Fischer has found that this reaction can be effected in the acids of the sugar group with great ease by means of sodium amalgam (*Berichte*, xxii., 2204). Thus, for instance, gluconic acid, the oxidation product of glucose, when treated in cold aqueous solution with sodium amalgam, and neutralized from time to time with sulphuric acid, is readily reduced, yielding a sugar that reduces Fehling's solution and is probably identical with dextrose. Killiani has already shown that the known glucoses can by treatment with hydrocyanic acid be converted into the corresponding carbonic acid containing one more atom of carbon, and such a compound is now shown to be reducible to another of the sugar type also containing more carbon. It is believed that this process can be repeated, yielding a series of "sugars" increasingly rich in carbon.

Iodised Phenols: Annidalin.

The reactions that take place between iodine and compounds of the phenol group in the presence of an alkali have been studied by Messrs. Messinger and Vortmann, who describe a number of new compounds, one of which it is intended to introduce into medicine as a substitute for iodoform (*Berichte*, xxii., 2312). Upon adding solution of iodine in potassium iodide to an alkaline solution of phenol, in the proportions of eight atoms of iodine to one molecule of phenol and four molecules of potassium hydrate, and heating the mixture to 50° or 60° C., a dark red non-crystalline precipitate falls, which has the composition of diodphenoliodide ($C_6H_3I_2 \cdot OI$), and is apparently isomeric with the already known white triodphenol, into which it is easily converted by boiling in potash solution and reprecipitation from solution by an acid. When dry the new compound is violet coloured, odourless, insoluble in water and dilute acids, soluble in alcohol with a red colour, and freely soluble in benzol and chloroform. The cresols form analogous compounds. Thymol combines in the proportion of three atoms of iodine to two molecules of thymol, the product being probably a dithymol compound. When properly prepared it is red and will retain this colour several months if kept dry and protected from light; but in contact with moisture it is readily decomposed, giving off iodine and passing into a pale yellow compound containing only two atoms of iodine to the double molecule of thymol. It is the red compound apparently which it is proposed to introduce as a substitute for iodoform, under the name "annidalin." It is described as being amorphous, insoluble in water, slightly soluble in alcohol and freely soluble in ether and chloroform. Resorcin treated similarly yields a diiodresorcin iodide, while the oxybenzoic acids form alkali salts of corresponding di-iodized acids, the compound with salicylic acid being represented by the formula  $C_6H_3I\left\langle\begin{matrix}OI\\COOK\end{matrix}\right.$, and containing 59·3 per cent. of iodine.

Synthetic Carbolic Acid.

At the pharmaceutical exhibition held in connection with the recent meeting of the Deutsche Apotheker-Verein considerable interest was excited in a sample of "synthetic carbolic acid,' an article now being sent out by the Badische Anilin- und Soda-Fabrik. This acid is claimed to be chemically pure, and consequently absolutely free from the impurities derived from tar with which the best qualities of carbolic acid hitherto available have been contaminated. It differs from ordinary carbolic acid in having a higher melting-point (41° to 42° C. against 35° to 37° C.), and in having a "weak pure smell" which does not in the least resemble that of tar, a 5 per cent. solution in water being hardly recognizable by its odour. It is described as boiling at 181° C. if the thermometer be enveloped in the vapour, as being entirely anhydrous, and as giving a clear solution in water. Apart from the advantages presented by so pure an article as this is represented to be when used for medicinal purposes it seems obvious that it would prove a superior material for the manufacture of artificial salicylic acid. It will also be interesting to note whether in the absence of the usual impurities the well-known red coloration of the acid after exposure takes place.

Phenolated Celluloid.

Under the name "phenolated celluloids" M. Desesquelle describes a class of preparations that may possibly find useful application as dressings for wounds (*Répertoire*, Aug. 10, p. 338). They are made by macerating pharmaceutical gun cotton at the ordinary temperature in one of the liquids formed by the combination of a phenol with camphor. The pyroxylin gradually swells, and by agitation of the mixture there is obtained a kind of homogeneous paste, more or less viscous according to the proportions employed, and resembling collodion. When spread upon a level surface this liquid forms after a time, through the evaporation of the camphor, a very adherent solid and transparent varnish.

Suggestion as to Nomenclature.

Considering the puzzling diversity of names applied to the ever increasing number of antipyretics and other synthetic compounds that are being introduced into medicine, a suggestion made in the July number of *Merck's Bulletin* for their reduction to something like order is worthy of attention. The group taken as an illustration includes the compounds known under the trivial names "antifebrin," "antisepsin," "exalgin," "methacetin," and "phenacetin," and it is proposed that the last four should bear names showing their relation to the first, that being now a well-known compound of recognized therapeutic properties. Thus, since antifebrin has the chemical constitution of phenylacetamide, and antisepsin that of bromphenylacetamide, or phenylacetamide in which an atom of bromine occupies the place of an atom of hydrogen, it is suggested that antisepsin would be more conveniently designated as "bromated antifebrin." In like manner, exalgine being methylphenylacetamide, or phenylacetamide with an atom of hydrogen substituted by a methyl group, it is suggested that it should be called "methylated antifebrin." Methacetin, it is claimed, could be correctly described as oxymethylphenylacetamide, and phenacetin as oxyethylphenylacetamide, or phenylacetamides in which an atom of hydrogen has been substituted by an oxymethyl or an oxyethyl group respectively, and accordingly it is proposed that the former be called "oxymethylated antifebrin" and the latter "oxyethylated antifebrin." Other close relations between the new compounds have been pointed out in this Journal on various occasions. It is obvious that the new names suggested are themselves not free from objection as being more cumbersome than those they are to displace, to say nothing of their hybrid character; but it is claimed that the characters and properties of antifebrin being now common knowledge, the names proposed would be usefully suggestive to chemists and therapeutists as to the nature and properties of the compounds that bear them. The question of proprietary rights in advertised names would also probably interfere to some extent with even so desirable a change as the substitution of a systematic terminology for the present aimless and haphazard one.

Crystallized Ferrous Phospho-Citrate.

At the recent Congress on Therapeutics held in Paris, M. Lecerf brought under notice a sample of crystallized ferrous phosphocitrate (*Répertoire*, Sept. 10, p. 387). The process followed in its preparation was to treat a solution of ferrous sulphate with sodium phosphate in excess, wash the resulting precipitate carefully and then place it in a concentrated solution of ammonium citrate and allow it to stand during four or five days at a temperature of 40° C. At the end of that time the solution, which had become coloured, was decanted and a fresh quantity of solution added, and this was repeated until the solution no longer acquired more than a faint greenish tinge, by which time the precipitate had lost its original blue colour and become white. The precipitate was then thrown upon a filter, washed rapidly first with distilled water and then with alcohol, and dried under shelter from air. The salt appears as a faintly greenish white crystalline powder, soluble in cold water, very soluble in hot water, and insoluble in alcohol. When exposed to the air it peroxidizes readily, and assumes a brown tint that darkens as the oxidation progresses.

Ammonium Iodide.

A useful hint is given by Mr. Falk for the treatment of ammonium iodide that has become decomposed and coloured through keeping (*Am. Journ. Pharm.*, Sept., p. 464). The treatment consists in placing the coloured iodide in a bottle together with a vitreous piece of ammonium carbonate wrapped in filter paper and stoppering the bottle closely. The ammonia disengaged from the unstable carbonate combines with the free iodine in the discoloured sample to reform ammonium iodide, and when this has been effected the ammonium carbonate is removed and the bottle left unstoppered until the excess of ammonia has disappeared.

Cotton-Seed Oil in Olive Oil.

M. Labiche proposes a modification in the process that has been recommended for the recognition of the presence of cotton-seed oil in olive oil by its reaction with nascent lead oxide (*Répertoire*, Aug 10, p. 352). It consists in mixing 10 c.c. of the oil to be examined with 10 c.c. of ether, adding 5 c.c. of a concentrated solution of neutral acetate of lead, shaking, and then pouring in 5 c.c. of solution of ammonia. If cotton-seed oil be present an orange-red colour is produced, and the test is said to be sufficiently delicate to detect an admixture of ·5 per cent.

Castor-Oil Chocolate.

As a means of making castor oil palatable, M. Giraud recommends its incorporation with chocolate (*Pharm. Zeit.*, June 22, p. 384). This is done by working up into a mass, on a warm plate, 50 parts of cacao powder freed from oil, 50 parts of castor oil, 100 parts of powdered sugar, and vanilla sufficient for flavouring. The product may then be formed into tablets or pastilles. It will be seen that the castor oil is here made to take the place of the removed cacao fat. About 10 grams of the chocolate is a sufficient dose for a child.

Mandragorine.

In a preliminary note published a few months since (see *Pharm. Journ.*, June 8, p. 989), Herr Ahrens gave some information as to what he believed to be two different alkaloids that he had separated from mandragora root and that appeared to be probably isomers of atropine. Since then he has made further experiments with larger quantities of fresh root from Sicily (said to be derived from *Mandragora vernalis*), Venice and Trieste. Only the Trieste root yielded any alkaloid worth mentioning, but whether this difference depended upon the parcels being derived from different species or being gathered at different stages of growth cannot be stated. Only one alkaloid was detected in this investigation, and this instead of being isomeric with atropine as supposed, appeared to contain more hydrogen. An attempt is being made to prepare a hydride of atropine for the purpose of comparing it with mandragorine. It has been ascertained that solutions of mandragorine and of its salts produce mydriasis when administered internally or applied directly to the eye.

Alkaloids in the Poppy.

Some interesting details have been published recently by M. Clautrian as to the time of the appearance of alkaloids in the *Papaver somniferum* and their localization in the plant (*Journ. Pharm. Chim.*, Aug. 15, p. 161). According to the author the young plant is not poisonous, and not until it has attained a height of five or six inches does it contain appreciable traces of morphine, which then occurs in the whitish latex, but not at the growing point or in the rootlets. The morphine is most abundant just at the time when growth ceases and fat and albuminoids commence to accumulate in the seed. The laticifers containing the alkaloids have a marked tendency in the roots to become localized under the epidermis, but wherever there are laticifers or latex there are to be found morphine and meconic acid, and probably also narcotine, papaverine and codeine. The presence of thebaine is thought doubtful. The alkaloids do not however remain exclusively in the latex: they are to be found also in the epidermal cells, in the small and thick-walled cells of the epidermis of the capsule, in less quantity in those of the epidermis of the peduncle and the leaves, plentifully in the stigmatic cells and in the hairs of the peduncle, especially at their base. They are absent, however, from the epidermis cells of the root and do not seem to occur in the seeds. They persist longest after maturation in the epidermis cells of the capsule, but eventually they entirely disappear.

It was pointed out by Pasteur in his classic work on wine that beer which has been fermented with the wine ferment has the odour of wine. Similarly grape juice fermented under the influence of

Wine Bouquet.

beer yeast acquires the odour of beer, and it is now generally recognized that the secretion produced by each yeast during fermentation has an odour peculiar to itself. This has suggested to M. Rommier the possibility of communicating to a common wine the bouquet characteristic of a wine of good quality by changing the agent of fermentation (*Journ. Pharm. Chim.*, Aug. 15, p. 145). Laboratory experiments made upon grape juice sterilized by heat with ellipsoidal ferments taken from different kinds of grapes showed that each variety of ferment is capable of communicating to the fermenting juice its characteristic odour, but a difficulty presented itself in the fundamental changes brought about in the constituents of the juice in the operation of sterilization. It was then observed that wine ferments taken from fermenting liquor multiply more quickly than the spores of yeasts and moulds occurring on the grape skin, and not yet brought into activity. In fact when such active ferment is introduced into the vat at the commencement of a fermentation it develops so rapidly that it quite paralyses the germination of the natural ferments, as long as the temperature remains below 21° or 22° C. Above that temperature the introduced and the native ferments develop side by side, but the former still exercises sufficient influence to modify the bouquet of the resulting wine. Thus the active ellipsoidal ferments from the white wines of Champagne and Buxy, and the red wine of Côte-d'Or, added to a grape juice that ordinarily gives an insipid wine, almost free from bouquet, and kept at a temperature between 22° and 28° C., yielded products that in each case possessed a bouquet resembling that of the wine from the respective district from which the ferment was derived.

Cubebs.

In the September report by Messrs. Gehe and Co. reference is made to the fact that the fine qualities of cubebs formerly imported are at present seldom met with. Most consignments now consist of mixtures of genuine fruit in different stages of maturity, which may, as a rule, be separated without difficulty under the four following types. (1) Small unsightly much shrivelled grey-brown to grey-black fruit, scarcely 2 mm. in diameter, and collected in the first stage of ripening; the stalk one and a half times to twice as long as the fruit; the seed shrivelled and often scarcely perceptible. (2) Fruit grey-black, 4 to 4·5 mm. in diameter, closely, but not very deeply and sometimes only faintly wrinkled; stalk as long as or one and a half times as long as the fruit; part of the seed well-formed and then round, adherent to the base, brown externally, greyish-yellow internally, with a horny appearance towards the circumference, and part shrivelled and of a blacker hue. (3) Fruit 5 mm. and upwards; stalk 5 to 7 mm. long; colour more of a grey-brown; wrinkles deeper and less numerous; seeds mostly developed, spherical, light brown, yellowish-white internally, frequently mealy and seldom horny. (4) Besides the foregoing most parcels contain 5 to 10 per cent. of yellowish fruit, having an easily separable cork-like covering; the fruit-shell is very friable and does not withstand the pressure of the fingers; the seed is undeveloped and adherent to the base as a more or less shapeless mass. Apparently these are genuine fruit that have been affected in their development by fungoid or weather influences. Nos. 1, 2 and 4 are coloured red immediately by concentrated sulphuric acid; No. 3 becomes at first yellow to yellow-brown, and blood red after an hour or more. In addition admixtures of false cubebs are not unfrequently met with; but these can usually be recognized by the seed being adherent to the inner wall of the fruit; in shape they vary, being sometimes round and then usually stalkless, or more pear-shaped and stalked. For pharmaceutical purposes preference is to be given to parcels containing a large proportion of the variety described as No. 2.

Passage of Gases through Plants.

In a communication recently laid before the Vienna Academy of Sciences Messrs. Wiesner and Mollisch have published some interesting results of their joint work in vegetable physiology (*Pharm. Post*, Sept. 22, p. 681). They have found that neither living nor dead vegetable cell-membrane allows dry gases even under pressure to filter through, either when the membrane is dry or when saturated with moisture, but that the movement of gases in plants is a process of diffusion, which goes on more rapidly in proportion as the cell-membrane is saturated with water. The greatest amount of diffusion takes place when the membranes of algæ or of submerged water-plants act as dialytic diaphragms. Carbonic acid diffuses through the membrane more rapidly under similar conditions than hydrogen, oxygen or nitrogen; generally speaking the rapidity with which gases diffuse through the cell-membrane is dependent upon the absorption co-efficient and density of the gas. Further, carbonic acid diffuses out from vegetable cells more rapidly into air than into water and probably the same holds good with other gases.

Tincture of Strophanthus.

In an article in the *American Journal of Pharmacy* (Sept., p. 454) Mr. G. M. Beringer recommends the use of a menstruum consisting of seven volumes of alcohol (sp. gr. 0·820) to one of water as the best for tincture of strophanthus, since the tincture of this strength shows no sign of precipitation even after being kept for a year. To get rid of the oil he prefers to treat the dried and powdered seeds with petroleum ether, sp. gr. 0·6829 at 60° F., in preference to ordinary ether. He also directs attention to the fact, first pointed out by L. Larmuth, and often overlooked, that the bitter principle, when dissolved in water, in a few days undergoes some change and becomes far more toxic than when recently prepared. He recommends, therefore, that the tincture should not be prescribed in aqueous solution. The seeds experimented with by him were those of the Kombé variety. In view, however, of the different kinds of seeds used in commerce under the name of strophanthus seeds, and of the amorphous and crystalline bodies obtained from different seeds by various chemists (see *Pharm. Journ.*, [3], xix., p. 207), it seems doubtful if any real advance can be made in the pharmacy of this drug until the crystalline bodies have been carefully worked out from the chemical side.

Hyoscine.

Some experiments with hyoscine prepared by Ladenburg have been undertaken by Messrs. Magnan and Lefort (*Practitioner*, September, p. 219). They find that in doses of $\frac{1}{60}$th of a grain it produces excellent results in acute mania, in five minutes after ingestion. The patient loses his morbid activity and grows silent, then mydriasis and loss of power of accommodation follow, and the patient goes to sleep for five or six hours without further inconvenience. It has also been used successfully in delirium tremens, and in severe local spasms in a child. In view, however, of the facts pointed out by Dr. Mitchell Bruce (*Practitioner*, xxxvii., p. 321) that doses of $\frac{1}{100}$ of a grain may produce symptoms of failure of the heart and Cheyne-Stokes breathing, it may be mentioned that M. Laborde finds that doses of one-tenth the quantity used by Messrs. Magnan and Lefort are sufficient for the purpose.

Royal Salep.

Dr. J. E. T. Aitchison has at length published in the *Annals of Botany* a full account of the badsha, or royal salep, a substance largely used as food in some parts of Afghanistan. This salep was described in a former volume of the *Pharmaceutical Journal*, but its botanical origin was then unknown. Dr. Aitchison recently identified it as a species of *Allium* (figured in the *Botanical Magazine*, t. 6707), *A. Macleani*. It is remarkable that although an *Allium* it does not possess any alliaceous odour. It also presents a remarkable peculiarity in the fact that the innermost scale of the bulb is remarkably fleshy and forms the greater proportion of the bulb, only a few outer scales of a membranous character being present. It does not contain starch, but, as with salep, its properties are due to mucilage.

Berberis Lycium.

In the *Botanical Magazine* for September (t. 7075) Sir J. D. Hooker has given an excellent illustration of the *Berberis Lycium*, which flowered in the Kew Arboretum in June and fruited in September. The extract, which is known in India under the name "rusot," and is identical with the lycium described by Dioscorides, is still esteemed in India as an application in ophthalmia and internally in diarrhœa, dyspepsia and general debility. The history of this ancient drug is given in 'Pharmacographia,' and specimens of the extracts are to be seen in the Museum of the Society at Bloomsbury Square, and of the dried plant in the Hanbury Herbarium.

Oil of Cedar.

According to a note in the *Garden and Forest* the distillation of oil of cedar (*Juniperus Virginiana*), which has long been carried on in the pencil mills at Cedar Keys, in Florida, from sawdust and wood of inferior quality unsuitable for pencil making, is likely to be carried on in other States, since straight-grained timber suitable for pencil making has become scarce in Florida and along the streams of the west coast, where the best used to be found. The supply of cedar timber of suitable quality is said not to be large in proportion to the demand, and not likely to hold out many years longer.

Mentha viridis.

At a meeting of the Scientific Committee of the Royal Horticultural Society on July 23, Professor Henslow called attention to the abundant flowering of *Mentha viridis* during the present season, and stated that the flowers appeared to be all female only, with rudimentary stamens, the plant being apparently, like so many other labiates, gyno-diœcious. At the same meeting Professor Marshall Ward exhibited a specimen of mint showing spiral torsion, the leaves becoming alternate in a secund manner by a twist through a semicircle and not by a development of internodes (*Gard. Chron.*, Aug. 10, p. 168).

The Pharmaceutical Journal.

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SATURDAY, SEPTEMBER 28, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

OPENING OF THE NEW SESSION.

With the advent of October scholastic and most other holidays come to an end, and professional and business men, professors and pupils, have to put on the harness for a fresh spell of work. The medical schools, as a rule, signalize the opening of the month with inaugural addresses, and following an honoured custom the Pharmaceutical Society of Great Britain has for several years past secured the kindly services of some eminent man to address words of encouragement and advice to the incoming and outgoing students in its School of Pharmacy. For many years in succession this office was filled by leading pharmacists, but more recently the Council has gone further afield and has obtained on several occasions the sympathetic help of men of world-wide reputation in the medical and allied sciences. This year, at the inaugural sessional meeting that will be held in the Society's House on Wednesday evening next, the students are for a second time to be addressed by a President of the General Medical Council, Professor John Marshall, F.R.S., having kindly undertaken to perform the duty on that occasion. The presentation by the Professors and Teachers of their reports on the work done by the students of the previous session, and the Distribution of Prizes to successful students by the President, always precede the address on these evenings, and as they invariably evoke intense interest, and as the invitation to be present is extended by the Council to all the students and their friends, ladies as well as gentlemen, it is hardly necessary to bespeak for Professor Marshall a full audience. But we are sure that all present, to say nothing of many who will be unable to attend, will appreciate at its proper value the presence and advice of the President of the Medical Council.

Although most students intending to put themselves under pharmaceutical tuition during the coming session will have already made their arrangements, it will not be inopportune to call attention to some of the principal arrangements in the School of Pharmacy carried on in the Society's premises, which will be brought into such prominence by the proceedings of the evening.

Briefly, they are as follows. Chemistry, including Physics in their relation to Chemistry, is dealt with in the session in two courses of lectures, delivered by Professor Wyndham Dunstan on Monday, Tuesday and Wednesday mornings at nine o'clock. These courses are not repetitions, but the first course, which extends from the beginning of October to the end of March, is designed to meet the requirements of elementary students, as it deals with the principal facts of chemistry and of the branches of physics most closely allied to it, while the second course, which commences in the third week in April and ends in the second week in July, is chiefly concerned with organic chemistry and is more particularly intended for advanced students. Practical Chemistry is provided for in the Laboratories under the supervision of Professor Attfield and his assistants. A junior course occupies about six months, the senior course filling up the remainder of ten months, and either can be commenced at any time when the laboratories are open. The lectures on Botany, delivered by Professor Green on Friday and Saturday mornings, are also divided into courses, the first and longer one dealing with the Morphology and Anatomy of Plants, and the second, which is delivered in the Royal Botanic Gardens, Regent's Park, with the principles of Classification. In connection with these lectures classes for practical histological and other work are held under the direction of the Professor. On Thursday mornings Materia Medica is taught by Mr. E. M. Holmes, the Curator of the Society's Museum, in lectures followed by demonstrations. Here also there are two courses, the first covering a description of the physical characteristics and active principles of all the more common animal and vegetable drugs, the means of distinguishing drugs of good quality, and of recognizing adulterations and substitutions, as well as their geographical, botanical and commercial sources, whilst the second course deals with other drugs less frequently met with in this country, and includes instruction in the use of the microscope in the recognition of simple drugs and of impurities in powders. Lastly, Pharmacy and Practical Pharmacy are in the competent hands of Mr. Joseph Ince, whose lectures and demonstrations are delivered on Tuesday, Thursday and Friday afternoons, commencing on the 4th of October, a complete course lasting five months.

Returning to the subject of the meeting on Wednesday evening next, mention must not be omitted that it will derive additional interest from the ceremony of the presentation of the fifth Hanbury Medal. This medal, it will be remembered, was instituted as a memorial to the late Daniel Hanbury, and is awarded biennially for high excellence in research in the natural history and chemistry of drugs. Previous recipients have represented Germany, England, Russia and the Indian Service. On this occasion the medal will go to France, it having been awarded to Professor Gustav Planchon, M.D., D. es. Sc., Director of the Paris School of Pharmacy, who it is hoped will be present to receive it in person.

We are glad to be able to state, in reference to a subject mentioned in these columns last week, that the Council of the Midland Counties Chemists' Association has now decided that the classes for pharmaceutical students in connection with the association shall be resumed on Monday evening, October 14, the lectures to be delivered in the Educational Chambers, 90, New Street, Birmingham. A "Preliminary" class will meet on Monday and Wednesday evenings, at half-past eight o'clock, at which the subjects of English, Latin and Arithmetic will be taught by Mr. Stokes Dewson, and the same gentleman will lecture on Chemistry and Chemical Physics on Tuesday evenings. Materia Medica will be taught on Friday evenings, from eight to nine o'clock, by Mr. F. H. Alcock, after which Mr. G. E. Perry will conduct a Pharmacy class for an hour. Arrangements for an advanced class and a class for Practical Dispensing are under consideration, but the formation of these classes will be dependent upon the number of persons who intimate their wish to join them. Further particulars may be obtained from either of the Honorary Secretaries, Mr. C. Thompson, 159, Stratford Road, Sparkbrook, or Mr. F. H. Alcock, Temple Chambers, Broad Street Corner, Birmingham.

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The opening meeting and Conversazione of the Midland Counties Chemists' Association is to be held at the Midland Hotel, New Street, Birmingham, on Tuesday, October 8, when an inaugural address will be delivered by the President, Mr. W. F. Wyley.

* * *

The inaugural meeting of the fifth session of the Sheffield School of Pharmacy will be held on Thursday evening, October 10, when an address will be delivered by Mr. S. R. Atkins, of Salisbury. On the same day, but previous to this meeting, the Annual Dinner of the Sheffield Pharmaceutical and Chemical Society will be held in the Masonic Hall, Surrey Street.

* * *

A remarkable case of poisoning, which occurred at Kilburn, has been reported in the daily papers this week. Four young men gathered a quantity of berries and one of them took them home, believing them to be edible, and had a pie made of them, with the result that himself, his wife and three children had to be taken to St. Mary's Hospital. The other three men, who also had apparently eaten some of the berries, were subsequently taken to the same hospital. The berries, which were shown to Mr. Allen, pharmaceutical chemist, of Kilburn, were at once recognized by him as those of belladonna. Fortunately belladonna is a somewhat rare and local plant, or cases of poisoning might be more frequent, the berries bearing a strong resemblance to small blackberries in size and colour. The plant from which the berries were gathered appears to have been growing by the Metropolitan Railway at Kilburn, the seeds having probably got there in chalk ballast, which is often used for draining railway cuttings in clayey soil.

* * *

We regret to have to report the death on Wednesday last, of Mrs. Louisa Kennett, who was elected an annuitant on the Benevolent Fund in the year 1880. This is the fourth death that has taken place among the annuitants since the last election.

British Pharmaceutical Conference.

MEETING AT NEWCASTLE-UPON-TYNE.

FIRST DAY'S PROCEEDINGS.

Tuesday, September 10.

(*Continued from page* 231.)

The next paper read was a—

NOTE ON EXTRACT OF STRAMONIUM.

BY A. W. GERRARD, F.C.S.

A few months ago, requiring some extract of stramonium hurriedly for a prescription, and finding our stock exhausted, my attention was directed to the quickest way of preparing some so as to best meet the requirements of the case. As the official process is somewhat lengthy, occupying much time, it was thought that percolation of the stramonium seeds with ether to remove oil might be omitted, and exhaustion at once effected by means of proof spirit. Accordingly some well bruised stramonium seeds were exhausted with hot proof spirit; and from the tincture on evaporation a satisfactory extract was obtained containing very little fixed oil; the oil was easily removed by washing with a few drachms of ether.

Believing the above process might be made the basis of an improvement on that followed in the B.P., especially as regards shortening time and saving ether, the following experiments were instituted to determine the point.

In the first place it was essential that the yield of fixed oil and of extract by the official process should be determined, so as to compare them with the yield by proof spirit. For this purpose four samples of stramonium seed from various sources were exhausted consecutively with ether and proof spirit. The average percentage of fixed oil obtained was 23·1, of dry extract 4·47.

In the next experiment 1000 grains each of the above samples of seed were exhausted by maceration and percolation with proof spirit, the solutions on evaporating yielding extracts almost free from fixed oil, having merely a slight greasiness; in fact, less fixed oil had been dissolved by cold proof spirit than by hot, as would be expected. The extracts of the above operation, after washing with ether and drying, gave an average yield of 4·4 per cent. extract. So far the results were decidedly in favour of omitting ether percolation, and although ether had been used it did not amount to one-fortieth the volume required to remove the oil from the seeds. Moreover, it is my opinion that in a general way even washing the extract with ether might be dispensed with, for the extract does not contain anything like the amount of oil present in extract of nux vomica.

The next step was to prove that so far as strength and active principle were concerned, the new extract was identical with that of the B.P., a matter about which there could be very little doubt. For this purpose fifty grains of each extract was dissolved in a little water, a large excess of ammonia added, and the mixture well shaken with three successive quantities of chloroform. The chloroform on separation and evaporation gave from the official extract a residue of daturine weighing 2·2 grains, and from the extract by the new process 2·15 grains, practically no difference except what may be ascribed to experimental error. As it is thus evident that the active principle is present in the new extract in the same proportion as in the old, it may be fairly asserted there would be no difference in therapeutic action.

From the evidence resulting from the above experiments we may reasonably submit to the compilers of ur Pharmacopœia the desirability of amending the cial process for making extract of stramonium, suggesting that percolation of the seeds with ether be discontinued, that proof spirit alone be used as the solvent, and the resulting extract, if containing oil, washed with ether.

As a further remark bearing upon this subject, it may be stated that in a general way, where a drug contains a fixed oil, and it is desired to prepare from the drug an alcoholic extract, the most economical process is to exhaust the drug first with alcohol, finally removing any oil present in the alcoholic extract by washing with ether.

The PRESIDENT said for years he had given up percolation by ether, which he looked upon as merely a waste of ether, just as it was in the treatment of ergot, as was formerly directed. He hoped that in the next edition of the Pharmacopœia the direction for the use of ether in the case of stramonium, which only had the effect of extracting the valueless fixed oil, would be omitted.

Mr. CONROY said he had adopted the same practice as had been mentioned by the President for some years, and he could fully confirm Mr. Gerrard's statement that the product was fully equal to that obtained when ether was used.

The next paper read was on—

FERRI ET AMMONII CITRAS.

BY B. S. PROCTOR, F.I.C.

In the early part of 1887 I had repeated complaints that mixtures containing this salt speedily went wrong. Two of the mixtures specially noted were as follows:—

℞ Ferri Ammon. cit.	ʒi.
Ammon. brom.	ʒss.
Syr. aurantii	ʒvi.
Aq.	ad ℥vi.
M.	

(A. 970).

℞ Ferri ammon. cit.	gr. xl.
Aq.	℥viii.
M.	

(A. 985).

The latter mixture most quickly changed, gradually becoming turbid, depositing a brown precipitate, and the liquor at last becoming colourless, or nearly so.

For comparison, a bottle of the same was made with hard water instead of distilled. Decomposition took place, but this time the precipitate was of two natures, one part being buff, another part black.

The precipitate treated with HCl gave off carbonic acid and H_2S. This experience was new to me, probably because the salt in question is most frequently prescribed with other matters which add to its stability or mask its change.

I obtained samples from some of my neighbours, but found there was no notable difference in their behaviour, my own sample going bad rather more quickly than that from one of my neighbours, and more slowly than the sample from another firm. Two of these, when burnt off, left of ferric oxide 32 per cent. and 30·7 per cent. respectively, the latter being the sample which had spoiled most rapidly. Mr. Umney, in the *Pharmaceutical Journal* of December, 1873, has expressed the opinion that the proportion of citrate of ammonium is the point upon which stability chiefly depends, and that the present official salt, which contains a less proportion than those of two previous Pharmacopœias, is less stable in consequence, hence the trouble springing up now which did not arise in former years. But the fact just noted that the sample containing 30·7 per cent. of ferric oxide decomposed more rapidly than those which contained 32 per cent., would imply that at any rate this is not the only circumstance upon which stability depends. But while I say this, I must also add that I acted upon the suggestion of Mr. Umney's paper, adding citrate of ammonium to the sample which had troubled me, and by so doing improved its keeping quality, the addition being made in such proportion as reduced the ferric oxide to 30 per cent., which the Pharmacopœia says is about what it ought to contain. But with this addition the stability was still inferior to that of two other commercial samples which I had meanwhile obtained.

A solution of the citrate rendered alkaline by a small addition of ammonia kept quite clear and unchanged for several months, and another solution rendered acid with citric acid kept quite clear for a similar time, but gradually became paler, and was found to have part of the iron in the ferrous state.

At a subsequent date, when estimating the iron in another sample of the same salt by burning 50 gr. in a platinum capsule, my object being to ascertain under what circumstances the residue of the combustion could be depended upon as being ferric oxide sufficiently pure to be accepted as evidence of the proportion of ferric oxide present in the sample, it was anticipated that the first effect of the heat would be to reduce the iron, or part of it, to either the ferrous or magnetic oxide, and with the view of determining this the contents of the capsule, when imperfectly burned, were tested with a magnet and treated with hydrochloric acid. They were found to contain magnetic oxide, and to evolve an odour of H_2S by the action of the acid. Clear evidence not only that reduction of the ferric oxide had taken place, but that the sample under treatment contained a sulphate. The presence of this impurity was confirmed by the barium test applied to the original salt, and more satisfactorily by the same test applied to the residue of a combustion effected with nitrate of potassium.

The next question is, how did the sulphate get there? I have no wish to bind manufacturers to follow the processes of the B.P., provided they obtain equally good results by the processes they adopt; but the results must be equally good, or the deviation becomes objectionable, and it is worth while glancing at the probable deviations from the official formula which would be liable to introduce this impurity.

Consulting a well-known maker of this salt, I learned that he expected a trace of sulphate, but only a trace, to be present in his product, and he attributed its presence to precipitating the ferric hydrate with caustic soda and the use of hard water, instead of using ammonia and distilled water, as the Pharmacopœia directs. And he was astonished to hear that I had found 2 per cent of SO_3, his idea being that $\frac{2}{10}$ths per cent. was too much, and $\frac{2}{100}$ths per cent. more like the probable figure.

However, upon examining a sample which I could depend upon having been made by precipitation with ammonia, I found sulphates present in very palpable quantity, and as lime was present only in very small traces the hard water doctrine did not appear a probable explanation.

Indeed, the considerable solubility of calcium sulphate in water and its still greater solubility in many saline solutions seemed sufficient ground for discrediting that theory.

The fact well known to analysts that ferric hydrate precipitated from the sulphate usually contains a notable admixture of basic sulphate, unless the caustic alkali used in the precipitation be constantly kept in free excess, suffices to explain the presence of the sulphate found in the finished product. For the basic sulphate, when once formed, is not readily deprived of its acid unless by considerable excess of caustic alkali, and either long maceration or boiling, and this I anticipate is just as much the case when ammonia is used as with the use of caustic soda. The advantage of using ammonia being that the excess is more readily washed out, and if a little remains it does not introduce into the finished product a base not legitimately there. Seeking for the means of avoiding this basic sulphate, I should look for it in a little change in the mode of manipulation. Taking a lesson from the experience of the late Mr. Hugh Lee-Pattinson in the manufacture of oxychloride of lead, when it was important to precipitate all the lead from the solution of chloride, and equally important to avoid an excess of the lime water used as a precipitant, as it spoiled the colour of the pigment, the two solutions were run into one another in thin streams so regulated that the correct equivalent proportions were pretty closely maintained.

Though the official formula for citrate of iron and ammonium may work perfectly when you pour 10 ounces of solution of ferric sulphate into 23 ounces of solution of ammonia, it is very likely to fail when hundredweights are substituted for ounces. Minutes instead of seconds will elapse before perfect mixture is effected, and while the stream of iron liquor is flowing into the alkali the centre of the stream will always contain iron in excess over alkali for a period which, though short, may be long enough to result in the formation of some basic ferric sulphate which may escape decomposition after the mixing is complete. The result is a brown precipitate suspended in a solution distinctly alkaline, and though to all appearances correct, it may contain basic sulphate along with ferric hydrate, and thus account for the faulty product being obtained, while there has been no deviation from the official process but that which every manufacturer is bound to adopt, namely, to work upon larger quantities.

The time involved in chemical action is a point difficult to define, difficult to investigate, but not to be overlooked.

In connection with this subject it is worthy of note that the sulphate present in the citrate was not readily detected or estimated by direct addition of barium chloride to a solution of the scales in water. It is unnecessary to describe all the experiments in detail, but the results I obtained, briefly stated, are as follows.

Five samples examined for the percentage of ferric oxide gave:—

P	32·0
B	30·7
A	30·0
D	32·5
H	28·0

With regard to the sulphate present as an impurity the first observation was the finding of sulphide in one of the mixtures dispensed, after it had been kept for some time; to this I may now add the results of several other experiments.

A. A sample of the citrate ignited in a platinum capsule left a residue containing magnetic oxide of iron.

B. A similar result was obtained, and the residue being treated with hydrochloric acid yielded hydrogen sulphide.

C. A sample of the citrate dissolved in water gave no immediate precipitate with barium chloride.

D. A sample of the citrate ignited with potassium nitrate and barium chloride yielded barium sulphate equal to 2 per cent. of sulphuric anhydride.

E. The same repeated with the same results.

F. Twenty grains of the citrate, not burned, dissolved in water and hydrochloric acid, and barium chloride added, on standing two days deposited barium sulphate equal to 1·2 per cent. of sulphuric anhydride.

G. Twenty grains not burned nor acidulated, on the addition of barium chloride gradually deposited a precipitate which on standing two days amounted to barium sulphate equal to 1 per cent. of sulphuric anhydride.

I. Fifty grains of the citrate dissolved in an ounce of water, four grains of barium chloride added and set aside for 20 hours and then filtered; the precipitate contained 0·7 of barium sulphate. The mother liquor with a free addition of hydrochloric acid yielded 2·0 of barium sulphate. This shows that the barium salt very slowly precipitates the sulphuric radicle in the presence of neutral or alkaline citrate of iron and ammonium, but that the precipitation is effected on adding hydrochloric acid enough to convert the citrates into chlorides and free citric acid. The total barium sulphate obtained in this case corresponds with the yield from the preceding combustion experiments and others I had tried, except that there was a loss involved in filtering out the first precipitate, the second precipitate being obtained from the filtrate without the washings.

M. Fifty grains of the same sample dissolved in an ounce of water, two fluid drachms of hydrochloric acid added and four grains of barium chloride yielded a precipitate not instantaneously, but speedily, which, on standing 20 hours amounted to 2·9 or 5·8 per cent., against 5·4 per cent. in the last preceding experiment.

As I have not met with any statement of this effect of citrates in retarding the precipitation of barium sulphate, I think it worth while to emphasize the observation by recording a confirmatory experiment.

To about 100 grains of solution of ammonium citrate, a drop of dilute sulphuric acid was added, and then a drop of solution of barium chloride. The solution remained clear for some time, a very faint opalescence developing in course of an hour, and a milky appearance in the course of a day, but by appearances only about one-tenth of what is produced with the same quantity of sulphuric acid and barium chloride in the absence of the citrate.

Tartrate of ammonium has a similar retarding effect to a rather smaller degree.

The **President** was glad to learn that the ammonio-citrate of iron in use in the trade now was found to be more uniform than it was some fifteen years ago, when he examined one official salt and found it contained 26 per cent. of ferric oxide, whilst some manufacturers put in as much as 32 per cent. The presence of basic sulphate of iron in the salt was certainly objectionable. This matter was by no means new, having been dealt with by Dr. Redwood many years ago, when he emphasized particularly that students should learn how to precipitate ferric hydrate with an alkaline solution. Mr. Proctor had shown how even manufacturers operating on a large quantity might deceive themselves as to the alkali being always in excess. Operating on a large scale he always tried to keep it in excess, but there were chances that some of the solution of the persulphate of iron would sometimes be rather in excess of the alkali. If makers took greater care in the precipitation of the ferric hydrate, they would not have complaints of an objectionable quantity of 2 per cent. of basic sulphate in the ammonio-citrate of iron.

Mr. **Maben** would have expected a solution containing 40 grains of ferri ammon. cit. in 8 ounces of water would go wrong in any case, for stock solutions of that drug would not keep, and he should therefore expect a weak solution would certainly go wrong, owing to the presence of an organic acid in ferri ammonii citras.

Mr. **Proctor** said he had tried three samples, his own make and that of two neighbours, and they all went wrong rapidly. He got some from another maker and it did not go wrong with the same mixture. He did not understand the difference, and should be glad to know if anyone else did, but he could not get this last mixture to go bad.

Mr. **Martindale** thought that probably the solution before scaling had been allowed too long an exposure, and that organic germs or growths had been formed in the solution before it was scaled. Scaling liquors were very apt, unless they were scaled off rapidly, to decompose, because of their containing organic salts. Even distilled water, when old, was very apt to have germs of growth in it.

The **President** said it was just possible that bromide of ammonium might not always be quite neutral but might sometimes contain an excess of alkali. In the Pharmacopœia preparation of ammonio-citrate of iron there was a saturated solution of ferric hydrate in the cold in strong citric acid. When he suggested that form he had in view the objection which always applied to heating a preparation that had to be subsequently scaled. In proportion as such preparations were boiled they were generally spoiled, as was known to every one who had any experience in the making of them. Manufacturers generally got the first preparation in the most concentrated form possible, the ferric hydrate in solid lumps, so obtained by draining and pressure. That was then dissolved in a very saturated solution of citric acid, so that there was very little to be done with it other than adding the alkali. When solutions were of that strength there was not much chance of vegetable growths forming in them, though he agreed with Mr. Martindale that in weak solutions they were very apt to occur; and, in fact, nothing favoured their growth more than a weak citric acid solution. He was inclined to think the very weak affinity between citric acid and iron, especially a saturated solution in the cold, partly explained the change that occurred. They all knew that ammonio-citrate of iron underwent a change in the process of time, and possibly some slight alkalinity might produce the turbidity or opalescent appearance.

Mr. **Proctor** said it was not the turbidity he had to complain of, but the total loss of colour and the throwing down of the iron.

Mr. **Dott** said there would be no error in the estimation of the amount of iron, supposing the iron were in the form of ferrous oxide, because if it were sufficiently ignited it would be converted into the ferric form. With regard to the determination of the presence of sulphuric acid as barium salt, he had frequently noticed that many substances retarded the precipitation of sulphate of barium, even in the presence of a considerable excess of hydrochloric acid, so that testing hurriedly one might think there was no sulphate present, when there was really an appreciable quantity.

Mr. **Proctor**, in reply, said when he found distilled water gave the results he had described, he tried ordinary tap-water, and that went bad just in the same way. Mr. Umney suggested that an alkaline condition of the bromide of ammonium might affect the product, but as he had said he had tried another specimen, making one portion alkaline and another acid, and neither of them went wrong. He was more inclined to attach weight to what Mr. Martindale said about the possibility of explaining the decomposition as taking place in the preparation of the article before it was scaled from the circumstance that the batch which was in his hands and in those of his neighbours all went wrong at the same time, but none of them had gone wrong since. It might have been a manufacturer's batch which got into the hands of himself and his friends at that time. He did not know whether others had met with the same difficulty, but if they had not, it might arise from the character of the mixtures they had to dispense being less liable to change, there being spirit in their composition which would tend to prevent decomposition. With regard to Mr. Dott's remark, he would say that if the reduction took place in the first part of the operation, a very considerable time and a good red heat would be required to get the whole of the iron into the ferric state; it maintained its magnetic property and a certain small trace of the lower oxide for a considerable time. If it could be said that the oxide remained magnetic after it had had the whole dose of oxygen, which was possible, it was a point he had to learn; so far he was not aware of it.

The next paper read was on—

EASTON'S SYRUP.

BY T. MALTBY CLAGUE,

Pharmaceutical Chemist.

This useful and popular compound has been prolific in the production of difficulties for the pharmacist and dispenser, and correspondingly fertile in the matter of literature upon itself and its faults.

Originally devised by Dr. Easton and published in Aitken's 'Science and Practice of Medicine,' vol. 2, it stood thus:—

℞ Ferri sulphat.	ʒv.
*Sodii phosphat.	ʒvj.
Quin. sulphat.	gr. 192
Acid. sulph. dil.	q. s.
Aq. ammoniæ.	q. s.
Strychnin.	gr. vj.
Acid. phosphoric. dil.	℥xiv.
Sacch. alb.	℥xiv.

The instructions are to dissolve ferrous sulphate in water and precipitate with sodium phosphate, wash, drain and press; dissolve quinine sulphate in water by aid of ac. sulph. dil. and precipitate with aq. ammon., wash and press. These precipitates and the strychnine are to be dissolved in the ac. phosph. dil., and in this solution the sugar is to be dissolved without heat. Although not given, it is evident from the context that the bulk is to measure twenty-four ounces.

For a ready consumption this formula leaves nothing to be desired; but on keeping the preparation a brown colour is developed, causing undesirable differences in its appearances at various times.

In the 'Year Book' for 1871 is a paper by Mr. Michael Carteighe, which included a ready method for its preparation from a solution which preserves its colour better. But why the author doubled the quantity of ferrous phosphate present is not apparent.

In the 'Extra Pharmacopœia,' Mr. Martindale gives a convenient mode of preparing this syrup from iron wire, and this, when in the form of syrup, does not precipitate so much or darken in colour so rapidly as when it is prepared from the precipitated ferrous phosphate.

My reason for again directing attention to this subject is that during the past two winters I have met with samples of this syrup in a condition most unsightly in appearance and discreditable to pharmacy; these have been sent out by different makers, but all have been exposed to cold. The first and the second of these that came under my notice I could not work with because of my ignorance of the mode in which they had been prepared; but later on I obtained possession of some the history of which was known. Instead of a syrup it was a jelly-like mass with long needle-shaped crystals and tufts of crystals, and a smaller amount of a fine precipitate showing. Warmth brought about solution, but on cooling to about 32° F. precipitation again began. The addition of 25 per cent. of water sufficed to maintain solution when again exposed to cold. The addition of the requisite quantity of quinine, strychnine and ferrous phosphate to make this up to Easton's strength was next tried, solution was permanent. The fact just mentioned and the high specific gravity of all the samples led me to suspect the quantity of the sugar as the cause of the trouble.

Samples were next prepared by, 1st, Easton's original formula, 2nd, Martindale's, and 3rd, one containing more sugar than either, and it was found that the precipitation and gelatinous appearance was in proportion to the quantity of sugar present.

	Easton.	Martindale.	Offending Sample.
Quin. phosph.	1·0	1·0	1·0
Fe$_3$(PO$_4$)$_2$	1·0	1·0	1·0
Total P$_2$O$_5$	4·04	4·0	4·1
Sugar	35·0	37·5	42·0
Water	28·4	26·4	23·0

The above table gives in grains the quantities present in each fluid drachm.

Another experiment to confirm this view. Using Martindale's solution of ferrous phosphate and of alkaloids, but with sugar in the proportions of 4-5-6 and 7 drachms to the fluid ounce, and submitting these repeatedly to freezing mixture, precipitation showed in direct proportion to quantity of sugar present. Or rather the first named gave none, the second a trace, while the third was marked, and the fourth considerable.

The gelatinous syrup was dealt with in the following manner. Thrown upon a muslin strainer the syrup passed through and left upon the strainer a mass of soft crystals matted together. Drained, pressed, and dried at 90° F. it weighed 8·4 grains; dried at 212° F. it weighed 7·5 grains. Submitted to quantitative analysis it showed:—

Insoluble in water	6·66
Quinine phosphate	44·53
Ac. phosphoric. (pur.)	13·33
Sugar	35·48
	100·0.

The portion insoluble in water responded to tests for iron and phosphoric acid, and was probably the same as the precipitate reported upon by Mr. T. B. Groves.

I am not prepared to put forward a reason for the production of this precipitation of the quinine phosphate and gelatinization of the syrup; but the mental suggestion is that gelatinization is similar to that in the case of solutions of quinine sulphate in hydrobromic acid when potassium tartrate is present in minute quantities and to that observed in mixtures containing tinct. ferri perchlor., quin. sulph. and sp. chloroformi. And also in this connection we may remember the fact that atropine in minute quantities causes the gelatinization of paraffinum liquidum.

My suggestion for the preparation of Easton's syrup therefore is, that where it finds a ready use the original formula be adhered to. That where it is not in so frequent demand the formula of the 'Extra Pharmacopœia' be used, but that the quantity of sugar be reduced at least 10 per cent in order that it may brave a northern winter with impunity.

In closing this paper, I would respectfully express my regret that in the B.P.C. unofficial formulæ there should be introduced a preparation bearing the same name which Easton gave to his syrup, and only containing three-fourths as much quinine phosphate. This is liable to cause some to make the mistake of supposing them to be identical, and may cause the "not over particular" to substitute the one for the other.

The PRESIDENT said this paper was a very practical one. All who were accustomed to handle Easton's and other phosphatic syrups knew the solidification which took place with syrup under certain conditions. His own experience was that this solidification of syrup had been noticeable the last few years more than formerly, and he believed it arose from the almost entire absence of cane sugar from commerce. Of course cane sugar could be obtained, but at least 95 per cent. of the sugar of trade was beet sugar. In practice syrup of iodide of iron and other syrups under some conditions which he did not quite understand, would be found one morning perfectly fluid and quite right, and the next morning a perfectly solid mass, and probably other gentlemen could support his experience. No doubt this was due to the presence of a small quantity of inverted sugar or something present in the beet sugar which was not present in cane sugar. The presence of phosphates also aided deposition, and that made the concentration in liquors objectionable. Sometimes the whole contents of a bottle would be found solidified, looking like a crystalline mass of phosphate of quinine, but no doubt the principal cause of the evil complained of was the use of beet sugar instead of pure sucrose from cane.

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* A little, say ʒj. more gives better result.

Mr. **Linford** having had a good deal of experience in the manufacture of Easton's syrup agreed perfectly with what Mr. Clague had said as to the excess of sugar. When he first made it it was constantly going thick in cold weather, forming a mass of soft crystals. Then he adopted the plan of using less sugar, when it left off crystallizing, but readily changed colour. It was necessary, therefore, to find some method of making it by which it would keep its colour, and he adopted Mr. Martindale's method of making the phosphate of iron about eight times the strength, so that one-eighth the quantity was necessary to make Easton's syrup. He kept that in a small 6 oz. bottle with no cork in, but adopted the Italian method of filling the bottle right into the neck, and then put about half a drachm of oil on the top. That was easily thrown off when wanted for use, and he had found it would keep certainly six months in that way without any change of colour whatever. In making Easton's syrup he always dissolved the quinine and strychnine in phosphoric acid, glycerine, and water, but he could not give the exact proportion. That was also made of such a strength that one part of the solution and three of syrup of phosphate of iron made Easton's syrup. It was always freshly made when it went out, and was always sent out perfectly bright. The action of the glycerine was that syrup so made would keep at least three times as long without changing colour.

Mr. **Conroy** said this paper was a most important one, and he could entirely agree with Mr. Clague's remarks with reference to the reduction in the quantity of sugar having the desired effect. He had worked with sugar which was guaranteed to be real cane sugar, and had no reason to doubt it, but in using the full amount of cane sugar he still found the syrup solidified. This solidification might be overcome by reducing the amount of sugar, but the greater difficulty was the discoloration, especially when the syrup had to be exported to a hot climate. He could also confirm the statement that the concentrated liquor used for making syrup, when made with the full amount of quinine, also became discoloured. That was more important than the point mentioned by Mr. Clague. His experience was that when the full amount of quinine was put in, whether to liquor or syrup, the syrup always became discoloured. With reference to the last speaker's remarks, he would say that the quantity of quinine in Mr. Martindale's formula was only three-fourths the amount in the original, but it was really phosphate of quinine. In the original formula the precipitation and subsequent washing would reduce the amount specified to about that ordered in Mr. Martindale's formula.

Mr. **Martindale** said this was a formula with which he had had a great deal of experience; the formula which he published first and modified afterwards as published in the B.P.C. Formulary, he had been perfectly satisfied with. It was impossible to prevent discoloration. The preparation was not intended to be kept any length of time, but by the process pub- ed in the Formulary it could be made in ten tes at any time, and that being so, what was the object in keeping it? The syrup of phosphate of iron could be kept very well, and the addition of phosphate of quinine and strychnine could be made at any time. He differed from the B.P. process in making the syrup of phosphate of iron, as the present formula was so exceedingly acid that it was unpalatable to take, especially for children. Even the formula of the 1867 edition was excessively acid, but it was a good reasonable formula. If made by the direct solution of pure iron wire in phosphoric acid the preparation underwent little oxidation or conversion into perphosphate; it would keep very well, and upon adding the amount of phosphate of quinine and strychnine to that with a slight excess of phosphoric acid he had never got that deposit, which many writers complained of, of a little whitish precipitate at the bottom of the bottle. If the full quantity of phosphate of quinine it was supposed to contain were put in, one grain in the fluid drachm, it would crystallize, probably because quinine was purer now than it used to be when the formula was originally devised. He rarely found it crystallize out unless the syrup were exposed to much cold. Once during last winter one sample which was more exposed to cold than others did become changed into a block of crystals, but it was hardly the formula Mr. Clague had given, as he put in only ¾ths of a grain of phosphate of quinine in place of one grain to the drachm. The formula said it should contain an equal quantity of phosphate of quinine and phosphate of iron, but it was not possible to keep such a preparation; if it was pure phosphate of quinine that was used it would crystallize if the temperature were reduced below 40° F. Any other deposit than that crystallization he had not seen for years, and he imagined this was because he used a syrup made by the direct combination of phosphoric acid and iron, not by the precipitation process. He only made about 2 lbs. at a time, and seeing that it could be made in ten minutes there was no reason why it it should be kept a long time. It was much better to keep drugs in a condition in which they could be kept properly than to make a compound which was liable to change. If the syrup did turn brown the best way was to throw it away and make fresh.

Mr. **Wrenn** could hardly agree with the last remark, that when a preparation went brown it should be thrown away. It was a better plan to guard against it turning brown. When washing the precipitate of iron he kept adding water, so that it did not acquire a blue colour. If care were taken in making up the bulk it could be made perfectly accurate, and then there would not be any precipitate. By all means he should advise chemists only to use Martineau's sugar.

Mr. **Naylor** said there was another point of view from which this question had not been sufficiently studied, which at first sight did not appear a promising one, but at any rate it would be an instructive one, and that was the amount of phosphoric acid that was used. He had not observed a precipitation so much of the syrup, but he had been many times puzzled by the appearance of this deposit in the corresponding concentrated liquors. So far as he had been able to ascertain from a limited number of experiments, from examining the quinine used and determining the amount of iron and quinine present in the liquor itself, and knowing the kind of sugar which had been used, he had been led to the conclusion that the deposit might not have occurred through a deficiency but through an excess of phosphoric acid. He remembered having separated this quinine body some time ago, and submitted it to a gentleman thoroughly conversant with the examination of quinine preparations, who distinctly pronounced it to be an acid phosphate of quinine. Being a maker of quinine he also informed him that there were different kinds of phosphate of quinine, and that it was very important that the amount of phosphoric acid should be kept within due limits. He was rather inclined to think that this question might be studied with profit from that point of view as well as from the sugar side of the question.

Mr. Dott said there was no question that the amount of sugar used in this preparation had a great effect on the precipitation of quinine or any alkaloidal salt, but as Mr. Naylor had remarked, the degree of acidity was a more important question. He believed preparations were often made under the belief that alkaloidal salts were more soluble in an excess of acid, but according to the law of solubilities it was rather the other way. An excess of acid tended to precipitate the alkaloidal salt from solution; the molecules of the acid had an attraction for the molecules of the water, and instead of getting a better solution by excess of acid the salt precipitated.

Mr. Clague said he had in some other experiments fully satisfied himself that glycerine did retard the colouring effect in a syrup of this kind, and he should be glad if on official authority they were allowed to use it. The liquor certainly did discolour, but that made from iron wire discoloured to nothing like the same extent as that made from precipitated phosphate. He liked the method as introduced by Mr. Martindale very much better. That gentleman, however, had not met with the difficulty to which he referred, but that probably arose simply from the fact that Mr. Martindale was living in not quite the same latitude. They were there not so far north as some friends whom he saw nodding assent to his difficulties when he was reading the paper, who lived on the hills in the neighbourhood. These samples were nearly all kept in surgeries in lean-tos to houses on perhaps a bare hill-side, and that fully explained why what might be a very good syrup in Mr. Martindale's establishment, which was probably warmed every day, might not be altogether satisfactory for use under the circumstances he had named. As to the precipitation at 40° F., if the full quantity of quinine phosphate was present, he must join issue with Mr. Martindale on that point. He found that he could put in the full quantity, and could cool it if he used less sugar not only to 40°, but to 50° below zero.

Mr. Martindale remarked that if there were a strong sugar solution it interfered with the solubility.

Mr. Clague said that was the point at the close of the paper. There could be no doubt that if the quantity of sugar was lessened by 10 or 15 per cent. the syrup could be cooled down to almost any attainable degree of cold without solidifying.

The President said there was no reason why syrup so dense should be used.

Mr. Clague added that the President's remark might be applied to a great many other syrups of the same class. Why so much sugar should be used he did not know; it made them more troublesome to keep and to take in every possible way.

The next paper read was a—

Note on the Effect of the Use of Nitrous Vitriol in Making Certain Aerated Waters.

BY JOHN PATTINSON, F.I.C., F.C.S.

A manufacturer of aerated waters in the neighbourhood of Newcastle-upon-Tyne recently found that the ginger ale he was making assumed a milky opalescence or turbidity a day or two after it had been aerated and bottled. The same materials, with the exception of the vitriol used for generating carbonic acid, had been used for some time without showing this objectionable turbidity in the ginger ale, and this naturally threw suspicion on the vitriol as being the cause of the change. On examination I found this vitriol contained nitrous compounds equivalent to 0·027 per cent. of nitrous anhydride (N_2O_3) by weight. In order to ascertain if the presence of these nitrous compounds was the cause of the turbidity, a stream of carbonic acid, generated from marble and pure oil of vitriol, absolutely free from nitrous compounds, was passed through a solution containing the same proportions of ginger essence, syrup, etc., as were used in the manufacture. The solution remained perfectly clear for several days. Then through another portion of the same solution a stream of carbonic acid made by acting on marble with the suspected vitriol containing nitrous compounds was passed. In this case the solution assumed the objectionable milky opalescent appearance in about twenty-four hours. Through a third portion of the solution I passed a stream of carbonic acid made from pure vitriol to which I added nitrite of potassium equal to 0·06 per cent. of nitrous anhydride. In this case also the milky opalescence appeared in about twenty-four hours. It was thus shown that the objectionable turbidity was caused by the nitrous compounds in the vitriol which had been carried over with the carbonic acid.

Further experiments showed that the objectionable action was upon the ginger essence and not upon the syrup and other ingredients used. It was also found that the nitrous compounds discharged nearly the whole of the colour from the ginger essence.

I have not had an opportunity of ascertaining if the same effect is produced on the other essences used in the making of aerated waters, but it is possible that this may be the case.

Fortunately there is no difficulty in obtaining vitriol absolutely free from nitrous compounds, so that this objectionable result in the manufacture of aerated waters may be easily avoided.

The President said the members of the Conference were much indebted to Mr. Pattinson, the public analyst of Newcastle, for coming to contribute something to their knowledge of the defects in the manufacture of aerated waters, the more so as Mr. Pattinson's experiments quite agreed with those which had been previously made by Mr. Naylor, who some three or four years since worked in the same direction, although he was not so fortunate as Mr. Pattinson in having his attention directed to the oil of vitriol. He had to work over the essences and all manner of things before he could find the cause of the turbidity of the aerated waters he examined. That paper was published in the 'Year-Book' for 1885,* and the experiments now made quite corroborated the results there narrated. One point alluded to was the presence of nitrous compounds in the oil of vitriol of trade. He had been much impressed the day previously in visiting the chemical works of Messrs. Alhausen to see that they were putting up plant for the utilization of sulphur from alkali waste. He had no doubt whatever that even at the present time oil of vitriol could be procured much purer than the ordinary sulphuric acid. The acid produced by this process, which had been worked out by Messrs. Chance, of Birmingham, was a very beautiful, elegant acid, perfectly white. He did not know that it was actually free from nitrous compounds, but it was much purer than the ordinary brimstone acid met with in the trade, and he hoped manufacturers would have the opportunity, when this acid was procurable in quantity, which no doubt it would be soon, of using it for their aerated beverages.

Mr. Naylor did not know that he could add anything to what the President had said, except to remark that while his experiments travelled over the same ground as those of Mr. Pattinson, so far as his memory served him, it was not with the same object, his endeavour being not so much to point out the cause of the opalescence as to account for a defect in the pungency. He had not observed that Mr. Pattinson had referred to that in his paper, and he would ask him whether the effect of the nitrous acid in the oil of vitriol was to at all destroy the pungency in the ginger ale.

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* For original paper see *Pharmaceutical Journal*, [3], xv., 731.

Mr. T. **HOWELL-WILLIAMS** (London), as a manufacturer of mineral waters, had found a difficulty many years ago in accounting not so much for the opalescence as for the loss of flavour in ginger ale referred to by Mr. Naylor. Although this effect was most marked in ginger ale it occurred at the same time to some extent in almost every other beverage they prepared. After a long examination of almost everything likely to lead to this result, he found it was due to the nitrous or nitric acid fumes in the carbonic acid gas. The opalescence did not trouble them; they noticed a little dullness, but no opalescence, and having satisfied themselves of the cause they got over the difficulty. For some time they tested the oil of vitriol very carefully, but they did not find it now necessary to do so, because they simply passed the gas through a scrubber containing an alkaline solution of permanganate of potash. The small trace of nitrates and nitrites might be disregarded if this precaution were adopted.

Mr. **PATTINSON** said he observed on referring to the paper read by Mr. Naylor, that his experiments were undertaken for the purpose of throwing light on the utter loss of aroma and pungency in ginger ale, whilst his attention had not been directed at all to that point, but simply to the cause of the turbidity in the samples shown him. It was very likely, however, that the pungency also would be affected. With regard to the President's remarks about oil of vitriol he would say that that made from pure sulphur might contain nitrous compounds, and was just as likely to do so as ordinary oil of vitriol made from iron pyrites, but it would be free from arsenic. Manufacturers could easily destroy the nitrous contamination by heating the sulphuric acid with a little sulphate of ammonia. The presence of nitrous compounds could easily be ascertained. A drop or two of permanganate of potash put into 20 c.c. of oil of vitriol mixed with water would retain a pink colour if free from nitrous compounds, but if it contained them that drop and many others besides would be completely decoloured.

The following three papers were then read together:—

IPECACUANHA, FLUID EXTRACT AND WINE (STANDARDIZED).

BY J. OLDHAM BRAITHWAITE AND JOHN C. UMNEY.

A perusal of the literature relating to ipecacuanha and its preparations, which has been published in this country since the appearance of the present Pharmacopœia, shows that attention has been directed mainly to the estimation of the alkaloid.* There appears to exist also an almost unanimous opinion that the long continued heating of the extract involved in the process of the official wine is injurious to the alkaloid it contains, and hence several modifications of the method have been suggested, which obviate more or less this supposed defect.†

By reference to the papers quoted above, it will be seen that the only suggestion of a standardized preparation is that of Messrs. Thompson and Duncan, who propose that the "dried acetic extract of ipecacuanha should be so standardized as to yield not less than 6 per cent. of alkaloid." The method which these authors adopt for standardizing, by the direct titration with Mayer's reagent of an acid solution of the crude extract, is obviously unsatisfactory.

It is with a view of diverting attention to this phase of the question that we have undertaken the following experiments.

Our object has been to prepare a fluid extract of definite alkaloidal strength, removing as far as possible the natural soluble constituents of the root, from which a wine may be prepared equal to the official one in elegance and stability, and which shall at the same time contain a definite amount of emetine.

Throughout the course of these experiments we have used Ransom's "ammoniated chloroform" process (or a modification of it) for the assay of the emetine. This has proved to be the most expeditious for our purpose, and has given us results that are strictly comparative with each other.

The ipecacuanha root which we have employed was assayed after crushing a whole seron, and found to contain 1·32 per cent. of emetine. It was thought better to make use of a sample of low emetine value, as affording the most satisfactory basis of operations.

In the selection of a menstruum and method of procedure many experiments have been made which need not be enumerated in detail. In each case the amount of alkaloid left in the marc has been determined as well as that carried into solution, and it has been found, in some instances, that where almost complete exhaustion was effected an unsatisfactory extract resulted. It may be mentioned that, among others, acetic ether, with and without the admixture of lime to the root, and alcohol of various strengths with and without lime, and also aromatic spirit of ammonia, were employed, but finally rectified spirit was found to give the most satisfactory results.

In estimating the amount of emetine in these fluid extracts, it was found that Ransom's method was not directly applicable, owing to the chloroform producing an inseparable jelly with the solutions of these extracts. Acetic ether was similarly tried, but gave results much in excess of the amount of emetine originally found in the root. The following modification of Ransom's process, which has given excellent, and in every case, concordant results, was finally adopted.

Twenty cubic centimetres of a fluid extract is mixed with 40 c.c. of water, and the volatile solvent driven off by cautious evaporation on the water-bath. The resulting solution is filtered, washed and precipitated with basic acetate of lead. The lead precipitate is removed by filtration, well washed, and excess of the precipitant removed by sulphuretted hydrogen and the sulphide filtered out. The filtrate is then rendered very faintly alkaline with ammonia, and shaken with chloroform, which readily separates; the alkaloid is washed out of the solvent in the usual way with acidulated water and titrated by means of Mayer's solution.

The following was the final experiment which led to the adoption of rectified spirit as the most suitable menstruum:—

One hundred parts of the root in No. 20 powder were moistened with rectified spirit and packed in a percolator. More spirit was added and percolation continued until 80 fluid parts were obtained. This was reserved, and percolation proceeded with until the root was exhausted. The drained marc was then mixed with 10 parts of recently-slaked lime and again percolated to exhaustion. The spirit was recovered from the last two percolates, the resulting extracts dissolved in the reserved portion, and the whole made up to measure 100 fluid parts with rectified spirit.

Twenty cubic centimetres of this extract (equivalent to 20 grams of root), estimated by the modified chloroform process previously mentioned, were found to contain 0·257 gram of emetine, equivalent to 1·285 grams from 100 grams of root. Twenty-two grams of the dry marc = 20 grams of root, exhausted by ammoniated chloroform, contained only 0·009 of emetine, equivalent to 0·045 per cent.

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* Ransom, 'Year-Book,' 1887, page 450; Cripps and Whitby, *Pharm. Journ.*, 3rd series, vol. xix., page 721.

† P. Wells; *Pharm. Journ.*, [3], vol. xvi., p. 1024; T. Maben; *Pharm. Journ.*, [3], vol. xvi., p. 652; J. T. Grant; *Pharm. Journ.*, [3], vol. xviii., p. 592; C. A. McPherson; *Pharm. Journ.*, [3], vol. xviii., p. 830; J. W. Thompson and W. Duncan; *Pharm. Journ.*, [3], vol. xviii., p. 834; J. W. Thompson and W. Duncan; *Chemist and Druggist*, Jan. 12, 1886.

The sum of these two figures, viz., extract 1·285 per cent. and the marc 0·045 per cent., is equal to 1·33 per cent. of emetine, whereas the original assay of the root gave 1·32 per cent. This shows an experimental error of 0·01 in these estimations, demonstrating most clearly in our opinion the reliability of these processes for comparative use. Of this fluid extract one volume was then taken and made up to twenty volumes with sherry, the resulting wine being cloudy in appearance. After allowing to stand for forty-eight hours, a permanently bright wine (possessing to a very marked degree the characteristic odour of ipecacuanha) was obtained by filtration, the feculence being removed without the slightest difficulty. Estimated by the modified Ransom's process, to be described later on, it was found that a volume of this wine equivalent to 100 grams of root contained 1·285 grams of emetine.

It is proposed that the standard extract should be so adjusted in strength that 100 fluid parts should contain 1·25 parts by weight of emetine. This figure is suggested as being easily attainable from all samples of root that are fit for pharmaceutical use, and although lower than the average percentage of emetine as stated by Ransom, yet giving a wine considerably stronger than the present official one, as will be shown subsequently. The following, then, is the formula we propose for the fluid extract:—

Take of—
Ipecacuanha root in No. 20 powder 10 parts.
Slaked lime, freshly prepared . . 1 part.
Rectified spirit. . . . . . . a sufficiency.

Moisten the drug with a small portion of the menstruum, pack firmly in a percolator, add more spirit, and when percolation commences close the lower end of the percolator and macerate for twenty-four hours. Then allow the liquid to pass until 8¼ fluid parts have been collected; set this aside, continue percolation until the root is exhausted, drain well, and mix the lime with the marc. Allow them to stand in contact for twenty-four hours, then continue percolation until final exhaustion is completed. Recover the spirit from the last two percolates by distillation, dissolving the residual extract in the reserve. Take 20 cubic centimetres of this solution and estimate the amount of emetine therein as described above. From the result of this assay finally adjust the strength of the fluid extract so that 100 fluid parts shall contain 1·25 parts by weight of emetine.

The standard wine is then prepared as follows:—

Take of—
Standardized fluid extract of
ipecacuanha . . . . . 1 fluid part.
Sherry sufficient to produce . 20 fluid parts.

Mix, allow to stand for forty-eight hours, and filter.

In the preparation of the fluid extract, it will be remarked that the amount of extractive obtained after the addition of the lime is not very great. We have found, however, that it is relatively exceedingly rich in alkaloid. It may be suggested that it would be preferable to mix the lime with the drug at the commencement of the process, but we have found that exhaustion is more complete, and the resulting extract more satisfactory when the method we have indicated is followed. When the wine from the fluid extract was prepared, a sample was also made according to the official process from the same root. These were filtered at the same time and have since stood for six weeks side by side. We exhibit a specimen of each.

We have found that after standing for some weeks, the liquid extract of the original experiment has thrown down a deposit consisting of a mixture of amorphous matter, with a small crop of very distinct crystals. This deposit was collected and examined for alkaloid, from which it was found to be entirely free. The crystals were separated by washing cautiously with absolute alcohol, and when submitted to analysis were found to be a sugar which, as it exists, sparingly reduces Fehling's solution, but gives a very copious reduction after inversion.

We have again assayed the fluid extract after six weeks, and have found it to be of the same alkaloidal strength as when first prepared; viz., 100 fluid parts contain 1·285 per cent. of emetine, proving that the matter deposited in no way deteriorates the emetine strength of the preparation.

This we have adjusted to the proposed standard strength, viz., 1·25 per cent. of emetine.

Ipecacuanha Wine (British Pharmacopœia).

BY J. OLDHAM BRAITHWAITE AND JOHN C. UMNEY.

From the experience gained in the experiments just enumerated, it was thought probable that some definite information might be obtained by applying the lead acetate modification of Ransom's process to the wine itself.

Two hundred cubic centimetres of ipecacuanha wine, prepared from the standardized fluid extract, containing 1·25 per cent. of emetine, was cautiously evaporated to one-fourth that volume. To this liquid a slight excess of basic lead acetate was added, the precipitate separated by filtration, the excess of lead removed by sulphuretted hydrogen and filtration, the filtrate rendered faintly alkaline with ammonia, shaken with chloroform, the alkaloid washed out in the usual manner with acidulated water and the acid solution titrated with Mayer's solution. The amount of emetine found was ·1213 gram; that originally present in the amount of fluid extract taken (10 c.c. = 10 grams root) ·125, showing an experimental error of ·0037. This establishes the accuracy of the method as applied to the wine. From 2 ounces of the assayed root (containing 1·32 per cent. of emetine) 2 pints of the official wine was produced. Two hundred cubic centimetres of this wine, equivalent to 10 grams of root estimated as above, were found to contain ·0812 grams of emetine.

Twenty grams of the dried marc exhausted by means of ammoniated chloroform were found to contain only 0·0189 gram emetine or ·0945 per cent. Since the original root contained 1·32 per cent., and the sum of the alkaloid in the wine and marc = 0·907 per cent., there is a subsequent loss, equivalent to 0·413 per cent.

Cripps and Whitby[*] definitely show that the alkaloid emetine is decomposed by heat, a fact which the following two experiments confirm:—

(*A*) A dilute solution of emetine in acetic acid was prepared, of which 10 c.c. was found to contain by titration with Mayer's solution 0·095 gram alkaloid. Another 10 c.c. was evaporated to dryness and exposed on the water-bath for sixteen hours. The residue was then dissolved in dilute acetic acid and titrated. Only 0·068 gram of alkaloid was found, showing a loss of 0·027 gram, equivalent to 28 per cent.

(*B*) Another solution was prepared, of which a portion, 25·986 grams, was found to contain 0·2872 gram of alkaloid The remainder, 20·873 grams, containing 0·2303 gram emetine, was exposed on the water-bath for eight hours. The residue was redissolved and titrated when 0·1927 gram was found, showing a loss of 0·0376 or 16 per cent. of the alkaloid originally present.

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[*] *Pharm. Journ.*, 3rd series, vol. xix., p. 723.

This amply confirms the opinion as to the detrimental effect of heat upon the alkaloid, but in order that the conditions might be exactly those which exist in the B.P. process, the following experiment was performed:—Fifty grams of root was mixed with 50 c.c. of acetic acid and exhausted precisely in the official manner. The percolate was cautiously evaporated to 100 c.c. and divided into two equal volumes.

One 50 c.c. was treated at once with basic lead acetate and the emetine estimated as described above when 0·308 gram was found.

The other half was evaporated to dryness, powdered, redissolved with dilute acetic acid and then treated in a similar manner and estimated. The amount of emetine found was 0·255 gram, showing a loss of 17·2 per cent. of the alkaloid. This extract was twelve hours upon the water-bath before it could be powdered. On the large scale it is our experience that it is necessary to expose the extract to a full water-bath temperature for from forty to forty-eight hours before a dry residue, which will keep permanently in powder, is produced.

In order to determine if we were singular in our results we have obtained a series of "trade samples" of the wine and submitted them to examination as to the amount of emetine contained.

In each case 200 c.c. of wine was treated by the basic lead acetate process described above.

No.	Emetine in 200 c.c. = 10 grams of root.
1	0·1077
2	0·0945
3	0·085
4	0·0756
5	0·0718
6	0·0699
7	0·0699
8	0·0699
9	0·0661
10	0·066
11	0·0378

These figures show that there is a general loss of alkaloid in the preparation of the wine. Seven out of the eleven samples examined, however, are very nearly of the same alkaloid strength. At the same time the variation between the first sample and the last is very wide.

Simultaneously we prepared a pint of the B.P. 1867 wine from our assayed root, and found that it contained 0·1228 emetine from the equivalent of 10 grams of root, showing that the old process practically exhausted the drug.

From these experiments we conclude—

(1) That the process of the present Pharmacopœia extracts practically all the alkaloid.

(2) That a considerable amount of the alkaloid so extracted is lost by the process of drying and powdering the acetic extract.

(3) That the wine produced is therefore far inferior in relative alkaloidal strength to the root, from which it is prepared.

(4) That the wine of the present Pharmacopœia, although undoubtedly a more "elegant" preparation than that of the 1867 edition, is considerably inferior to it in its chief therapeutic ingredient.

Note on a Volumetric Process for the Assay of Ipecacuanha Wine.

BY THOS. P. BLUNT.

Emetine, in common probably with other alkaloids, appears to react with Mayer's solution by removing the mercuric iodide from its solution in iodide of potassium; it is possible, therefore, to measure the amount of mercuric iodide thus removed by determining the solvent power of the potassium iodide set free upon more of the salt. In practice it is more convenient to add a solution of mercuric chloride of known strength, though in this case the mercury added is not equivalent, but only proportional to that removed. The process suggested consists in evaporating the ipecacuanha wine considerably, to remove alcohol, in which mercuric iodide is slightly soluble, adding excess of Mayer's solution, which must of course be saturated with the mercuric salt, filtering, and adding to the clear filtrate centinormal mercuric chloride solution until a permanent precipitate appears; this part of the process resembles that given in the Pharmacopœia for the assay of hydrocyanic acid. After several trials the following plan was adopted:—50 c.c. of the wine are evaporated on the water-bath to 20 c.c., 10 c.c. of Mayer's solution are added, the precipitate is allowed to subside, and the solution passed through a dry filter 3 inches in diameter. From 25 c.c. to 27 c.c. will be recovered, according to the amount of the precipitate and its consequent absorptive power on the solution.

To the filtrate is now added cautiously, and with constant shaking, a centinormal solution (2·71 parts in 1000) of mercuric chloride, until a faint permanent cloudiness is observed. The quantity required will be from 4 to 6 c.c., and is most conveniently dropped in from a pipette graduated in tenths of a c.c.

The wine first tested by this process was a few months old; two trials gave in each case 4·2 c.c. as the quantity of mercuric chloride necessary to re-saturate the solution with mercuric iodide.

The second sample was a guaranteed one, obtained from a first-class wholesale house. The amount of the precipitate with Mayer's solution showed at once that it was much stronger in emetine than the previous specimen; two successive assays required 6·9 and 6·7 c.c. respectively of the mercury solution for saturation of the filtrate. The Mayer's solution is prepared by taking 100 parts of 10 per cent. solution of potassium iodide, adding saturated solution of mercuric iodide until there is a slight permanent precipitate, filtering, and making up to 200 parts with distilled water. It is clear that the exact strength of the solution is immaterial, but it must be added in excess to the evaporated wine.

The principle involved in the process given above is evidently capable of a much wider application; time, however, has not served for further work upon the subject, and in the meantime it seemed worth while to bring this preliminary note before the Conference, as supplying the pharmacist with a tolerably easy process for testing from time to time the quality of a preparation which is peculiarly liable to deterioration on keeping.

The **President** remarked that preparations of ipecacuanha seemed to be as much the *bête noir* of pharmacy now as they were twenty-seven years ago. He found one of the old papers sent out at Newcastle contained, amongst other things, as a suitable subject for examination, the deposit in ipecacuanha wine, and pharmacists were still working very much in the same direction, although no doubt in the meantime a great deal had been done. There were several gentlemen present who had worked on this subject, amongst them being Mr. Ransom, who had done a great deal with reference to the standardizing of drugs, and they all knew that his investigations were most thorough, and this was not the only subject he had dealt with with very great success. Sir Dyce Duckworth had also given a paper on the exhaustion of ipecacuanha root by acetic acid, Mr. Carteighe having made the preparations for him. The mischief, no doubt, of using acetic acid in extracting ipecacuanha for the production of wine was the destruction of the alkaloid by the heat to which it was subjected in order to drive off the acid. His son had pointed out that they found forty hours heating on the water-bath was necessary to get the extract into condition for powdering, and there could be no question whatever that if emetine was destroyed by heat this process must be objectionable. It was far preferable to make the preparation by putting the fluid extract of such a strength as 1 in 1 into wine, especially when it was quite clear that the ipecacuanha wines of the present day were anything but uniform, some samples yielding twice as much alkaloid as others.

Mr. RANSOM congratulated the authors of these papers on having at last found a process which answered so well for the estimation of alkaloid in both extract and wine. The process he had suggested did not work out sufficiently well to justify its being recommended for the extract. The variety of roots imported and the difference of alkaloidal values was quite sufficient to account for a considerable difference in the wines and extracts, and taking into consideration also the heat employed in drying the extract, it was evident that there would be a great advantage if they could secure a standardized preparation of this drug; he hoped this might soon be accomplished.

Mr. MARTINDALE congratulated Mr. John Umney on the success of his paper, which appeared to describe a process superior to the acetic acid one, to which there were several objections. It was slow, and there was much too great a quantity of fluid used in extracting the drug, which required a long time both in percolation and evaporation, and this must be detrimental to the product. It was very difficult to evaporate the extract down to the condition in which it would powder, and the process with slacked lime and rectified spirit would probably have a better result. The proof of this was that it yielded a certain amount of alkaloid after a fair time of keeping. In the United States Pharmacopœia the formula for the fluid extract had been changed two or three times. They first had an alcoholic extract treated with acetic acid, thinking that would preserve the liquid from that unsightly deposit that nearly all preparations of ipecacuanha formed, except the wine of the British Pharmacopœia, which did keep bright. He had tried another American method, in which glycerine, water and spirit were used. It made a thick mucilaginous preparation, containing some substance allied to bassorin, which when added to wine really did not make a preparation superior to our old wine. Getting the alkaloid into a free condition was a step in the right direction, it being desirable to get rid of the vegetable acid with which it was combined, which had been looked upon as being mostly the cause of the deposit that formed in the old ipecacuanha wine.

Mr. REYNOLDS also congratulated Mr. John Umney upon his paper, which seemed to be especially fortunate in its practical results, and the thoroughness with which the experiments had been carried out. It was most unsatisfactory that after a quarter of a century progress in this matter seemed to be backwards, for they had been making ipecacuanha wine under the authority of their rulers worse than it was before. He believed if the formula now in the British Pharmacopœia had been submitted to a meeting like that the amount of doubt thrown upon it, especially with regard to the desirability of heating such a substance too long, would have prevented its being officially adopted, but so long as pharmacists were not allowed to have much to say about pharmacopœias these mistakes would occur. He hoped, however, that the circumstance of one mistake of this kind being corrected might be some protection against a future crop.

Mr. NAYLOR said he had not made many experiments on ipecacuanha since those he reported to the Aberdeen meeting, the result of which pointed to acetic acid as being the best solvent. A short time afterwards he found that some of his results were rather low, because in estimating the alkaloids he treated the fluid with lime, and evaporated down the residue to dryness. On seeing Mr. Ransom's results he made further experiments, and found that his results were much too low. Still they were strictly comparative. What he wished to point out was this: he had, he was afraid, ever since been guilty of a gross departure from the official formula in making the vin. ipecac. of the British Pharmacopœia, as he always used acetic acid as there stated, but he never evaporated quite to dryness and reduced it to powder, because he knew by direct experiment that the emetine really suffered by that process. He was extremely gratified to find that Messrs. Braithwaite and Umney now brought the matter forward in an official form, and hoped it would receive recognition in another quarter, so that they might no longer labour under the delusion that they had emetine in the wine, when in point of fact it had been decomposed. He hoped also that before long they would gain a recognition of a standardized fluid extract, that of the American Pharmacopœia being very defective.

Mr. CONROY heartily congratulated Messrs. Braithwaite and Umney on the excellence of their paper. He was very pleased to find that the wine of the old Pharmacopœia of 1867 turned out so well. That preparation had always been a great favourite with him, when made in a way he explained at a previous meeting, namely, to macerate the whole root in the wine, using a wine of good alcoholic strength. At the same time he was pleased to see the excellent results obtained by the authors of this paper. The extracts which had been shown seemed everything that could be desired, and the sample of wine also. The process in the Pharmacopœia ought certainly to be discarded, and they should either revert to the old process of making and using the whole root, or having a standardized fluid extract like this.

Mr. BARCLAY (Birmingham) congratulated not only the authors of the paper, but also the President, and ventured to predict that if Mr. John Umney continued to work in the same direction as he was doing now some of the younger members would live to see him occupy a very distinguished position in connection with the Conference. Now it was made plain that heat had the effect of destroying the emetine one practical outcome of the paper would be to show that it was not only necessary to standardize the drug, but to standardize the preparation. Even if drugs themselves were standardized, preparations made in different ways by different houses would be found to vary very much, and it would be necessary in the next Pharmacopœia that many preparations should also be standardized. He hoped that in future Conferences this question would be kept to the front, as it was of the utmost importance.

Mr. MABEN thought after this excellent paper ipecacuanha need not be their *bête noir* much longer. He was rather glad to find that it had been proved that evaporation to dryness destroyed a certain amount of emetine, for he had suspected that in the beginning. Like Mr. Proctor he had experimented *in corpore vili*, and found ipecacuanha wine not so effective as it was said to be. After that he did not evaporate to dryness, but always retained a certain portion of the fluid, and since that time the wine had been very good. He took the additional precaution of separating the tannin from the wine that he employed, because he had an impression that that tended to precipitate emetine. With all deference to Mr. Conroy and to the authors of the paper he did not think the 1867 wine was so good therapeutically, at least it did not keep so well as the present wine did, and he believed the experience of pharmacists would corroborate what he said.

The PRESIDENT said no doubt Mr. Conroy and others who operated on a large scale would bear him out that they were very much at sea at times on account of the varying yield of the products. Sometimes it was as low as about 15½ per cent. with the acetic acid extraction when dried and powdered, and sometimes it went up to 23½ per cent., and to bring it to something like uniformity they diluted it up to 25 per cent. with sugar of milk. He therefore hailed the introduction of a standardized fluid extract very heartily.

Mr. J. C. UMNEY in reply said Mr. Maben had misunderstood him with regard to the 1867 wine. The only remark he made about it was that it was very good as far as the emetine strength was concerned, but as to its elegance he said nothing, except that the present wine was more elegant. With regard to Mr. Naylor's remarks he could only repeat that they found that acetic acid completely exhausted the ipecacuanha.

The following two papers were then read:—

NOTE ON HYPOPHOSPHOROUS ACID AS A SOLVENT OF STRYCHNINE AND MORPHINE.

BY H. W. JONES, F.C.S.

In searching for readily soluble salts of strychnine and morphine for hypodermic medication, I was struck with the extreme solubility of both alkaloids in dilute hypophosphorous acid; and the ease with which these alkaloids dissolve to form neutral, or practically neutral solutions when hypophosphorous acid is employed points to a possibly advantageous use of such compounds for hypodermic injections.

In the case of hypophosphite of strychnine it appears to be a very stable salt in solution; and hypophosphorous acid might, I think, be usefully employed, not only to form a hypodermic injection, but in place of the hydrochloric acid ordered for making liq. strychninæ (B.P.), as the official preparation sometimes gives trouble in cold weather from separation of crystalline matter.

The morphine combination also appears to keep better in solution than the acetate, and would more easily afford a stronger solution than the official inject. morphinæ hypoderm. in cases where such was required. A solution 1 in 6 is sometimes wanted, and the ready solubility of hypophosphite of morphine allows of this being easily made, or even of a very much stronger solution. Thus, for a concentrated injection intended for veterinary use I found no difficulty in preparing a solution four times the strength of the official injection.

The solutions produced with hypophosphorous acid, and using a slight excess of morphine or strychnine, are neutral, or only very faintly acid. In the case of morphine I have found it advantageous to make a decidedly strong solution, to estimate the morphia, and dilute to the required strength; and a similar method may obviously be followed with regard to strychnine.

Morphine hypophosphite is so readily soluble that crystals only separate from a thick syrupy mother-liquor after keeping for some time.

Strychnine hypophosphite can be more easily obtained, as though exceedingly soluble, the highly concentrated solution solidifies on cooling to a crystalline mass from which the salt can be separated.

The salts of both alkaloids would well repay a more extended examination, both as to composition and solubility.

NOTE ON A NEW MODE OF APPLYING CHLORIDE OF METHYL.

BY W. MARTINDALE, F.C.S.

Among the residual products obtained in the manufacture of alcohol from the molasses of beet-root sugar, is trimethylamine, which when purified and converted into a chloride is decomposed by the action of heat into chloride of methyl, ammonia, and trimethylamine again. These are conducted into vessels containing hydrochloric acid, the ammonia and trimethylamine form salts, while the gas of chloride of methyl passes into a gasometer, from which it is compressed by an air-pump. The latter is largely used in France for the manufacture of methyl compounds, such as methylaniline and the new antipyretic exalgine (methylacetanilide). The tension of its vapour not being high, and not increasing very rapidly with the temperature, under a pressure of about six atmospheres its liquefaction is easily effected, and as a commercial article it is sold in the compressed liquid form, in copper cylinders. In this liquefied condition it is a powerful refrigerating agent. When allowed to escape from the cylinder into an open vessel, it begins to boil, and in a few moments the temperature of the liquid is lowered by the ebullition about 75 degrees Fahrenheit below the boiling point of the chloride. It is therefore employed in the arts like ether, for freezing purposes. For medicinal use, a pulveriser is attached to the portable cylinder, so that as the chloride is emitted, it vaporises and produces intense cold. It can thus be applied in a direct stream which should fall obliquely, not perpendicularly, on any part requiring its congealing action, either as a local anæsthetic or for relieving neuralgia, sciatica, and other affections. Without the use of a pulveriser, the jet of gas is apt to take an uncertain direction, owing to the aperture becoming blocked with particles of ice.

Another form of applying it, to which I more particularly wish to draw your attention, is that in which the chloride of methyl is contained in a liquid form in what is called a thermo-isolator. If a little of the liquid chloride be drawn into a beaker, it boils rapidly and is volatilized almost immediately, but in the thermo-isolator it may be retained for some time at the ordinary temperature, so that tampons may be dipped in it and applied to any part of the body requiring its use. The thermo-isolator is simply a glass test-tube, fused at the top to a larger outer surrounding tube, with a vacuum intervening, which acts as a non-conductor of heat, or as it is termed, a thermo-isolator.

The application of chloride of methyl requires care, as, if freely used, it is liable to cause ecchymosis, but it appears to be non-poisonous, as I recently witnessed in Paris a patient suffering from facial neuralgia apply a jet of it freely along the lower jaw and side of the face, afterwards repeating the process along the gum inside the mouth. This he applied daily, and said it was the only thing that gave him relief.

At the conclusion of this paper Mr. Martindale demonstrated the use of the apparatus and the Conference adjourned until the next day.

(*To be continued.*)

The British Association for the Advancement of Science.

ADDRESS TO THE CHEMICAL SECTION.

BY SIR LOWTHIAN BELL, BART., F.R.S., F.C.S., D.C.L., M.INST.C.E.

(*Continued from page* 240.)

There is, however, another way of securing this prolonged exposure of the ore to the action of the reducing gas without incurring the inconvenience just referred to, viz., by increasing the dimensions of the furnace blown with cold air. When this was done by raising the height from 48 to 71 feet it was found that the duty performed by the coke, apart from the heat contained in the blast, was just about the same as that in the hot blast furnace.

With regard to the position of equilibrium above referred to, it is worthy of remark that, while this was reached when a furnace of 48 feet ran 100 tons per week when driven with cold air, it was not arrived at in one of similar dimensions using heated air until the make was increased to about 220 tons.

When we proceed to examine the composition and weight of the gases given off by a 48 feet furnace blown with air at 485° C. it will be found that about 20 per cent. of the carbon as dioxide has disappeared, due no doubt to the still excessive temperature of the upper zone and too rapid a current of the reducing agent. An obvious way to remedy this evil would be by an addition to the capacity of the furnaces. This was done by raising them to a height of 80 feet, with a cubical space three or four times greater than those of 48 feet. In such a furnace almost the full theoretical quantity of carbon as dioxide has been obtained, but while the larger furnace held three or four times as much ore, etc., the production was only about double that of the lesser. On referring to Table II. it will be seen that a further economy of 6·6 cwts. of coke has been effected in furnace C as compared with B, due solely to an enlargement of space, for the temperature of the blast was exactly the same in both. This improvement, it will also be perceived, is due to an extension of those causes which acted so beneficially when hot air was applied to B.

If 6·6 cwts. of carbon or thereabouts is the full quantity per ton of iron which can be found in the gases as dioxide, and if in a furnace working under the conditions of C, it requires 22·32 of coke to furnish this carbon and that in the carbonic oxide, it is clear we cannot withdraw any coke without disturbing the position of equilibrium supposed to have been established in the case of the furnace in question. Suppose into such a furnace the blast, instead of 485°, is admitted at 695°, as happened under column D. The additional heat, 732 calories, instead of 534 as in C, will make itself felt throughout the entire height of the furnace, including, of course, the upper zone. Immediately this happens the carbon dioxide generated by the reduction of the ore attacks the coke and escapes as carbonic oxide. If Table I. is examined it will be seen that almost the whole of the additional heat carried into the furnace D, as compared with C, has been absorbed by the disappearance of carbon dioxide, so that the net power of the coke unit in both cases is practically the same. Nevertheless it will be remarked that there is still a small saving of coke due to a reduced amount of blast, escaping gases, etc.

From what has preceded it has been concluded that a furnace of 80 feet affords sufficient opportunity for the gases being as fully saturated with oxygen as the nature of the process of deoxidizing the ore will permit. The sensible heat in the escaping gases, however, still represents a considerable loss, reduced as they have been from 29,482 to 11,043 calories.

According to estimate it was believed that the reduction of oxide of iron ought to be attended by an increase of temperature—in other words the conversion of carbonic oxide into carbonic dioxide produced more heat than that absorbed by splitting up oxide of iron into its constituent parts. The estimated difference not being a large one, an experiment was made by substituting in the furnace inert substances having about the same specific heat as the ore. The results confirmed the correctness of the calculation—the temperature of the escaping gases fell, and rose to their normal point when the use of ore was recommenced. A more expensive experiment was subsequently made in the same direction by building, at Ferryhill, a pair of furnaces having a height of 103 feet, without any substantial benefit being derived from the large additional expenditure incurred.

It was Scheerer, I think, who first divided the blast furnace into zones. The first division, beginning at the top and extending 12 feet downwards, was designated the preheating zone; the following 18 feet downwards was distinguished as the reducing zone; the next 8 feet the carburizing zone, followed by four feet which constituted the zone of fusion. The lowest of all, having a depth of about six feet, was named the zone of combustion. The author of this mapping out, as it were, the interior of the furnace does not wish to be understood as confining its various functions within the respective spaces assigned to them; on the contrary, he admits the existence of considerable variations of position. My own observations, however, have led me to conclusions varying considerably from those adopted by Scheerer.

The fundamental cause of these differences seems to depend on the temperature considered as being required for a commencement of the reduction of the ore. By Scheerer the reducing zone is considered to require a temperature of 1,000° to 1,200° C. This change undoubtedly is not the same with all kinds of ores, but my experiments were conducted when using almost every variety of the mineral. According to the trials made a mixture of one volume of carbon dioxide and two volumes of carbonic oxide at a temperature of 410° removed 10 per cent. only of the oxygen in Cleveland ore, and 37·8 per cent. from an artificially prepared oxide. The composition of the gases at the different depths, however, indicates in an unmistakable manner the nature of the action which is going on at any particular point. A table has been prepared from actual analyses of the gases which gives the quantity of oxygen present for every 1,000 parts of metal produced; and to this is added the weight of carbon they contained. The results vary, but the general inference to be drawn from the observations made on furnaces of 80 feet is that by the time the minerals have passed through a space of 8 feet of the depth they have to travel all the oxygen susceptible of removal from the ore in the upper region is found in the gases, the remainder being retained until it reaches the zone of fusion. The same is the order of action in a somewhat modified form which was found to prevail in the case of furnaces 48 feet in height.

On casting the eye along the lines of figures a somewhat remarkable circumstance is apparent, viz., that the quantity of oxygen per 1,000 of pig-iron gradually decreases as the gases ascend, until they approach the upper region, when it commences to increase. This had been the subject of observation for many years without any complete explanation being given of its cause. Dr. Percy, among others, bestowed some attention to the circumstance without arriving at any opinion satisfactory to himself. It is a little extraordinary, so far as I have seen, that no notice has ever been taken of the fact that the carbon in the gases followed the same law. While engaged in investigating the action of furnace gases on the ore a peculiarity was observed previously unknown to me, viz., that large quantities of carbon were deposited by the dissociation of the reducing gas, the action being $2\,CO = CO_2 + C$. Experimentally I ascertained that spongy iron, as well as oxide of iron, was capable of producing the change, and that 30 per cent. of carbon dioxide, mixed with the carbonic oxide, arrested the reaction, the temperature at the time being 420°. Dr. C. A. Wright, who subsequently became chief chemist of our laboratory, was asked to continue the examination. The conclusion arrived at was the impossibility of effecting the complete reduction of Fe_2O_3, or of any oxide, by CO. On the contrary, when metallic iron known to contain no oxygen was exposed to a current of this gas carbon was deposited and oxygen absorbed. It would seem, therefore, that this absorption of oxygen by the iron and precipitation of carbon suffice to explain the disappearance of these two elements from the gases,

TABLE III.—*Showing the quantity of Oxygen and Carbon in gases per* 1000 *parts of Pig Iron produced. The* 8 *feet immediately below charging plates is occupied by charging apparatus.*

Distance below top of Minerals.	0 ft.		8½ ft.		18 ft.		31 ft.		44½ ft.		57 ft.		62½ ft.		69 ft.	
	O.	C.	O.	C.	O.	C.	O.	C.	O.	C.	O.	C.	O.	C.	O.	C.
No. 1. Oxygen	1843	—	1250	—	1235	—	1234	—	1236	—	1207	—	1137	—	1348	—
Carbon	—	1101	—	864	—	816	—	871	—	904	—	899	—	890	—	967
No. 2. Oxygen	1843	—	—	—	1410	—	1482	—	1190	—	1207	—	1255	—	1366	—
Carbon	—	1104	—	—	—	914	—	1046	—	894	—	887	—	—	—	927
No. 3. Oxygen	1670	—	1309	—	1206	—	1312	—	1256	—	1253	—	1253	—	1378	—
Carbon	—	1048	—	926	—	907	—	918	—	946	—	931	—	939	—	1013
No. 4. Oxygen	1670	—	1271	—	1224	—	1300	—	—	—	1261	—	1285	—	1387	—
Carbon	—	1048	—	897	—	898	—	917	—	—	—	926	—	977	—	1021

NOTE.—Nos. 3 and 4 were usually partially calcined limestone, hence the deficiency of O. and C. until the lower depths are reached.

TABLE IV.—*Showing what may be regarded as a typical instance of the absence of Carbon Dioxide in the gases taken from a furnace of* 80 *feet. Measurements taken from the highest level of the minerals, i.e.,* 8 *feet below charging plates.*

Depth below charge.	Escape pipe.	3½ ft.	9¾ ft.	16 ft.	22½ ft.	28¾ ft.	35 ft.	41¾ ft.	60 ft.
Carbonic acid . .	16·07	11·71	10·03	8·17	6·12	—	—	·72	3·01
Carbonic oxide .	27·34	29·71	31·39	31·40	32·79	35·27	36·00	36·02	39·47
Hydrogen . . .	·11	·10	·07	·14	·28	·10	·11	·08	·14
Nitrogen . . .	56·48	58·48	58·51	60·29	60·81	64·63	63·89	63·18	57·38
Total	100·	100·	100·	100·	100·	100·	100·	100·	100·

and that they remain in this condition until the fusion of the iron in contact with intensely heated carbon, liberates the oxygen as well as that portion of the carbon which is not absorbed by the metal in order to produce pig-iron.

So far, then, as the analyses given in Table III. enable us to judge, instead of the upper two-thirds of a furnace being required for the purposes of reduction, no material change is effected after passing through 18 feet in a modern furnace of 80 feet in height. After this the composition of the gases, and, therefore, of the minerals, remains pretty steady until the vicinity of the tuyères is reached, with the consequences already referred to.

Of the excess of oxygen at the zone of combustion it is highly probable that a portion is due to the reduction of P_2O_5, SO_2, SO_3, and CaO. In the case of Cleveland iron I have estimated this at 54 parts per 1000 of pig-iron produced, but the average total oxygen beyond that furnished by the blast in the first two instances given was 130 parts. At this rate there must have been 76 parts of oxygen liberated from the oxide of iron, which is equal to 19 per cent. of that originally combined with the iron in the ore.

It may be appropriate here to refer to what may be taken as a typical expression of the working of a blast furnace in respect to the presence of carbon dioxide. An analysis of the gases is therefore inserted, drawn from an 80-feet furnace at various levels, with the simple remark that it is improbable that carbon dioxide can exist for any length of time when exposed to incandescent coke at the temperature which prevails at the depths mentioned in the last two columns.

Something like forty years ago the escaping gases from the blast furnaces, rich as they were in carbonic oxide, were permitted to burn wastefully on the surface of the minerals charged at the throat. This meant a loss of about 54 per cent. of the heating power of the coke. For reasons already given it was of course impossible to utilise much of this heat in the actual smelting of the ore because of the necessity of preserving a large excess of carbonic oxide in the gases. This, however, constituted no reason why, apart from the furnace work itself, this vast quantity of gaseous fuel should not have been utilised, as it no doubt would earlier have been, had the ironmakers known, as they now do, its full value. To-day all the blast and other engines are driven and the air is heated at our blast furnaces by fuel formerly wasted, and this without any labour for stoking being required. In Great Britain alone the annual saving is fully equal to four million tons of coal.

In connection with the other volatile products which accompany the iron smelters' work I will only mention ammonia. Some qualities of coal admit of being used in the raw state. In this case, as in distilling coal for illuminating purposes, ammonia is generated and may be collected. Instead, however, of the ammoniacal vapour being all contained in the hydrocarbons as in gas-making, it is diluted in addition with all the fixed carbon as oxides and all the nitrogen of the atmospheric air used in its combustion. Nevertheless, Messrs. Bairds, of the Gartsherrie works, and others, are manufacturing large quantities of ammonia sulphate from the ammonia so obtained. A similar object is achieved by attaching the necessary condensers to the apparatus for coking coal. The process of distillation is then carried on in hermetically closed ovens heated by the combustion of the gases evolved. These, before reaching the fire-place where they are burnt, are deprived of their ammoniacal vapours by passing through condensers provided for the purpose. Previous, however, to this being done, the waste heat from the coking process had been applied for generating steam, so that at certain collieries in the county of Durham all the mechanical power is obtained without any coal being specially burnt for this purpose.

Before speaking of the next and last great improvement in connection with my subject, I should like to say a few words, and a few words only, respecting steel, a well-known and most valuable compound of iron and carbon. Let me first observe that it seems improbable that this substance was not earlier known to the ancients, as was at one time supposed. The facility with which the metal combines with carbon renders it very unlikely that acieration would not occasionally take place when iron itself was the object of the manufacturer. Certain it is that Agricola, who wrote in 1556, describes in Latin a mode, apparently as well known as that of making iron itself, of making *acie.* The engraving in his "De re metallica" shows bars of malleable iron placed upright in a charcoal fire resembling that of a Catalan hearth. These, after an exposure of several hours to the incandescent charcoal and hot carbonic oxide, were found changed to steel and employed as such.

(*To be concluded.*)

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual meeting of this Society was held on Wednesday, September 18, in the new premises, New Surrey Street, the President, Mr. Radley Learoyd, in the chair. Two associates, Messrs. Dalton and Moffat, were appointed scrutineers for the counting of voting papers for the election of the Council for the ensuing year.

The minutes of the last general meeting having been read and confirmed the President called upon the Honorary Secretary to read the Annual Report:—

The Council in presenting the Report congratulated the members on the continued success of the Society, the number of members and associates now numbering 51 and 35 respectively, and it was hoped that the coming year might see a further addition to the strength of the Society. A number of papers and lectures had been given at the general monthly meetings, most of which have already been recorded in this Journal.

The inaugural meeting of the fourth session of the School of Pharmacy was held in the Montgomery Hall, on Wednesday, October 10, when the prizes were distributed and an address delivered by Dr. Symes, of Liverpool. The past session had been one of prosperity, the number of students having entered being forty, an increase of twenty, the average attendance being 82 per cent. The lecturers had reported well of their classes and the results of the examinations were highly satisfactory, the following gentlemen taking the prizes: Practical Chemistry, A. Barrett (also Lecturer's prize); Botany (1), C. D. Moffat (Mr. Fox's prize), (2), C. H. Twelves; Pharmaceutical Chemistry (1), C. H. Twelves, (2), C. D. Moffat; Materia Medica (1), Sydney Smith, (2), C. H. Twelves; President's prize (in all subjects), Sydney Smith.

The staff of Lecturers is now as follows:—Botany, Mr. J. Humphrey; Pharmacy, Mr. G. Ellinor, Ph.C.; Materia Medica, Mr. R. Watts, Ph.C.; Practical Pharmacy, Mr. G. A. Grierson, F.L.S.; Chemistry, Mr. S. Rhoden; Practical Chemistry, Mr. J. H. Worrall, F.C.S., F.I.C. The Council deeply acknowledged the unabated interest of the Lecturers in their respective classes.

Owing to the increased attendance at the School, the Council had had once more to consider the question of accommodation. Eligible rooms in New Surrey Street being at liberty, which in every way seemed desirable for the carrying on of the Society's work, they were acquired. A fund called "The School of Pharmacy Fund" had been established for the purposes of the school, and out of which the furnishing of the laboratories would be defrayed. The promises and donations received amounted to £30, and the Council appealed to all interested to make the fund a success.

In conclusion the retiring Council appealed to the pharmacists of Sheffield for increased support to their successors, so that the sphere and usefulness of the Society may be extended.

A duly audited statement of accounts was presented which showed an improvement in the financial condition of the Society.

The President moved the adoption of the report and invited discussion, but as the feeling of the meeting was one of entire satisfaction the motion was immediately seconded by Mr. S. Lowe and unanimously carried.

The scrutineers at this point handed in their report, when it was found that the following gentlemen were elected to serve on the incoming Council:—Messrs. Bradwall, Ellinor, Fox, Grierson, Humphrey, Learoyd, Morrison, Newsholme, Preston, Rhoden, Ward and Watts.

Mr. McLeod proposed and Mr. Lowe seconded a vote of thanks to the retiring Council, to which Mr. Humphrey replied.

Mr. Newsholme proposed and Mr. Preston seconded a vote of thanks to Mr. Learoyd. Both gentlemen referred to the President's conspicuous ability in the chair, and to his untiring energy displayed throughout the year for the benefit of the Society.

The President in replying freely expressed his opinions, and spoke encouragingly of the Society's position.

With other votes of thanks the meeting terminated.

Mr. Bingham, of Masboro', and Messrs. Cowan and Wilkinson, of Worksop, were elected associates.

On Monday, September 23, the new Council met for the election of officers, when Mr. A. R. Fox was elected President, Messrs. J. H. Bradwall and G. A. Grierson, Vice-Presidents, and Messrs. G. T. W. Newsholme, C. O. Morrison and C. D. Moffat were re-elected treasurer, secretary and librarian respectively, and Messrs. R. W. Watson and J. F. Eardley, auditors.

With votes of thanks to the retiring President and others the meeting closed.

It was announced that the inaugural meeting of the School of Pharmacy will take place in the new premises, New Surrey Street, on Thursday, October 10, when S. R. Atkins, Esq., J.P., of Salisbury, will deliver an address. The annual dinner will be held immediately after the meeting in the Masonic Hall.

Parliamentary and Law Proceedings.

POISONING BY STRYCHNINE VERMIN KILLER.

On Saturday, September 21, Mr. A. Braxton Hicks, the Mid Surrey coroner, held an inquiry at the Star and Garter, Church Road, Battersea, into the circumstances attending the death of Sarah Godwin Housdon, aged 19 years, who committed suicide by taking strychnine in the form of Battle's vermin killer.

Mrs. Hannah Housdon, wife of a refreshment housekeeper, carrying on business at 26, Queen's Crescent, Battersea, stated that deceased was her niece, and had been in her service as an assistant for about six years. Latterly she had suffered very much from the toothache, and only a few days since had three teeth extracted. She had been rather low-spirited for some time, but witness could not attribute it to any particular cause. She did not know whether she had a sweetheart.

Saxby, the coroner's officer, said the girl was keeping company with a young man living three or four doors from the witness's shop.

Mrs. Housdon, continuing, said that her niece did her work as usual on Monday, and went to bed at 10 o'clock. At midnight witness was about to retire to rest when she heard the girl calling her. Upon going to her bedroom she found the door locked on the inside, and on bursting it open she discovered the deceased lying on her stomach and screaming with pain. At first she said she had got the cramp, but when witness threatened to send for a doctor she admitted having taken rat poison. Asked why she had done so she replied, "I took it on the impulse of the moment and am very sorry for it." Emetics were administered and a medical man was summoned. Witness could not induce her to give a reason for committing the rash act. She lived very happily with them, and had never threatened to destroy her life. The packet of Battle's vermin killer produced was found in her dressing-table drawer. It was of a bluish colour.

Dr. George F. Burroughs deposed that at an early hour on Tuesday morning he was called to the deceased, who was suffering from the effects of strychnine poisoning. She expired on the following day. In reply to his question, the deceased said she had a sweetheart, but he could not learn upon what terms they were.

By the Coroner: Battle's vermin killer contained strychnine, but he also found traces of what he took to be arsenic in the stomach. The girl told him that she purchased the poison at a chemist's shop, and that a young man served her. Witness did not consider it prudent to serve a young girl like her with strychnine.

Mr. Alfred Evans, manager to Messrs. Foster and Dallas, chemists, of 1, Lavender Hill, Wandsworth, who had been sent for by the coroner, produced his poisons sale book, from which it appeared that on Sunday evening, September 1, 6d. worth of Battle's vermin-killer was purchased by "S. Godwin, of 26, Queen's Crescent, for rats." Witness explained that he was at church at the time and the girl was served by his assistant, who was twenty-one years of age and unqualified; and who, moreover, according to the book, introduced the customer, a witness being necessary. They never sold the poisons mentioned in Schedule A to persons they did not know.

The Coroner said it was evident that the assistant did not know the deceased, who did not give her surname. It was perfectly alarming that poisons should be sold in that loose manner, for people were really at the mercy of their servant girls. Then, again, it was an offence against the law for an unqualified assistant to sell poisons, and he should certainly report the matter to the Pharmaceutical Society.

The jury returned a verdict "That the deceased committed suicide while in a state of unsound mind," and strongly condemned the action of the assistant, who, being unqualified, sold strychnine to a person he did not know.—*Times.*

LIQUOR POTASSÆ SUPPLIED FOR "FLUID MAGNESIA."

At the Central Criminal Court on Saturday, Sept. 21, George Henry Hill surrendered to his recognizances and was indicted for the manslaughter of Lucretia Lydia Goodman.

It seemed that the defendant was a lodger in the house of a chemist in Battersea, and it was stated that the arrangement between him and his landlord was that the defendant was in the evening to assist the chemist in the shop. The defendant was a pipe rack manufacturer by trade. On the evening of July 10 the defendant was serving in the shop when a nurse came in and asked for some fluid magnesia for a child who was suffering from thrush. The defendant put some fluid in a bottle, and having labelled it "fluid magnesia" he handed it to the nurse. The fluid was given to the child, which subsequently died, and it was discovered that instead of being liquid magnesia, the fluid which the defendant had put into the bottle s liquor potassæ. It was stated that the defendant had served in the shop for two or three years, but was not allowed to serve registered poisons. When the fluid was given the child vomited, and was taken to the chemist's shop, and the chemist administered an antidote. It was pointed out that liquor potassæ was not one of the poisons mentioned in the schedule of the Act of Parliament. The defendant was a well educated man who had patented an invention for pipe-racks. It was stated that the defendant had never made a mistake before. The defendant was examined as a witness at the inquest, and stated that to the best of his belief he took the liquid from the fluid magnesia bottle.

Dr. Stevenson was called as a witness, and gave evidence as to having analysed the liquor potassæ.

Mr. Fulton, in addressing the jury for the defence, said the defendant took down the wrong bottle, and it was a pure misadventure which might happen to any one. There had been no negligence on the part of the defendant, and he was therefore entitled to be acquitted.

Mr. Justice Charles having summed up,

The jury returned a verdict of not guilty.—*Times.*

Obituary.

Notice has been received of the death of the following:—

On the 22nd of September Mr. Charles Heaton Sharples, Chemist and Druggist, Fishergate, Preston. Aged 40 years. Mr. Sharples was an Associate of the Pharmaceutical Society.

On the 23rd of September, Mr. John Whimpray, Market Street, Lancaster. Aged 78 years.

Correspondence.

THE SOLUBILITY OF GLASS.

Sir,—About three weeks ago I was requested to examine a peculiar deposit which had formed in white glass vessels intended for exhibiting water from the Holy Well on the Malvern Hills. The bottles were of one gallon capacity, and from the time when filled, about five years ago, had been kept undisturbed. A beautiful, apparently crystalline incrustation had almost completely covered the sides and bottom, and as the water when collected at the spring contains only 6·5 grains total solids per gallon the excess of solid matter was, after some experiments, stated without hesitation to be siliceous matter derived from the glass. Being compelled to admit only a slight practical experience as to the prolonged action of highly dilute solutions on various kinds of glass my opinion was somewhat incredulously received, and smaller bottles were shown which had been filled sixteen years and absolutely free from deposit. This, however, seemed confirmatory not of the special solvent power of the water, but of the peculiarity of the make of glass, which deserves thorough investigation.

As I am looking up information on the subject the recent paper by Mr. Reynolds and subsequent discussion at Newcastle has to me, personally, been most opportune, and perhaps further correspondence may afford more facts bearing on this interesting, though scarcely considered, point of high practical importance to pharmacists.

Malvern. ALFRED MANDER.

J. W.—No doubt ammoniated mercury would be found in proportion to the ammonia present.

E. E. Rowland.—Rubbing the figures with a brush dipped in oil would probably be sufficient for the purpose.

W. J. Shepherd.—(1) *Hyoscyamus niger.* (2) *Amaranthus* species: not British. (3) *Polygonum Fagopyrum.* (4) *Verbena officinalis.* (5) *Gentiana Amarella.* (6) *Anagallis cœrulea.*

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Ashe, Williams, Dott, McLaren, Groves, Woolley, Branson, Reynolds, One who Knows, R. J.

INTRODUCTORY SESSIONAL ADDRESS

DELIVERED AT THE

COMMENCEMENT OF THE FORTY-EIGHTH SESSION OF THE SCHOOL OF PHARMACY,

October 2, 1889,

BY PROFESSOR JOHN MARSHALL,
F.R.S., LL.D., F.R.C.S., M.CH. (HON.), ETC.,
President of the General Medical Council.

Introductory.—Mr. President, Ladies and Gentlemen,—When, a few days since, I perused the addresses which had been delivered in this theatre on five similar occasions to the present one, dealing with various questions of interest in relation to your Society, I realised the seriousness of the duty which I had perhaps somewhat hastily consented to undertake. But when, having read those discourses, each so excellent in its way, I laid them aside and turned to that solid volume, your Calendar for 1889, I took heart of grace; for I speedily discovered that if my own words should fail, I might appeal to the silent eloquence of that substantial record. Moreover when, under the guidance of your President, I had visited this Pharmaceutical Habitation with its ever expanding accommodation, I felt, as a practical educationist, that I could hardly fail to find some fit topics wherewith to occupy the brief moments at my disposal.

Past History.—Not yet quite half a century ago the actual foundation of your Society was laid within the memory of many still living, but it is easy to imagine that its conception in the minds of its distinguished founders was not the impulse of a moment, but the thought and hope of many antecedent years. I need not here record the names of those energetic pioneers, so familiar to us all, nor will I venture to particularize any of them at the cost of those whom I might wrongly omit to mention, but I must be allowed to express my sincere admiration of their sagacity, prevision and prudence in not attempting to compass all their manifest intentions at once, in keeping themselves free from the fetters of premature restrictions, and in manifesting a sure confidence in the future growth of their infant Institution. Corporate interests, commercial advantages they assuredly appreciated and sought after; but from the earliest period of their labours, to their credit and merit be it recorded, they recognized the grave public interests involved in their undertaking, and also the sacred trust that would be incidentally placed in their hands of promoting, advancing and diffusing the special knowledges connected with their useful, necessary and honourable calling.

In swaddling clothes, as a private Society, from 1841 to 1843, it was in the last-named year invested with the protective mantle of a Royal Charter, and since that period its existence and utility have been deservedly recognized by the Legislature in the important Acts of 1852 and 1868. But its restless craving for improvement is not yet satisfied, and a new "Pharmacy Bill" has made its appearance in Parliament, destined in time, it is to be hoped, to be transformed into an Act, which, like its predecessors, has for its aim the improvement of the professional education, and thence of the social status of the alumni of your popular and flourishing Society.

To the more restless and indefatigable of your members, the progress thus made in the development of your Institution may seem to have been too slow; but, I would ask, what is half a century in the career of a new public body? and, again, what in so comparatively brief a period have you not already accomplished?

Present State.—Reverting to your Calendar for full information as to your present condition, I find the record of continued and strenuous efforts crowned with marked, I would almost say with improbable success. To meet the growing exigencies of your educational work, your home, with its manifold adaptations, has been gradually expanded, and is now again being expanded, not only in a vertical, but in a lateral direction. The old technical laboratories, once large enough for the former classes of students, are now relegated to other uses, whilst much larger and more commodious rooms, fitted with improved and more abundant apparatus, have been provided; and, again, besides the separate accommodation thus set free for advanced pupils and other individual workers, each Professor and Lecturer has now his ample and suitably-furnished laboratory department. The various Collections, Chemical, Botanical and Pharmaceutical, the last-named being unique of its kind, are separately and suitably disposed, and so arranged as to be available for the lectures, or for practical instruction, or for private study, whilst a methodized Materia Medica collection is open, not only to your own school, but to medical students proper on the recommendation of their respective teachers. The Library, of ample extent, and in special directions of great excellence, is, under most liberal and yet safe rules, accessible to students from so early an hour as 9 a.m. until so late an hour as 10 p.m.; nor is this all, for it is, with certain exceptions, a lending library, even to members of the Society residing in the provinces. Lastly, I must not omit here to record the fact that the North British Branch of your Society established in Edinburgh has, not long since, been improved in its accommodation, and has met with continued success.

To all these apparently adequate provisions for sound and good scientific and practical teaching, I must add the ample supply of incentives to continuous effort on the part of your students in the form of Prizes and other rewards for distinctive merit of various degrees.

Finally, let me note, that from the earliest stage of your existence, a Benevolent Fund has been created for the kindly purpose of assisting your less fortunate brethren or their bereaved and destitute families.

Action of the Society.—I pass on now to note that all this inanimate machinery, built up, however, under the direction of living and enthusiastic minds, has had, and continues to have, a life-like energy and movement imparted to it by a succession of well known and often famous Professors, Lecturers and Students; its work has been tested by your Examiners, and the action of your entire educational system has been regulated by an evidently wise and sympathetic Council.

It would ill become me, so much a stranger to your affairs, to appraise the merit of any one of the many personal agencies which have been, or which are now engaged in your particular educational field; but I must be allowed to offer my opinion that you have already gathered in a goodly harvest.

I speak not alone of the stimulus you may have given by your highest distinctions to original or otherwise valuable and elaborate research; but I would say, as a member of my own profession, and as one of the body politic of this great country, it is no idle boast to proclaim that of the 14,000 individuals whose names are inscribed on your Register, about half, *i.e.* 7000, have passed either your Major or your Minor examinations.

Now this observation leads me naturally to turn to consider the special function which we are called upon to witness and participate in to-day; I mean the award of honours to those who have just been tested in their respective departments of study, and have distinguished themselves by special merit as to their scientific knowledge or their technical skill.

I need hardly say that I desire to offer the successful candidates my sincere congratulations, to which I am sure I may add those of the Council, the Professors and the Lecturers, on having earned these hard-won distinctions. I may remind them that the receipt of such honours assuredly involves future responsibilities, not to be lightly set aside, or carelessly neglected. All prize winners are marked men, and their future career does not pass by unobserved. Early rewards received at the hands of an honoured public institution, are not only a recompense for past exertions, but should be regarded as pledging their recipients to future efforts for the maintenance of the reputation not only of the individual, but of the Society under whose training they have been earned. Nor, rightly considered, should those, who have only relatively failed in a competition for a necessarily limited number of prizes, be held exempt from the same obligation; for even in regard to them it is impossible to overate the value of their methodical training and their individual efforts to succeed, nor the general beneficial effect of the race which they have run against others just a little more successful in their scientific and technical contest.

Future Progress.—I now turn to the future,—for to an Institution like this a future is of necessity in store, and it will be laden with good or evil, according as its living agencies may shape its onward course.

It is not for me to intrude my opinions on those debateable questions which involve the commercial interests of the members of your Society;—such, for example, as relate to the competition between co-operative trade associations and private establishments,—to the necessity which exists in the former case for attaching definite personal responsibility in regard to the purity of drugs, the accuracy of dispensing and the sale of dangerous poisons,—and, again, to the question of the desirability of the State obtaining a source of income from the sale of patented medicines.

But I may be allowed to express, as the representative of the General Medical Council, the sympathy of that Body towards every endeavour and every practical suggestion which may be made by this Society with a view of improving the British Pharmacopœia, the responsibility for framing and publishing which is by law vested in that Council. Hence comes a direct and continuous encouragement to your legitimate aims of advancing pharmacology as a science, and of promoting pharmacy as an art.

The immediate object of your Society is, as I understand it, to afford the means of a perfect education, general, scientific and technical to all your future Members and Associates—so that each and all may attain to a high state of culture, knowledge and efficiency. Your past history shows that you will not halt in your efforts, but will even yet improve in your methods and in your results.

To this end, your future students, many of whom, unhappily, are outside the sphere of your influence and guidance, and must often be imperfectly informed as to the fittest course for them to pursue in regard to their education, should seek early in their career some friendly and trustworthy advice. It might not be beyond the scope of the duty of your Society itself to circulate very widely a brief pamphlet, containing advice especially intended for those who are still in the apprenticeship stage. It should be strongly insisted upon that a good preliminary general education is absolutely necessary to all who aspire to be really accomplished pharmacists and to be worthy Members or Associates of your Body. It is of the greatest moment, moreover, that the general education of which I have spoken should really be in fact, as in name, *Preliminary*; and therefore the needful examination tests in it should be passed *before* the systematic scientific training is commenced; whilst this, again, should, if possible, precede the special technical work. It must, of course, be granted, that this last recommendation cannot always be followed; but, if not, at least the scientific habit and scientific mode of thought should be invariably inculcated, even by the practical teacher, as the ever leading and essential guides by which to interpret and illuminate the simplest technical procedure. In this way the humblest task is elevated; manual dexterity and mental improvement advance together; and every process thus watched, and every result thus accomplished, will yield the reward of intellectual satisfaction and will excite the pardonable emotions of pride and triumph which spring from the dutiful and successful performance of the humblest work. Finally, I would urge in the most positive manner, that not only socially, but professionally, the greatest probability of real success in life will fall to those who have had the most liberal, as well as the best scientific and technical education.

On the most interesting but perplexing questions relating to *Examinations* I am not now prepared to enter at any length. That examinations cannot be abandoned is clear; that there are evils connected with them is obvious; and hence the conclusion is evident that it is the business of examining bodies and examiners to investigate the charges against them and to aim at their improvement. That some examinations may be too feeble, and others too severe, must also be true; for examining boards will differ as to what is the proper mean. A due admixture of the systematic and the practical form of examinations is absolutely needful, for theoretical questions cannot well be answered *vivâ voce*, and all technical work must be directly tested. The more of the latter the better, and yet not at the expense of the former. Longer time may be required; but the results will be more satisfactory and more fair. Besides this, "cram" will sink to a minimum, and be even beneficial, for it must take the practical form of doing actual work. I am a strong advocate for the introduction of what are called "outside" or "coadjutor" examiners; but this only in co-operation with the institutional teachers, who best know the aims and the extent of the preceding education. Of course, this remark applies specially to bodies which both teach and examine, and thus it is surely applicable to your own Society. In regard to purely examining bodies, no particular training institution or school should be over-represented on the examining board. In all cases two examiners at least should work together at every part of every subject. As to the subjects which are to be examined in at each time, they are often too many or are too severely represented; either practice is a serious source of overstrain, as well as of illegitimate and unhealthy "cram." If the subjects at each examination were fewer, if schedules in certain otherwise enormous subjects were adopted, and if the examinations were more prolonged and practical, "tutors," not "crammers," would take and keep the field.

I cannot close this address without offering your Society my warmest congratulations on the establishment of its Research Laboratory. It will undoubtedly prove useful, nay, indispensable, to many an advanced student, who, whether trained within your own walls or elsewhere, may aspire to lend his aid in endeavouring to promote real knowledge in ever so simple yet unexplored corner of chemical or pharmaceutical research. But what I would specially refer to is the encouragement which you now offer to the higher and more elaborate and more difficult prosecution of inquiries in what is understood as pure science, undertaken for science's sake. Pharmaceutical chemistry, and through it pharmacology, have before them, in the domains of nature, both inorganic and organic, never-ending problems, concerning the constitution and action of remedial substances, which nothing but the highest and most prolonged investigation can pretend to solve. In such inquiries the physiologist must take his share; but in your own sphere of investigation, they invite you to reap a rich reward, not only in an increased reputation with the outside scientific world, but in the realization of a corporate pride arising from your own augmented influence, in the increased reliance of the public upon your opinion and guidance, and, I doubt not, in that progressive success which all must desire for you.

Permit me to thank you for the opportunity and the honour of thus being able to address you and to assure you that I have not meant to flatter, but to encourage. And so I conclude with congratulating all, your President and Council, your Professors and Lecturers, your Members and Associates, and lastly your Pupils both past and present, on your actually accomplished successes; and I venture to prophesy for you that future prosperity which is the invariable reward of lofty aims followed by harmonious and vigorous acts.

NOTES ON ESSENTIAL OILS FROM MESSRS. SCHIMMEL AND CO.'S OCTOBER REPORT.

The following notes on various essential oils are taken from the October Report of Messrs. Schimmel and Co., of Leipzig:—

ANGELICA ROOT OIL (Japanese).—Information has been received from Mr. Murai, Tokio, that the *Angelica anomala*, Lall. s. *Angelica japonica*, A. Gray (Jap. "*Biyakushi*"), referred to particularly in the last report (*Pharm. Journ.*, April 6, p. 803), is cultivated in Japan on account of its roots. Mr. Murai's experience as to the oil contents of the root corresponds with that of Messrs. Schimmel. From roots cultivated at the botanical station in Tokio he obtained 0·074 per cent. and from seed 0·67 per cent. The oil was of a greenish colour and had a very strong odour resembling that of musk. In winter a solid white mass separated.

ARNICA FLOWERS OIL.—The specific gravity of this oil is given as 0·906 at 15° C. The oil is said to be a liquid and not of a butter-like consistence, which form it assumes only upon undergoing a cooling.

BAY OIL.—A sample of oil distilled from leaves imported direct from St. Thomas has been examined by Dr. Mittmann, in Breslau, who found eugenol to be the principal constituent; the methyl ether of eugenol was also present in small quantity as well as pinene and probably dipentene and diterpene. The specific gravity at 15° C. was 0·970. The oil dissolved clear only in ether, petroleum ether, carbon bisulphide and chloroform, while with alcohol and glacial acetic acid it gave a strong turbidity. In preparing "bay rum" from bay oil, therefore, the solution may prove turbid and require to be filtered or treated with magnesia.

BETEL OIL.—The isomer of eugenol mentioned in the last report (*Pharm. Journ.*, April 6, p. 803) as occurring in the oil of betel leaves has now been definitely named "betelphenol." The other important constituent of the oil is a sesquiterpene identical with that already detected in the oils of cubebs, savin, patchouli and camphor.

CASSIA OIL.—Several pages in the present report are devoted to the controversy that has arisen upon the statements made by Messrs. Schimmel respecting the adulteration of certain brands of cassia oil (*Pharm. Journ.*, April 20, p. 842). It will be remembered that samples of oil that had been certified by the proprietor of a "Medical Hall" in Hongkong as being pure and completely volatile, were reported by Messrs. Schimmel to contain an ingredient that they had identified as petroleum, and to leave on redistillation 25 per cent. of a solid residue that had been recognized as pitch resin. It appears that this report has drawn from the person responsible for the certificates, a Mr. Niedhardt, an assertion that Messrs. Schimmel's chemists have mistaken for petroleum a light hydrocarbon that is a natural constituent of genuine cassia oil, and that the resin was a natural product of alteration in the oil, which occurs to the extent of 30 or 40 per cent., even in an oil only a year old. In respect to the first point Messrs. Schimmel protest against it being supposed that their chemists, who are engaged every day in dealing with essential oils, would confound with petroleum a terpene. Moreover, they state that after purification the substance in question has a specific gravity of 0·795 at 20° C., being considerably lower than that of any known terpene; also that it boils between 160° and 265° C., and is indifferent towards sulphuric acid. As to the solid residue it is pertinently asked how an oil that contained so much resin, even if that were a natural constituent, could be certified as "perfectly volatile." But the prevailing scarcity of pure cassia oil has had the effect of bringing into the market some old stocks, and afforded Messrs. Schimmel an opportunity of examining samples from seventy cases said to have been warehoused in Amsterdam for from nine to seventy years. These, whether distilled in a retort over an open fire or rectified by steam, gave as a distillate a clear oil, and the residuum, which varied from 5·5 to 8 per cent., was in every case liquid and did not solidify. Cassia oil distilled in Messrs. Schimmel's establishment from cassia chips, when redistilled at the end of four months, yielded 5·4 per cent. of liquid residue, and an oil of the same age, from cassia buds, gave 4·4 per cent. of liquid residue. As the result of this experience the opinion is expressed that a good merchantable cassia oil should answer to the following characters: (1) It should have at 15° C. a specific gravity of 1·050 to 1·070. (2) Upon distilling about 90 per cent. of pure cassia oil should pass over, and the residue, which may amount to 6 or 7 per cent., and in no case to more than 10 per cent., should not become solid and assume a resinous appearance on cooling, but should remain semi-liquid at least. Experiment has shown that no practical value as a test attaches to the relative solubility of cassia oil in alcohol when it contains an admixture of resin and petroleum.

It is thought that the determination of the value of mercantile cassia oils on a scientific basis will have to depend upon the quantity of cinnamic aldehyd contained in them. The percentage of cinnamic aldehyd obtained at present are as follows:—

a. Pure Oils.	
1. Home distillation from cassia chips	88·9
2. Home distillation from cassia buds	80·4
3. Brand "Ayong," age 60 to 80 years	76·0
4. Brand "Ayong," age 24 years	72·9
5. Brand "Ayong," age 20 years	89·4
6. Brand "Hop Lee," very old	76·6
7. Brand "Tac Foong," very old	78·4
b. Adulterated Oils.	
8. Brand "Yan Loong," 1st lot	58·0
9. Brand "Yan Loong," 2nd lot	63·2
10. Brand "Cheong Loong," 1st lot	58·7
11. Brand "Cheong Loong," 2nd lot	52·9
12. Brand "Cheong Loong," 3rd lot	57·8
13. Brand "Luen Tai"	47·1

The amount of cinnamic aldehyd in these oils was found by determining the percentage of non-aldehydes after separating the aldehyd by means of sodium bisulphite, but some skill is necessary to obtain exact results. The results show that the amount of cinnamic aldehyd is smaller in proportion to the increase in adulteration. Further investigation will be required, but at present it may be stated that a cassia oil that contains less than 70 per cent. of cinnamic aldehyd may be considered adulterated, and that probably an oil containing less than 75 per cent. should be looked upon with suspicion. For instance, a sample of oil, brand "Ayong," age 9 years, which yielded 79 per cent. of cinnamic aldehyd, left a liquid residue from which 10 per cent. of fixed oil was separated, so that before it was adulterated this oil would have shown nearly 90 per cent. of aldehyd.

The principal non-aldehyd constituent of cassia oil has been ascertained by repeated fractionation to be the acetic ether of cinnamyl, $C_2H_3O_2 \cdot C_9H_9$, the portion boiling between 135° and 145° C. (at 11 mm. atmospheric pressure) consisting entirely of that ether. The cinnamic alcohol, obtained by saponification, crystallizes from ether in white solid crystals, boils at 137° C. (11 m.m. pressure), and has a "somewhat hyacinth odour." The presence of the acetic ether of phenylpropyl is also probable. Terpenes of the constitution $C_{10}H_{16}$ are not present, but probably sesquiterpenes and polyterpenes are. Free cinnamic acid, formed by oxidation of cinnamic aldehyd in contact with air, was found both in old oils and those freshly distilled, but always in small proportion.

CITRONELLE OIL.—Two years since Messrs. Schimmel called attention to the adulteration of citronelle oil with petroleum and they now state that since that time the adulteration has gone on with increasing audacity. Fortunately a ready test for the adulteration is available in the behaviour of the oil towards alcohol. Experiment with specially distilled oil has shown that the solubility of the citronelle containing only a small quantity of petroleum is pretty large, but that upon the addition of more petroleum it diminishes rapidly. The test recommended is that one part of the oil should give a clear solution with ten parts of 80 per cent. alcohol, when shaken vigorously. In the presence of 10 per cent. of petroleum the mixture becomes milky. An addition of a fixed oil is still more perceptible, as little as 1 or 2 per cent. being recognizable, but the mixture becomes turbid rather than milky. The specific gravity of the oil should not be below 0·895 at 15° C.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, OCTOBER 5, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

THE Council meeting of last Wednesday was attended by nineteen members, the absentees on that occasion being Messrs. GREENISH and MARTIN. Two persons were then elected associates of the Society, and fifteen as apprentices or students, while several others were respectively restored to their former status in the Society or to the Register of Chemists and Druggists. The report of the Finance Committee showed that the receipts since the last meeting of the Council consisted mainly of examination fees, which are in the ordinary course paid at this period of the year. In addition there was a sum of £25 10*s.* 6*d.*, representing five penalties and costs that had been paid as the result of prosecutions for infringements of the Pharmacy Act. The payments were chiefly for the usual monthly and quarterly accounts, and as a payment would probably in the course of the ensuing month become due to the contractors for the new premises in course of erection that amount was also included in the estimate presented. In view of the payments that would be requisite in that respect between now and Christmas the Committee recommended that power should be given for the sale of stock standing to the credit of the General Fund to the amount of £3000, and the motion of the President to that effect was carried unanimously.

The report of the Benevolent Fund Committee recommended the payment of five grants of ten pounds each, and one of five pounds, to six applicants for relief whose cases had been considered and found most deserving. Four other applications had not been entertained, and one had been deferred for further inquiry. The death of four annuitants since the last election in December, 1888, has reduced the total number of annuitants to forty-eight, and since the financial position of the Fund at the end of the present year appears likely to be much the same as it was last year, the Committee recommended that four others should be elected next December, in view of which the names of four applicants whose cases have been approved are to be added to the list of candidates unsuccessful at the last election. There will therefore be altogether eight candidates for annuities at the next election on the 5th December. From the remarks of the Vice-President on this subject it may be inferred that the Committee considers that by the election of four more annuitants the extreme limit of its capability will have been reached under existing conditions and that the possibility of electing a larger number would be dependent upon a considerable increase in the amount of subscriptions to the Fund. Moreover, when it is remembered that so large a proportion as about one-half of the annuities are being paid out of current subscriptions, the need for caution will be obvious to avoid any possible risk of reducing the power to afford casual relief of an adequate nature in cases of emergency. This difficulty has already been experienced in past years, and where a grant of £10 or even £20 would have been appropriate, it has only been possible to give £5. The disappointment expressed by Mr. HAMPSON that six annuitants could not be elected will doubtless be shared by many others who take an interest in this useful part of the Society's work, but they, as well as he, must bow to the decision of the Committee in this respect, but with the hope that means may be devised for considerably augmenting the amount of annual subscriptions to the Fund. At the present time the annual subscriptions to the Benevolent Fund amount to about £1500, an amount which if contributed equally by every person on the register would represent little more than two shillings from each individual. Actually the number of subscribers is very much more limited, the individual subscriptions ranging from 2*s.* 6*d.* to ten guineas. The possibility of augmenting the Fund is therefore very considerable. If the number of subscribers could be so far increased that the average contribution of registered persons were only five shillings each, the capability of the Fund for granting annuities would be doubled. That is a result which must still be hoped for as being attainable in the future, though at present the approximation to it is but slender.

Another point of considerable interest in regard to the administration of the Benevolent Fund was again raised by Mr. HAMPSON in the course of the discussion. The necessity that exists under the present system of canvassing for votes is one which he regards as painful and humiliating to the candidates, besides being a trouble and expense to them that might well be rendered unnecessary. It is true that candidates are sometimes assisted in this work by their friends or benevolent persons who take an interest in their application, but even in such instances the other applicants who are not thus assisted are placed at some disadvantage. There seems to have been a very general recognition of these objections to the system under which the administration of the Benevolent Fund is now administered by those members of the Council who took part in the discussion. Some were even inclined to think that the action of the Committee which selects candidates for election might be extended so far as to supersede the election as now carried out, and there can be little doubt that the particular objection raised by Mr. Hampson could thus be removed. With a sufficiently large body, such as the Council of twenty-one members, to elect annuitants on the Benevolent Fund on behalf of the subscribers there ought not to be any ground for want of confidence that this duty would not be properly performed. Such a course would entirely do away with the hardship that candidates for annuities should be put to the trouble and expense of making a personal canvass, while the present system of selecting candidates for election only mitigates that hardship by making the contest less severe than if there were a large number of candidates for election. Still it must not be forgotten that the adoption of such a method of election might have a prejudicial influence upon the subscriptions to the Fund. It cannot be doubted that subscribers to charitable institutions frequently take a special interest in the elections, and in exercising their influence to secure votes in favour of particular candidates. As the President pointed out, a little of the commercial element has to be brought in to keep up the funds of charitable institutions like the Benevolent Fund, and there is a danger that if the opportunity for direct personal influence of subscribers upon the elections were to be removed by transferring the voting power from them to a committee the subscriptions might be materially reduced in amount. However, the question of the desirability of a change in the mode of election of annuitants to the Benevolent Fund has now been so definitely mooted, that it will no doubt receive further consideration from the subscribers and those specially interested in the welfare of the Institution. It may also be added that the plan of election by a Committee acting on behalf of the subscribers is already in operation in two of the largest and most successful charities in this country, and that it has been found to work satisfactorily in every way.

Among other matters that came before the Council was the appointment of Mr. William Heywood as local secretary for Bury in Lancashire in place of Mr. Bowker, who has resigned in consequence of going into the medical profession. An application to allow a certificate of the Academy at Aix to be received in lieu of the Preliminary examination was agreed to on the motion of the President. The report of the General Purposes Committee gave particulars of some recent cases of prosecution for infringement of the Pharmacy Acts and recommended proceedings in another case. Two letters from Mr. Braxton Hicks, the Coroner, were discussed in committee, and the recommendation to prosecute an unregistered assistant of a registered chemist and druggist gave rise to an amendment moved by Mr. Schacht and seconded by Mr. Evans, that this portion of the report should be struck out. This amendment was put to the vote and negatived and the original motion for the adoption of the report was then carried.

The Council of the Leicester and Leicestershire Chemists' Association announces that arrangements have been made for Mr. H. Evans to conduct a Practical Pharmaceutical Chemistry Class on Wednesday evenings during the Winter session, commencing October 16, in the Laboratory of the Wyggeston Technical School. In addition a Materia Medica Class will be held at St. George's Chambers, Leicester, on Tuesday evenings, by Mr. W. James, Pharmaceutical Chemist, and an Elementary Chemistry Class on Friday evenings, by Mr. J. Ward. No fee will be charged to Associates of the Association for attending the Materia Medica and Elementary Chemistry Classes and only a small one for the Practical Pharmaceutical Chemistry Class. Further particulars may be obtained from Mr. J. H. Shepherd, Honorary Secretary, St. George's Chambers. The Second Annual Prize Distribution and Ball is fixed for Thursday, October 10, on which occasion the prizes awarded to successful students in the previous session will be distributed by the President of the Association, Mr. J. G. F. Richardson.

* * *

From the Syllabus of the School of Pharmacy in connection with the Sheffield Pharmaceutical and Chemical Society we learn that there will be a course of lectures and demonstrations on Botany on Monday evenings, by Mr. J. Humphrey; a course of lectures and demonstrations on Materia Medica, on Tuesday evenings, by Mr. Robert Watts; a course of instruction in Analytical Chemistry, on Thursday evenings, by Mr. J. H. Worrall; and a course of lectures on Chemistry and Physics, on Friday evenings, by Mr. S. T. Rhoden. In addition a course of twelve lectures and demonstrations on Pharmacy and Practical Pharmacy, by Mr. G. Ellinor and Mr. G. A. Grierson, will be given on such evenings as may be found convenient. The classes will meet in the rooms of the Society, New Surrey Street, and the session will last from Monday, October 14, to Friday, April 27. Further information may be obtained from the Honorary Secretary, Mr. C. O. Morrison, 137, West Street, Sheffield.

* * *

The first meeting of the new session of the Chemists' Assistants' Association will be held on Thursday evening next, at nine o'clock, at the rooms, 103, Great Russell Street, when the Inaugural Address will be delivered by the President, Mr. T. A. Ellwood.

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A meeting of the Dundee Chemists' Assistants and Apprentices' Association will be held on Wednesday evening next, when an address will be delivered by the President, Mr. John Forsyth.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, October 2, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Evans, Gostling, Hampson, Harrison, Hills, Leigh, Martindale, Newsholme, Richardson, Robbins, Schacht, Southall and Watt.

The minutes of the August meeting were read and confirmed.

ELECTIONS.

ASSOCIATE IN BUSINESS.

David Thomas, of Talgarth, having passed the Minor examination, being in business on his own account, and having tendered his subscription for the current year, was elected an "Associate in Business" of the Society.

ASSOCIATE.

Frederick Alfred Roper, of Plymouth, having passed the Minor examination, and tendered his subscription for the current year, was elected an "Associate" of the Society.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Albrecht, Paul Frederick	London.
Beattie, James Brown	Fife.
Braden, Frank	Nottingham.
Branford, William	Farnham.
Branson, Preston James	Plymton.
Carter, Charles	Newlyn.
Dickinson, Charles	Llandudno.
Dodd, Henry Vincent	Slough.
Geary, Frederic Charles	Coalville.
Harris, George William	Nottingham.
Jones, William Miall	Aberyswith.
Pearson, George Edward	Northallerton.
Strickland, Ernest Frank	Cardiff.
Underwood, George	Whitby.
Woodward, James Henry	Spalding.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

David Burgess Cowper, 9, Lynedoch Street, Greenock.
William Glover, 262, High Street, West Bromwich.
Charles Frederic Groom, 44, Great Charles Street, Birmingham.
Ralph Dearlove Walker, 20, Alice Street, Leicester.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee recommended the payment of the usual current account, and also of a sum not exceeding £1000 to the contractors for the new buildings, on the certificate of the architect. It also recommended that a power of attorney be obtained for the sale of stock standing to the credit of the General Fund not exceeding £3000.

The PRESIDENT, in moving the adoption of the report and recommendations, said there was nothing calling for special attention in the receipts, which mainly arose from examination fees at this time of the year. He might mention, however, that in one case in which legal proceedings had been taken, five penalties, amounting to £25 and 10*s*. 6*d*. costs, had been paid, and he understood that the offender had discontinued his illegal proceedings. The payments were mainly for monthly and quarterly salaries, and the amount to be paid to the contractors would probably be due in the course of the month, and it was therefore included in the estimate. Having regard to what would probably be required on this account between now and Christmas, the Council recommended that power be taken to sell out £3000, which would be done as required, at the discretion of the Treasurer.

The motion was carried unanimously.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (age 53) of a member from 1842 to 1850. Applicant has had three previous grants, the last of £5 in October, 1883. (Sussex.)

£5 to the widow (age 60) of a member from 1870 to 1880. Applicant has had four previous grants, the last in October, 1885. (Birmingham.)

£10 to the widow (age 33) of a chemist and druggist and subscriber to the Fund for four years, who died in March last, leaving her wholly unprovided for and in bad health. (Edinburgh.)

£10 to a registered chemist and druggist (age 64), who has failed in business, and cannot obtain employment. (Hants.)

£10 to a former associate from 1844 to 1848 (age 72). Applicant, who has had two previous grants, is very feeble, with failing sight and hearing. His family can only render him very slight assistance. (London.)

£10 to an associate and member from 1842 to present time (age 67). (Bristol.)

Four cases had not been entertained, and one had been deferred.

The Secretary had reported the death on September 25 of Mrs. Louisa Kennett, aged 71, who had been an annuitant since 1880.

The next Election of Annuitants.

A Financial Statement of the Fund had been submitted, showing that in October, 1888, there were forty-nine annuitants on the list, and that three were added at the December election, making the total fifty-two. Four of these had died during the year, leaving the number of annuitants now on the list at forty-eight. Four candidates were unsuccessful at the last election, and the Committee, after a careful examination of the cases of persons relieved during the year, had added four more names to the approved list. The Committee recommended that four annuitants be elected in December next, the election to take place on Thursday, December 5.

List of Candidates for an Annuity.

Brown, Eliza, Louth.
Copney, William, London.
Davis, Samuel Forbes, Southend.
Edwards, Hannah Cutting, London.
Mumbray, Henry George, Manchester.
Pitman, Emma, Westbury.
Spendelow, Mary E., Liverpool.
Suggate, Henry Ezra, London.

The VICE-PRESIDENT moved the adoption of the report. He said the Committee had carefully gone into the question, and come to the conclusion that at the end of the year the position of the Fund would be about the same as it was last year, and that therefore, while it would be safe to recommend the election of four annuitants in December, bringing up the number to fifty-two, it would not be prudent to advise a larger number being elected. There were four remanets, who were unsuccessful last year, and after a very careful examination of the cases of persons relieved during the present year the Committee had selected four more candidates who appeared to be the most deserving.

The Vice-President, in committee, gave particulars of one of the rejected cases.

Mr. Atkins said the Committee had very carefully considered whether it would be prudent to elect six annuitants, which it would have liked to do, but it could not see its way to do so. He wished again to press the claims of the Fund very earnestly on the attention of chemists. There were a large number of cases coming forward, and the Committee did its best to relieve distress, but after all it was obliged to make a selection of the most pressing and deserving cases.

Mr. Hampson was rather disappointed that six annuitants could not be elected, but bowed to the decision of the Committee. The only thing which troubled him was the very painful process which the candidates had to undergo. Here was one old woman of eighty-one, who had to enter into a contest with others, one of whom was fifty-nine, and to subject herself to all kinds of trouble and expense in order to obtain an annuity. It appeared to him that the process was a cruel one and absolutely unnecessary in the interests of the charity. He should be very glad if the Council at some future time should see its way to discontinue this method entirely, and by some other fair means distribute the charity without this ordeal, which was painful, unnecessary, and inhuman.

Mr. Robbins said there was no difference of opinion in the Committee as to the number which should be placed on the Fund, and it was not always a good thing to put too large a number on the list. Some time ago six annuitants were elected, and the result was that the action of the Committee in affording casual relief was crippled, and it was only able to grant £5 when it would willingly have given £10.

Mr. Richardson asked if Mr. Hampson meant to imply that the action of the Committee was inhuman?

The President said Mr. Hampson objected to canvassing, and in that he believed they would all sympathize with him. He hoped the time would come when the Council would have twice as much money to dispose of, and the subscribers would have sufficient confidence in the Council to allow it to dispose of the funds. He was sorry to say, however, that in all charitable, and even in all religious matters, a little of the commercial element had to be brought in in order to keep up the income. It was a great pity, but the care with which the Committee selected the applicants to some extent diminished the evil; the contest was less trying than if there were a large number of candidates. He would remind the Council that there was much truth in what the Treasurer had said. Roughly speaking, half the annuities were paid out of the current subscriptions, and it was very important for the Committee to make an estimate, and decide how much should be available for annuities and how much for casual grants. Sometimes a grant of £10, £15, or £20 was of the utmost value, and if there were too many annuitants there would not be enough for casual grants. Much as he would like to put more annuitants on the list, he thought the way to do the greatest good to the greatest number of their poorer brethren was to adopt the recommendation of the Committee, so as to leave a fair amount for distribution in casual grants during the year.

Mr. Richardson asked if he understood aright that the President hoped that at some future time their constituents would give the Committee the power of granting the annuities?

The President said yes; if they had more money.

Mr. Richardson said that was a new idea altogether. Several members expressed their dissent.

The President said this plan was followed in some charities.

Mr. Richardson said he knew a case where it was done, and it lessened the subscriptions considerably.

Mr. Harrison said it was suggested that this was an entirely new departure, but it was only an extension of the principle already adopted. There were many applicants for the annuities, and the Committee in its discretion selected those it thought the most deserving. Mr. Hampson now suggested, and the President supported, the idea that that principle should be carried a step farther, and that the Committee should not only make the first selection, but the final selection, and he must say he thought it would be a very good thing if this were adopted. According to the present practice six or eight names were issued to the general body of subscribers, many of whom knew nothing whatever about the cases, and it was very much a matter of haphazard who were selected. Sometimes one with a large number of friends and some means was able to make an elaborate canvass, and obtain an advantageous position on the poll, but it was certainly something like a hardship that persons who were in such a state of poverty should be asked to go to the expense, trouble and labour of making a personal canvass. He believed the Benevolent Fund was administered with such scrupulous care that the subscribers would have full confidence in leaving the final selection in the hands of the Council.

Mr. Richardson said he did not give any opinion of his own; he simply asked the question whether that was the idea suggested. His idea was that the Fund should be administered for the benefit of those who were the recipients of it, and so as to obtain the largest amount of subscriptions possible, and he feared that if the voting power were taken away from the subscribers it would materially lessen the subscriptions.

Mr. Evans agreed to a great extent with Mr. Richardson; he thought subscribers would take less interest if they were not allowed to vote, and possibly many would not subscribe at all. It occurred to him, however, that the Committee, in the exercise of the powers vested in it, might in one particular case which had been referred to have made a casual grant where the person was so old that she could not possibly require it for very long, and in fact, if she were elected she could hardly be expected to receive the annuity for the whole year. By giving her temporary relief the case might have been met.

The President remarked that the person referred to had had one grant in the course of the year, and it often happened that those who were unsuccessful in the election had their cases brought before the Committee and received grants.

Mr. Abraham asked if the Committee had considered the advisability or possibility of prohibiting or checking the practice of canvassing. He feared that under the present system, not the most deserving, but the best off and those least in need were most likely to be successful; in fact he had known instances of such a character.

Mr. Cross said there were two sides to this question, and in reply to the observations of Mr. Richardson he might remark that there already existed an association in London which recommended its supporters to withhold all subscriptions from any fund which was dispensed by elections and allowed of canvassing.

Mr. Hampson said it was only by ventilating this question that any good would be done. He felt strongly disposed last year to move a resolution on the subject, but he thought his purpose had been very well served by the progress of this movement in the Council. They all professed to be humane and anxious to give as much relief and happiness as possible to those who sought their help, but he was sure that no kind hearted man, if he examined the next election as it took place, or obtained all the particulars he possibly could with regard to each case, and the means which had to be adopted to further the ends of the candidates, but would be ashamed to subject them to such a contest again. It was a most pitiful thing that the common sense of Englishmen, chemists or others, took such a long time to arrive at a decision on this point, which was sure to come in the end.

Mr. **Atkins** said there was not the slightest doubt on the part of the Committee that the particular case referred to would be successful at the next election.

The **President** in putting the motion said the objection raised by Mr. Abraham had been mooted before, but it was inseparable from the present system, and that was just the reason why Mr. Hampson and others suggested that the system should be changed. It was not fair, however, to say that when an application was received from a candidate asking for votes that the candidate was spending the money involved in the canvass. There were benevolent men who out of their private pockets assisted the candidates with money for this purpose. Of course that was not a desirable thing to do.

Mr. **Hampson** said the result was that the persons without friends went to the wall.

The **President** said no doubt that was the drawback. Nothing short of a process of selection by a sufficiently large body, such as the Council of twenty-one members, would get rid of this objection, and he hoped the time would come when their subscribers would have sufficient confidence in the Council to entrust it with sufficient funds—and 5*s*. from every chemist would do it—to allow the Council to elect the annuitants without their having to go through this process, which he agreed with Mr. Hampson was a degrading one.

The motion was then put and carried unanimously, as was also a resolution for the election of four annuitants on December 5.

Local Secretary.

On the motion of Mr. **Newsholme**, seconded by Mr. **Allen**, Mr. William Heywood was appointed Local Secretary for Bury, Lancs.

Certificate in lieu of Preliminary Examination.

The **President** said an application had been received from a French gentleman that a certificate from a public examining body in France should be received in lieu of the Preliminary examination. The body in question was the Académie at Aix, in the south of France, and the examination was a most thorough one, far in excess of that which the Board of Examiners required. He therefore moved that the Board of Examiners be empowered to receive this certificate.

This was unanimously agreed to.

The Hanbury Medal.

The **President** read a letter which the Secretary had received from Professor Planchon, expressing his great sense of the honour which had been conferred upon him by the award of the Hanbury Medal. The President added that Professor Planchon would be present that evening to receive the medal in person.

General Purposes Committee.

This report, which was taken in committee, included two letters from the Solicitor, giving particulars of cases which had been placed in his hands. One defendant had paid penalties and costs into court, and several cases were standing over for the collection of evidence.

The Committee recommended proceedings in another case of alleged infringement of the Act which had been placed before it.

Two letters from Mr. A. Braxton Hicks, Coroner for London, had been considered.

On resuming,

The **President** moved that the report and recommendations of the Committee be received and adopted.

Mr. **Schacht** moved as an amendment that the report be received and adopted, with the exception of the portion which recommended the prosecution of the unregistered assistant of a registered chemist and druggist.

Mr. **Evans** seconded the amendment.

The amendment, on being put to the vote, was negatived, and the original motion was then carried.

EVENING MEETING IN LONDON.

Wednesday, October 2, 1889.

The inaugural meeting of the session took place on Wednesday, October 2, the chair being taken by the President, Mr. **Michael Carteighe**, at half-past eight o'clock, when the Hall was crowded to its utmost capacity.

In opening the proceedings the President said he regretted to announce that Professor Marshall, President of the Medical Council, had unfortunately been attacked with a severe cold and lost his voice, and he had just received a letter from him saying that he was unable to deliver the address. The address was in his possession, but unfortunately the meeting would be deprived of Professor Marshall's personal presence.

Report on the Practical Chemistry Class.

Professor **Attfield** being called upon to report on the class of Practical Chemistry, said there had been eighty-four students during last session, twenty of whom competed for the bronze medal at the end of March, the successful candidates obtaining 85 per cent. of the possible marks. Sixteen competed for the silver medal in July, and the successful competitor, who he was glad to say would be associated with him in the coming session as demonstrator, obtained 96 per cent. of the possible marks.

The successful competitors were—

[First Examination.]

Bronze Medal	George Sydney Fuller.
Certificates of Honour	Thomas Woodruff. John Brooks Thornley.

[Second Examination.]

Silver Medal	Harry Dixon Fuge.
Certificates of Honour	John Brooks Thornley. Richard Henry Norman. George Sydney Fuller.

The questions set at these examinations will be found in the *Pharmaceutical Journal* for April 20, p. 854, and July 20, p. 49.

Report on the Class of Chemistry and Chemical Physics.

Professor **Dunstan** next reported on the Chemistry and Chemical Physics Class. Last session, for the first time, he remarked, a change had been introduced into the mode of teaching. Formerly it had been the custom to deliver two courses of lectures, the first occupying five months and the second being a repetition of the same. During the last session the plan had been introduced of having one course divided into two parts, one ending in March and the other in July. This plan had worked extremely well, and anyone who knew the amount of chemistry it was now necessary to teach a pharmaceutical student would realize the difficulty a professor was in when attempting to deal with the subject in five months. In a course of ten months both the professor and the students were placed in a much better position. This improved system had had the result—not unsatisfactory, but somewhat remarkable—that the same man had been able to get both the bronze and the silver medals, and in each case the first and second certificates of honour also fell to the same gentlemen, both of whom were Bell Scholars. All these gentlemen and also the one who took the third certificate in July, richly deserved the honours which had been awarded them. The examination was by no means an easy one, including as it did the three branches of chemistry, physical, inorganic and organic, and the successful candidates therefore might well be congratulated. The medals and certificates, however, were not to be regarded as ends in themselves, but should rather be regarded as incentives to future exertion. He should have been very glad if Mr. Thornley, the silver medallist, could have gone on with his work in the Research Laboratory, but unfortunately his health did not admit of this, his medical adviser having prescribed a lengthened residence in another country, and he was therefore going to Australia.

The successful competitors were—

[First Examination.]

Bronze Medal.................	John Brooks Thornley.
Certificates of Honour...	Harry Dixon Fuge. Equal { Alfred Latchmore. Richard Henry Norman.

[Second Examination.]

Silver Medal..................	John Brooks Thornley.
Certificates of Honour...	Harry Dixon Fuge. Richard Henry Norman. Lewis Ough.

The questions set at these examinations will be found in the *Pharmaceutical Journal* for April 13, p. 830, and July 20, p. 49.

Report on the Botany Class.

Professor **Green**, in reporting on the Botany Class, said that what had fallen from Professor Dunstan with regard to the new arrangements of the school would have come with equal force from himself, as the teaching of Botany had also been slightly altered. There had been two courses, independent of each other, though most of the students at the beginning announced their intention of attending both courses. It had been a subject of some anxiety, whether one course divided into two sections, elementary and advanced, should supersede the older plan, but so far experience had been in favour of the plan now adopted. Nearly all the students attended the whole course, and looking over the work done during the year, without going into indiscriminate eulogy, he might say that the work had been done in every way as well as could be expected. There had been men of different calibre, some very good, and others whose claim to consideration was founded on sheer hard work, rather than on brilliant talents, but taking the work as a whole he had every reason to congratulate himself and the school on the class of men who took advantage of it. The first division of the course, consisting mainly of anatomy and morphology, which could be carried on in the winter months, was examined upon at the end of March, when Mr. H. D. Fuge took the bronze medal, closely followed by Mr. Latchmore and Mr. Jones, the Redwood Scholar. The work was thoroughly good, and the Society might be congratulated on the results of establishing this scholarship. At the end of the session Mr. Fuge again took the chief honours, and he was glad to say that he was going to continue his studies, and to assist him as a demonstrator during the ensuing session. The special feature of the botanical work during the year had been the development of practical botany. Two years ago the Council enabled him to commence this department, and last year further facilities were afforded him, by means of which he established a microscopical class for practical botany, and he could speak in high terms of the work done by many of the students, one in particular, Mr. Albert Smith, though his name did not appear afterwards as a prizeman, was exceedingly good at this practical work. In conclusion he wished to mention in terms of high appreciation the assistance he had received from Mr. Edmund White, a former Bell Scholar, and while congratulating him very heartily on his new position at St. Thomas's Hospital, where he followed their old friend, Mr. Sidney Plowman, he could not help expressing his personal regret that by Mr. White's good fortune he should be deprived of the assistance of a very able colleague.

The successful competitors in the Botany Class were—

[First Examination.]

Bronze Medal	Harry Dixon Fuge.
Certificates of Honour..	Alfred Latchmore. William Thomas Jones.

[Second Examination.]

Silver Medal..................	Harry Dixon Fuge.
Certificates of Honour..	Lewis Ough. Alfred Latchmore. William Thomas Jones.

The questions set at these examinations will be found in the *Pharmaceutical Journal* for April 13, p. 831, and July 20, p. 49.

Report on the Herbarium Competition.

With regard to the herbarium prize, Professor Green reported that three collections had been sent in. The first, a very good one, including 531 specimens mounted with great care, and with an evident appreciation of the peculiarities distinguishing the different species and genera, and showing all that there was to show, so that he had no difficulty in ascertaining whether the collector had been successful in identifying them. The next one contained 337 specimens—a very good work, and the third, 467, but they were not quite so well mounted. With regard to the competition for this prize, he thought it was not very satisfactory to get only one herbarium sent in, as had frequently been the case, and possibly some clear understanding of the conditions of this competition might lead to better results in the future. Most candidates seemed to think it was no use competing unless they could send in a huge mass of specimens, but he would point out that that was not the idea, which would be really degrading the competitor to the level of a plant hunter. The real object was to show the competitor's knowledge and discrimination. He thought, therefore, it would be a good plan if it were understood that quality, not quantity, was principally looked at. Mr. Horrell would have got the same prize if he had only sent in half the number of specimens, and he would suggest that the Council might in future limit the number of specimens, and that it should be well understood that the mode of displaying them so as to show that the competitor had actually worked upon them should be a criterion in future. He should also be inclined to give the preference to medicinal plants over others.

The successful competitors were—

Silver Medal	Wm. Foskett E. Horrell.
Bronze Medal	George James Monger.
Certificate of Honour	Alfred Wade Willmott.

Report on the Materia Medica Class.

Mr Holmes in reporting on the Materia Medica Class said that twelve candidates competed at the end of the winter course for the bronze medal, and the gentleman who had the good fortune to win it obtained the full number of marks possible. At the close of the summer season there were eight competitors, Mr. Wain, who obtained the silver medal, having done so simply by steady, persevering hard work, for he had had some powerful competitors, the next candidate being only three marks behind him.

The successful competitors were—

[First Examination.]

Bronze Medal	Harry Dixon Fuge.

[Second Examination.]

Silver Medal	Clement John Wain.

The questions set at these examinations will be found in the *Pharmaceutical Journal* for April 13, p. 830, and July 20, p. 49.

Report on the Pharmacy and Practical Pharmacy Class.

Mr. Ince next reported on the Pharmacy Class. He said there had been no alteration made in the arrangements of this course, there having been the usual winter and summer courses of the same duration as before; but in one respect there had been a great change, which he hoped would be permanent, namely, that nearly all the students had remained for the full course of ten months. It was obvious to all practical pharmacists that it was impossible for any man to get an intelligent notion of pharmacy in five months. The course had, however, been divided into two parts to meet the wishes of those who joined the class at the commencement of the summer season. He need not repeat what had been said by the other Professors, and would only add that both at the end of the first and second course the papers of the two first competitors stood out so distinctly from the others that there had been no difficulty whatever in deciding on their merits, though there was considerable difficulty in saying who should be first and who second. Both these gentlemen were Bell Scholars, and he might remark in conclusion that he was quite convinced now from practical experience, as he had been before on theoretical grounds, that a good liberal education was infinitely the best preparation for any technical study, pharmacy not excepted.

The successful competitors were—

[First Examination.]

Bronze Medal	Harry Dixon Fuge.

[Second Examination.]

Silver Medal	Richard Henry Norman.

The questions set at these examinations will be found in the *Pharmaceutical Journal* for April 13, p. 830, and July 20, p. 50.

The President then distributed the prizes and certificates to such of the successful competitors as were present.

Report on the Council Examination Prizes.

Mr. Bowen then reported on the Council Examination Prizes, for which eleven gentlemen competed, three of whom only gained sufficient marks to entitle them to a prize. At the same time he could not say that the work of the unsuccessful candidates was to be despised. It was very good work, but it was uneven. For instance, one gentleman who had very excellent marks for chemistry was faulty in botany and materia medica, thus reducing his average. He considered it a matter of great satisfaction that the Bell Scholars should come out so prominently in an open competition of this kind.

The President then handed the medals to the successful competitors as follows :—

I. PEREIRA MEDAL (SILVER); and Books of the value of £5 presented by Mr. T. H. Hills.

Harry Dixon Fuge.

II. PHARMACEUTICAL SOCIETY'S MEDAL (SILVER); and Books of the value of £3, presented by Mr. T. H. Hills.

Alfred Mander.

III. PHARMACEUTICAL SOCIETY'S MEDAL (BRONZE); and Books of the value of £2, presented by Mr. T. H. Hills.

Lewis Ough.

The questions set at this examination will be found in the *Pharmaceutical Journal* for July 27, p. 72.

Report on the Bell and Redwood Scholarships.

The President then explained the nature and origin of the Bell and Redwood Scholarships, and remarked on the satisfaction which it must be to all there that Professor Redwood was again able to be present at the awarding of the scholarship which had been founded in his honour.

Mr. Saul then gave his report on the examination which had been conducted by Mr. Tanner and himself for these scholarships. He said the competition was a decidedly good one, being satisfactory both in the number of candidates and the general quality of the papers. The number of candidates had only once been exceeded, and it would have been brackettted with the highest on record but for the sad accident which happened to one of the would-be competitors, Mr. E. G. Wilson, which resulted in his lamentable but heroic death, he having lost his life in the happily successful endeavour to rescue two children from drowning at Oxford. The candidates were distributed at all the chief examination centres throughout England, but it was worthy of notice with regret that Scotland should be so poorly represented. This year there had been none from that part of the United Kingdom, and during the past five years only two students had been examined for these scholarships on the other side of the border. He thought that a nation so deservedly famous for its students ought to show a more practical appreciation of these useful, valuable and honourable scholarships. He then announced the result as appears below, and the President awarded the scholarships accordingly:—

The Jacob Bell Memorial Scholarships.

Charles Ernest Boucher
and
Harry William Kilby Pears,

The Redwood Scholarship.

Edward Birchall Sherlock.

The questions set at this examination will be found in the *Pharmaceutical Journal* for July 13, p. 30.

THE INAUGURAL SESSIONAL ADDRESS.

Professor **ATTFIELD** was then asked by the President, in the absence of Professor Marshall, to read the inaugural address. The address is printed at the commencement of the present number of this Journal.

At the conclusion of the reading—

The **VICE-PRESIDENT** (Mr. **BOTTLE**) moved a vote of thanks to Professor Marshall for his extremely comprehensive address. The members of the Society thanked him as President of the Medical Council for the sympathy he had shown in their work, and for the sketch he had given of the rise, progress, and probable future of the Society. They would also desire to convey to him their sympathy with him in his present ailment, and to express the hope that he would soon be fully and permanently restored to health.

Dr. W. J. **RUSSELL**, F.R.S. (President of the Chemical Society), in seconding the motion, said he had listened with very great interest to the address, which appeared to him exceedingly appropriate to the occasion. It was not for him as an outsider to say anything with regard to the history and prospects of the Society, but the subject of examinations, which was no doubt the burning question of the day, was one which Professor Marshall had studied very deeply, and his views upon it were of great importance. He thoroughly sympathized with all that he had said upon that subject.

The vote of thanks was carried by acclamation.

PRESENTATION OF THE HANBURY MEDAL.

The **PRESIDENT** said the next business of the evening had little to do with the School of Pharmacy, except in the sense that Daniel Hanbury was one of the early students in that School, and that the Medal which he had the honour that evening of presenting was founded by a number of his friends, pharmaceutical, scientific and medical, to commemorate his memory. The desire to show sympathy for the work which Daniel Hanbury had done, not only for pharmacy and pharmacology, but for the whole profession of medicine, was so strong that it was found necessary to limit the amount of subscriptions, and in the result a very handsome sum was raised, and the Council of the Pharmaceutical Society was chosen as the executive body to carry out the provisions of the trust deed which was agreed upon. That deed, after reciting the merits and claims of Daniel Hanbury, provided that a gold medal of a certain value should be awarded biennially to the most distinguished man of any nation in materia medica in its widest sense. The conditions laid down were very special and definite, and in order to prevent any possibility of abuse in the adjudication it was decided that besides the President of the Pharmaceutical Society, the President of the British Pharmaceutical Conference, and a pharmaceutical chemist nominated by them, there should be associated the Presidents of the Chemical and of the Linnean Societies. Those gentlemen represented in the widest sense the corporate bodies dealing with the sort of work in which Mr. Hanbury was interested. He was glad to say that all but one of the adjudicators were present that evening. Mr. Carruthers, President of the Linnean Society, was unable to attend, but he had sent his homage and congratulations to the recipient of the medal. He had now simply to report that the award had this year been made to a distinguished Frenchman, Professor Gustave Planchon, of Paris, and if it was a great honour to Englishmen to be associated with this award, it was also a great compliment when the recipient, being a foreigner, came over to receive it in person. On only one occasion previously, when it was awarded to Mr. Howard, had the medal been personally presented. Professor Planchon was an eminent authority on the subject on which Daniel Hanbury worked so arduously and with so much satisfaction, so that he was sure if he could have been present he would have heartily concurred in the choice which had been made. The first medal was awarded to Professor Flückiger, Mr. Hanbury's colleague; the next to Professor Dragendorff; the third to Mr. Howard; the fourth to Professor Dymock; and now for the first time it fell to an eminent Frenchman. From being a pharmacist, with that liberal education which the French law required of all pursuing that calling, Professor Planchon had become not only a prominent man of science in his own country, but a great authority all over the world on this special subject of pharmacology. He was the successor and editor of Guibourt, who might be termed the Pereira of France, and he was therefore the Pereira, the Daniel Hanbury, the Guibourt of the world. And he might remark that this subject was a peculiar one, which did not present those immediate attractions that some other branches of experimental science did; but to those who did pursue the work as Professor Planchon had done, not only in editing Guibourt's works, but in original lines of his own, such as his treatise on the genus Strychnos, which was published in the Pharmaceutical Society's Journal, it no doubt had peculiar attractions, and was certainly of the greatest value. The original papers to which he had referred were so completely and perfectly worked out that they alone would have been sufficient to justify the award which had been made. But Professor Planchon had also done an immense amount of other work. He was interested in science in its pharmaceutical aspect throughout the whole of France, for he was director of the School of Pharmacy of Paris, which was a national institution and part of the University of France. In fact, in France, as in some other countries, pharmacy was recognized as a liberal profession, and the student had to attend the University in order to gain the knowledge requisite to become a pharmacien. In England they were a long way off that, pharmaceutical education being entirely voluntary, but it was remarkable that while Englishmen were complaining of some of the difficulties in the way of obtaining a qualification, the restrictions in the neighbouring country were much more precise and severe. Besides being director of the École de Pharmacie, Professor Planchon was associated with the department of public instruction in France in all that appertained to the science of biology, and took part in the school examinations in that subject. Under the French system of national education, even school boys had an opportunity of obtaining at a comparatively early age a good knowledge of biology and general science. He had said enough to show the reasons which had actuated the adjudicators in awarding this medal, and in conclusion he would again remark on the great courtesy and courage which Professor Planchon had shown in braving the terrors of the English Channel, and coming there *in propria persona* to receive the medal which he had now the honour and privilege of presenting to him.

Professor PLANCHON, who spoke in French, replied as follows:—

Ladies and Gentlemen,—I regret that I am not able to tell you in your own language with what happiness I find myself in your midst in such circumstances. Nothing could gratify me more than the choice of your committee, composed of men whose independence and authority cannot be contested, while it is in itself a very precious consecration and great encouragement for the efforts that I have made for the advancement of materia medica. It is also a great satisfaction to see my name associated with the distinguished pharmacologists who have received the same medal: Flückiger, the worthy co-worker with Hanbury, with whom I have long been on terms of good friendship; Howard, so devoted to science, who with a charming kindness and courtesy supplied me with valuable materials for my 'Etudes sur les Quinquinas;' and Messrs. Dragendorff and Dymock, whom I have not the pleasure of knowing personally, but whose works on the chemistry of drugs and the Pharmacopœia of India I am called upon to consult daily. With these sentiments of natural pride is joined another that is more personal—a true satisfaction of heart induced by the name of the medal that I venture to receive. Daniel Hanbury was the ornament of your Society, which he has honoured by his science and by his character. He belongs to you entirely; but all the societies on the continent were glad to have him amongst them, and we in particular, the Société de Paris, considered him as one of ourselves. He had been the faithful friend and assiduous correspondent of Guibourt, who resembled him in the conscientiousness of his researches and his love of the good. Subsequently he kindly afforded to myself, in various ways, evidences of esteem and affection, and in Paris we regarded him with the most lively sympathy and listened with the most respectful interest to any communications that he made. His memory always lives among us, and lends, in the eyes of our Society, a great additional attraction to the prize given in his name. For these reasons I thank with all my heart the Committee which has awarded it to me, the Council of the Society which has accorded me so gracious a reception, and all present who have kindly taken part in it. To these thanks permit me to add the wishes and salutations of two institutions, whom it is my duty to associate in a part of my success of to-day; for if you have crowned the modest labours of the man of science you have also wished to honour the École de Pharmacie de Paris in the person of one of its Professors and its Director, as well as the Société de Pharmacie through its General Secretary.

British Pharmaceutical Conference.

MEETING AT NEWCASTLE-UPON-TYNE.

SECOND DAY'S PROCEEDINGS.

Wednesday, September 11.

(*Continued from page* 256.)

On Wednesday morning the proceedings commenced with the reading of a paper entitled—

CHEMICAL OBSERVATIONS ON THE ROOT BARK OF EUONYMUS.

BY W. A. H. NAYLOR, F.I.C., F.C.S., AND E. M. CHAPLIN, F.C.S.

Mr. W. T. Wenzell appears to be the only chemist who has published the results of a systematic examination of the bark of the root of *Euonymus atropurpureus*. His monograph on this subject is to be found in the *American Journal of Pharmacy*, September, 1862. In initiating an inquiry into the proximate principles of this drug it seemed advisable that we should follow the plan marked out by Wenzell, carefully go through his experiments, and see to what extent we could confirm the results he obtained.

A. The bark was first treated with 95 per cent. alcohol, and the tincture thus obtained set aside for future examination.

B. The marc was then thoroughly exhausted with cold water. This solution was heated, in order to coagulate the albuminous matter present and afterwards filtered. The liquid thus freed from albumen was evaporated over a water-bath to the consistence of a thin syrup, when it was observed that a white deposit adhered to the bottom of the basin; this, after the liquid had been poured off, was found to consist of citrate of lime.

The decanted solution after suitable dilution with water was then precipitated with neutral acetate of lead, and the precipitate (*a*) thus formed was taken up in suspension with water and decomposed with sulphuretted hydrogen; the liquid after the sulphide had been filtered off proved to be composed of tartaric and malic acids. (β) The filtrate from the neutral acetate of lead precipitate was then treated with subacetate. From the precipitate thus produced, Wenzell states that after separating the inorganic salts present, he was able to obtain a small amount of a crystalline body of the nature of an organic acid which he termed euonic acid. The quantity, however, was insufficient for him to examine thoroughly as to its properties. Although we have very carefully followed his method of procedure we have not succeeded in detecting this body.

The filtrate from the subacetate of lead precipitate (β) was then freed from lead by sulphuretted hydrogen. After the sulphide of lead was filtered off the liquid was evaporated slowly down to a small bulk on the water-bath and then put in a warm place for spontaneous evaporation. A large crop of crystals soon formed. These crystals were drained on bibulous paper and taken up with water. The greater portion dissolved, leaving behind a white sediment consisting of lime and alumina.

These inorganic salts were filtered off and to the filtrate was added twice its own volume of strong alcohol. A flocculent precipitate was formed, and after a few minutes on pouring the liquid off a small quantity of the organic crystals came out of solution and deposited on the sides of the vessel. The flocculent precipitate consisted of salts of potash. After the potash salts had been filtered off the solution was evaporated and the resulting crystalline deposit drained on bibulous paper as before. This process of purification was repeated until the crystals were practically colourless. Under the microscope they exhibited a needle-shaped form, and with the aid of the selenite plate could be seen to polarize beautifully. This body was distinctly sweet to the taste, and when quite dry was much less readily soluble in cold water; when once dissolved, however, it did not easily fall out of solution. It was very sparingly soluble in alcohol and ether. Hot water dissolved it freely, forming a neutral solution. Its aqueous solution was not precipitated by tannic acid. It melted at about 182° C., and it did not become red by contact with sulphuric acid. We would here draw attention to the fact that though the body we have just described was obtained by following Wenzell's plan exactly, still few of the reactions, beyond the solubilities, agree with those that he gives to the crystalline substance which he separated and pronounced to be asparagin.

The body we have isolated, and which may be provisionally called *atropurpurin*, differs from asparagin in the following particulars. Nitrogen does not enter into its composition. When boiled for an hour or more with a 2 per cent. solution of aqueous sulphuric acid it reduces Fehling's solution, indicating that it is of the nature of a glucoside. It has a fixed and well-defined melting point.

Further, we are unable to harmonize certain of Wenzell's statements of the behaviour of his crystalline substance with his inference that "there is no doubt of its identity with asparagin." The statements we refer to are these:—Solution of ammoniacal acetate of lead gives a voluminous white precipitate. On heating the crystals on platinum foil, they first fused. When treated with sulphate of potash in the cold combination was readily effected, with the evolution of ammonia.

C. In a tincture of the bark prepared with dilute alcohol, Wenzell found a neutral, uncrystallizable body, possessed of a bitter taste which he termed euonymin. We are able to confirm his finding of such a principle.

For the purpose of this experiment we used alcohol of the sp. gr. 0·920. The tincture thus prepared was shaken up with chloroform and after separation was effected, the chloroformic layer was drawn off and evaporated down with the aid of very little warmth.

The residue was very bitter and had an acid reaction. This was then treated several times with warm ether; part dissolved (*α*) and (*β*) remained undissolved.

(*α*) On evaporation gave a yellow resin which had an acid reaction and produced an irritating sensation at the back of the throat to be afterwards described as acrid.

(*β*) The residue unacted upon by ether was taken up with alcohol and to this solution neutral acetate of lead was added. The precipitate formed was filtered off and the filtrate freed from lead by sulphuretted hydrogen. After removing the lead sulphide a slightly coloured liquid was obtained, which when evaporated left the euonymin as an exceedingly bitter residue.

It was quite soluble in water, forming a neutral solution; was insoluble in petroleum ether; did not crystallize; was precipitated both by subacetate of lead and by tannic acid. When dissolved in alcohol subacetate gave no precipitate.

Another method for obtaining euonymin is described by G. Romm (*Chem. Centr.*, 1885, 442-443). He extracts the bark with 70 per cent. alcohol, distils off the spirit, and concentrates the residue to a syrupy consistence on a water-bath. It is then diluted with water and filtered. This filtrate is precipitated by neutral acetate of lead; the precipitate is filtered off and sulphuretted hydrogen passed through the filtrate; the resulting precipitate of sulphide of lead is filtered off and the acid liquid neutralized with carbonate of magnesia and precipitated with tannic acid. The precipitate formed after being washed with water is exhausted with absolute alcohol. This alcoholic solution is next treated with excess of freshly prepared oxide of zinc and dried to a powder on the water-bath. The powder is extracted with absolute alcohol and the liquid filtered off. After ether has been added to separate out the glucose the solution is gently evaporated down, when he states that crystals of euonymin separate out. As he gives no properties or reactions of this body, whether it is acid or alkaline or neutral, or whether it has a bitter taste or not, we are unable at present to say if the product we obtained by this method is identical with Romm's euonymin.

D. A fresh portion of comminuted bark after treatment with boiling water was extracted with 65 per cent. alcohol. On the alcohol being distilled off a dark brown mass was left behind. When this was treated with petroleum ether part dissolved (*α*). (*β*) was the portion undissolved. (*α*) This portion soluble in petroleum ether was evaporated down to dryness, when a dark brown acrid residue remained. This was boiled for about an hour with a 5 per cent. solution of caustic potash in proof spirit. The spirit was then driven off and the aqueous portion left behind shaken up with ether.

Three layers separated out:—

(*α* 1) The top layer contained the portion soluble in ether.

(*α* 2) The middle layer was composed of rosy-red flocculent matter.

(*α* 3) The bottom layer contained the part soluble in water and was of a dark brown colour.

(*α* 1) The ethereal layer was then taken and evaporated, and the residue treated with alcohol, which dissolved it. A portion of the alcohol when drawn off and evaporated yielded a yellow resin free from bitterness, neutral in its reaction and tasteless. Potash salts were tested for and proved to be absent. The remainder of this alcoholic solution was allowed to stand for some hours. When again looked at a crop of colourless crystals had separated boldly out from the solution, in the form of long silky needles. They were insoluble in boiling water and also in diluted hydrochloric acid, but were soluble in ether and in a less degree in alcohol. When incinerated they left no ash, and when placed in contact with strong sulphuric acid were turned red. The melting point was found to be about 129° C. From the fact that we have not met with this crystalline body by the use of simple solvents, we are inclined to believe that it is to be regarded as a product rather than as an educt.

(*α* 3) To the aqueous layer hydrochloric acid was added to set free whatever fat and acid resins might be present. This separated mixture of free acids was taken up with ether, which, on evaporation, left a brown oily substance. When treated with proof spirit part dissolved (*α* 4), leaving the fat acids of the oil undissolved (*α* 5). These fat acids crystallized in fine needles assuming a fan-like arrangement.

The portion soluble in proof spirit (*α* 4) filtered through animal charcoal yielded on evaporation an acrid uncrystallizable principle to be again referred to.

(*β*) The part of the residue from the 65 per cent. alcohol extract, insoluble in petroleum ether, consisted of a dark brown resinous substance which dissolved completely in ether. It was possessed of a disagreeably bitter taste. When dissolved in alcohol it precipitated with neutral lead acetate (*β* 1). The filtrate after getting rid of the excess of lead was evaporated and yielded a yellow uncrystallizable resin having a slightly acrid and bitter taste. (β 1) The lead precipitate was suspended in alcohol and decomposed with sulphuretted hydrogen; the liquid, after the separation of the sulphide of lead, gave on evaporation a yellow uncrystallizable resin, soluble in ether and insoluble in petroleum ether, having an acid reaction.

Viewing the results from the extraction with 65 per cent. alcohol in the clearer light of after experiments it is evident that the method adopted fails to effect a sharp separation of principles. The educts are more or less contaminated with their associated bitter and acrid principles respectively.

E. The marc, after the treatment with 65 per cent. alcohol, was further treated with 84 per cent. alcohol. After the alcohol had been distilled off the residue was treated with petroleum ether. This dissolved out a fixed oil, which after washing with 60 per cent. alcohol was quite bland to the taste and of a brownish-yellow colour. The portion insoluble in petroleum ether was identical with Dβ.

F. The marc was finally treated with ether, which gave a mixture of wax contaminated with oil. This was not further examined.

A. From the knowledge we have already gained and from subsequent experiments, we recommend the following method for isolating the proximate principles of euonymus dissolved in the tincture of 95 per cent. alcohol (*A*), alluded to at the commencement of the paper as having been set aside for future examination. The residue obtained by the distillation of this tincture was exhausted with ether. The part which remained undissolved, and which Wenzell describes as a soft resin, when treated with water, completely dissolved, and presented the characters of "bitter extractive."

The portion taken up with ether was then evaporated to dryness, and to the residue was added just sufficient alcohol to effect its solution. It was allowed to stand for three days, when the larger portion of the neutral fixed oil it contained separated out. The oil, after washing with 60 per cent. alcohol, was practically tasteless.

The solution from which the oil originally separated, after evaporation to dryness, was treated with petroleum ether, when a portion dissolved (α). This (α) was evaporated to dryness, the oily residue was shaken up repeatedly with 60 per cent. alcohol.

The insoluble portion (α 1) consisted of neutral oil.

The soluble portion (α 2), after being evaporated, was treated with proof spirit, which dissolved out an oily principle (α 3). This was acid, and markedly acrid.

(α 4) The portion which did not dissolve in proof spirit crystallized readily from the mixture of stronger alcohol, and consisted of free fat acid or acids, a condition in which they exist naturally in the oil.

β. The portion insoluble in petroleum ether. This was treated with 60 per cent. alcohol. That which passed into solution (β1) consisted of Wenzell's golden yellow resin, uncrystallizable, having an acid reaction associated with a pronouncedly bitter principle. The removal of the latter was effected by repeated digestions with warm water, and the filtration of the decanted liquors when cold. The filtrate on evaporation left a light yellow residue, which after treatment with ether was practically colourless. It was intensely bitter, neutral, not crystalline, and was precipitated by tannic acid when not added in excess, and by basic acetate of lead. In all these respects it agrees with Wenzell's neutral body euonymin. Dissolved in water without the intervention of an acid it reduced Fehling's solution.

(β2) The portion of (β) insoluble in 60 per cent. alcohol was a brownish resin, hard and pulverizable, which after repeated washing with water was not perceptibly bitter. This corresponds with the resin insoluble in petroleum ether, from the 65 per cent. extract by alcohol (Dβ.)

We have searched for an oleoresin, but have failed to find one. We may also add the observation that an aqueous extract reduces Fehling's solution.

To summarize the results of our examination of the root bark of euonymus, we find the following organic principles:—Citric, Tartaric and Malic Acids, Atropurpurin? Euonymin (Wenzell), Neutral Fixed Oil, Crystalline Free Fatty Acid or Acids, Acrid Principle, Yellow Resin, Brown Resin, Bitter Extractive and Wax.

Our analysis differs from Wenzell's, in that we find atropurpurin in place of asparagin, bitter extractive in place of soft resin, free fatty acid in place of crystalline resin, brown resin soluble instead of insoluble in ether, and in addition an acrid principle.

The **President** said the Conference was much indebted to the author for this paper. There was nothing much more unsatisfactory than the preparations of euonymus.

Mr. **Groves** asked if the euonymin of commerce was made from the root bark, as he understood it was made from the twigs, and if so, what was the reason for examining the root bark? Also he should like to know if the examination identified with any certainty the really active principles. What was the purgative property due to—the active principle or the fatty acids? Lastly, he asked if the crystalline body like asparagin had any action on the body if taken internally?

Mr. **Martindale** said there was a substance which was described as a glucoside. It might be the same as Mr. Naylor spoke of, but it was not identical with asparagin.

Mr. **Naylor**, in reply to Mr. Groves's question, said the root bark was used partly because Mr. Wenzell had employed it in his analysis; secondly, because so far as he knew, the root bark was principally used in pharmacy. The only difference between the root bark and the twig in point of composition was, that the root bark contained much less of the poisonous principle that had been isolated by Meyer and Romm, which was a glucosidal body analogous to digitalin. With reference to the glucosidal principle which had been isolated by Mr. Chaplin and himself, he had not experimented with it on himself, or on anyone else, beyond tasting it. It had a slightly sweetish taste like populin. It gave no colour reaction with sulphuric acid. He was unable to say what was the active principle in euonymin or the euonymus bark of commerce. This paper was preliminary to one of a more pharmaceutical character to follow.

The **President** was glad to learn that Mr. Naylor purposed taking further action in the matter, and no doubt at some future meeting the Conference would hear further from him about it.

The next paper read was on—

MEDICAL AND CHEMICAL MISCONCEPTIONS ABOUT LITHIA.

BY LOUIS SIEBOLD.

For many years it has been an established article of faith with the medical profession to regard lithium compounds as powerful agents for preventing the deposition of uric acid in the tissues, or for dissolving and removing such deposits when already formed. These salts have been generally credited with being greatly superior for these purposes to the corresponding potassium salts; and they therefore enjoy a correspondingly greater reputation as remedies in chronic gout, calculus, etc. They owe their place in the materia medica originally to the observation that, as compared with potash or soda, a smaller amount of lithia suffices to form a soluble salt with uric acid, and that this salt is more readily soluble in water than the corresponding potassium and sodium salts. From a chemical point of view, the relatively greater power of lithia to dissolve uric acid or—what practically comes to the same thing—its greater antacid or neutralizing power, presents itself as a matter of course, owing to the low atomic weight of lithium. It follows from the atomic weights of lithium and potassium that lithium carbonate will go nearly twice as far in this respect as potassium carbonate, or, to put it more exactly, that 74 parts of the former salt possess the same acid-saturating power, and are likely to dissolve as much uric acid as 138 parts of potassium carbonate. This is a natural conclusion apparent to every chemist; and if the medicinal fame of lithium salts went no further than appears warranted by this conclusion, I should not now trouble you with any observations on this subject. But that fame extends further, and the faith that many medical practitioners, and chemists along with them, have in the superior virtue of lithia amounts to a belief that its superiority is far greater than is indicated by the ratio of molecular weights. Were this not so it could have hardly come to pass that so much preference is given to the not so harmless and much more expensive lithium preparations. Nor is this faith in the superior efficacy of the latter confined to the carbonate, which is a direct antacid, and to the citrate, which though a neutral salt becomes converted into carbonate within the organism, and thus acts as an indirect antacid. It is extended also to a number of mineral waters containing lithia, generally mere traces of it, notwithstanding the fact that what there is of lithium in these waters generally occurs in them as chloride or as sulphate, salts which neither directly nor indirectly act as alkalies and possess no solvent action on uric acid. This seems quite irrational, and the question arises whether this fame, so far as it exceeds the reasonable chemical conclusions alluded to, really rests on a solid foundation, or whether it has no such foundation, but is based on misconceptions. Experiments which I conducted a few years ago, and which were then left unfinished, strongly inclined me to the latter view; and a further investigation of this subject carried out quite recently confirms me in this opinion. It is not my intention to trouble this meeting with a description of the numerous experiments made, though I shall be glad to give any information I may be asked for in the discussion. I shall simply give, in the briefest form, the conclusions I have arrived at from these experiments. They are as follows:—

(1) The relative solvent action of solutions of lithium, sodium, and potassium carbonates on a given weight of uric acid, under equal conditions of dilution and temperature, is strictly proportional to the ratio of the molecular weights of these solvents. (The determinations were made at 37° C., and the proportion of water to uric acid was not much greater than that occurring in urine.)

(2) Equivalent proportions of the three solvents named dissolve equal quantities of uric acid under equal conditions of dilution and temperature. (Experiments conducted on the same lines as in 1.)

(3) Crystals of uric acid deposited from urine show the same behaviour towards the solvents named as the pure uric acid used in 1 and 2.

(4) Equal weights of a urinary sediment consisting of acid urates, are dissolved by quantities of the three solvents named proportional to their molecular weights.

(5) Lithium chloride and lithium sulphate exercise no solvent action on uric acid and acid urates.

(6) Natural mineral waters containing lithium chloride have no solvent action on uric acid beyond that exercised by basic constituents simultaneously present, and by the water.

(7) The degree of alkalinity of urine produced by the internal administration of medicinal doses of lithium citrate is not greater than that produced by equivalent doses of potassium citrate. It is greater than that produced by equal doses of the corresponding potassium salts, but only so in proportion to the molecular weights. (All these experiments were conducted under strictly equal conditions of diet. The alkalinity was determined in the urine of twenty-four hours.)

To the foregoing conclusions I may add that lithium salts are known to be more toxic than potassium salts, and hence less suitable for prolonged administration. Altogether, the superiority of lithium salts as remedies in calculus, gout, etc., appears to me much overrated.

The PRESIDENT said the Conference was fortunate enough to have one or two gentlemen belonging to the medical profession present who possibly might throw some light on the question from a medical point of view. From the chemical point of view Mr. Siebold had certainly raised some queries which would indicate that lithia waters had no advantages over some other waters, and had probably some disadvantages.

Mr. SIDNEY PLOWMAN said he agreed in great measure with what Mr. Siebold had said. At the same time some allowance should be made for believing in tradition with regard to the therapeutic value of medicines. If one examined the pharmacist's Bible, the Pharmacopœia, and went through its contents, all would agree that it would be impossible for a medical student or practitioner to test rationally all the statements and traditional beliefs he has had to listen to from the lecture platform concerning the drugs therein contained. The Pharmaceutical Conference was doing splendid work when it induced such investigators as Mr. Siebold to come forward and show the fallacies of tradition, even with regard to one series of drugs, viz., the salts of lithia, and if other workers would come forward in the same way a great many of these traditional errors might be done away with, and they might get some exactitude in the science of medicine, which, though it had been said to be an exact science, was in fact the most inexact of all. He must say this, however, that in spite of tests and experiments and so on, it must always be remembered that the human body was not an enlarged test-tube, and, though these experiments might be very exact, yet the result of experience must always be taken into account.

Mr. PROCTOR asked whether a lithia water did not become famous before the fact of lithia being present was known. His impression was the fame came first, and the lithia was discovered afterwards.

Mr. SIEBOLD said he agreed with nearly everything Mr. Plowman had said. Still, the experiments he quoted were not altogether test-tube experiments, but were to some extent conducted on different lines. For instance, where he dealt with the alkalinity produced in urine by the internal administration of certain alkaline remedies, and showed that no greater effect was produced by lithium salt than by potassium salts, except in so far as the difference in the molecular weight would account for it, that was not really a test-tube experiment. But in a general way it was perfectly true that it was not always safe to draw conclusions from laboratory experiments as to what went on within the human organism. It was certain, however, that the therapeutic application of lithia for complaints such as calculus was based on its power to dissolve or render soluble uric acid, and what he was anxious to show was that it exercised this power simply in a chemical way as an alkali. Whatever view might be taken of the complicated processes going on within the organism, they could not arrive at the conclusion that certain salts could neutralize acids in any other way than in the manner which they had all learnt to understand as chemists. They could also feel sure that infinitesimal quantities of any alkaline salt could not neutralize or render soluble more than infinitesimal quantities of acid, and it was really little else than superstition to believe that mineral waters containing a mere trace of lithium chloride should possess special powers in this respect. He quite agreed with Mr. Proctor that some of these waters had a reputation as medicinal agents for a variety of purposes before lithia rose to fame; but it was not until after that fame had commenced that they came into special favour as remedies for calculus, gravel and similar complaints. Some of these mineral waters did not contain the lithia they were said to contain, while others in which minute quantities did occur contained it in a form in which it had no solvent action on uric acid. In his opinion it was quite time that this matter should be looked at from a more rational point of view.

The next paper read was on—

ARSENIC IN GLYCERINE.

BY LOUIS SIEBOLD.

Attention has been called by Jahns in the *Chemiker Zeitung* (1888, 293), and subsequently by Vulpius in the *Apotheker Zeitung* (April 10, 1889), to the frequent occurrence of arsenic in glycerine. More recently R. A. Cripps, in a letter to the *Pharmaceutical Journal*, has pointed out that this contamination is not confined to glycerine of German manufacture, but occurs also in glycerine made in this country. These statements, and the absence of any information respecting the quantity of this objectionable impurity, induced me to submit a large number of samples of both English and Continental manufacture to a careful qualitative and quantitative analysis. My experiments, however, were not extended to low qualities of commercial glycerine, commonly used for technical purposes, but were confined to colourless and odourless samples sold for toilet and pharmaceutical purposes. The majority of the samples tested proved to contain arsenious acid varying in proportion from 1 part in 4000 parts to 1 part in 6000 parts; a few samples somewhat exceeded this proportion, while about 10 per cent. of the samples contained smaller proportions than 1 in 6000. The samples which were found free from arsenic nearly all represented, as far as I could ascertain, the product of one process of manufacture, viz., the steam distillation process, and this product is the very kind of glycerine which, I believe, is universally used by pharmacists in this country in the dispensing of prescriptions.

The process I adopted for the estimation of the arsenic consists in the conversion of the latter into arseniuretted hydrogen in a Marsh's apparatus, and the passing of the gas through a solution of silver nitrate. From the weight of the silver precipitate thus obtained the proportion of arsenic is readily calculated.

As a very ready and delicate means of detecting this impurity in glycerin Vulpius recommends the mode of testing first suggested by Gutzeit, and recently reported upon in detail by Flückiger (*Archiv der Pharmacie*, ccxxvii., p. 1). I agree with Vulpius as to the extreme suitability of this test for the purpose in question, but would recommend a much smaller proportion of acid as more conducive to success. I find an acid even weaker than that suggested by Flückiger to give the best results, and invariably employ a mixture of 1 volume of pure hydrochloric acid of 1·16 sp. gr. with 7 volumes of water, or in other words an acid containing about 4 per cent. of HCl gas. The following is a very safe and successful way of applying the test:—

Place a mixture of 5 c.c. of the dilute hydrochloric acid and 15 to 20 drops of the glycerine to be tested in a very long, narrow test-tube or cylinder, together with about 1 gram of metallic zinc perfectly free from arsenic. Before adding the zinc, place 1 drop of saturated solution of mercuric chloride, by means of a thin glass rod, in the centre of a small white paper filter and allow it to dry up by gently warming the paper over a flame. As soon as the zinc is added to the mixture of acid and glycerine, turn the paper over the mouth of the tube, and allow the latter to stand in an upright position. In the presence of $\frac{1}{100}$ of a milligram or more of arsenious acid in 1 gram of glycerine a distinct yellow stain will be produced on the under surface of the paper within a quarter of an hour, while with quantities of $\frac{1}{50}$ of a milligram and more this result is attained within a few minutes. Exceedingly small traces, such as $\frac{1}{200}$ to $\frac{1}{500}$ of a milligram of arsenious acid in one gram of glycerine may take from half an hour to one hour to produce a visible stain, but such minute traces may, I think, be disregarded. For all practical purposes I consider that the sample of glycerine under examination may be passed as pure if a distinct yellow stain fails to show within a quarter of an hour. In the presence of more arsenic than the proportions named the stain passes from yellow through orange to brown. In the place of mercuric chloride Vulpius used a saturated solution of silver nitrate which Flückiger has shown to give still more delicate indications, showing the presence of as little as $\frac{1}{1000}$ of a milligram of arsenic. But the test with mercuric chloride is amply delicate enough and has the marked advantage of not being interfered with by light or by the organic matter of the paper, and of being much less affected by minute traces of sulphuretted hydrogen. The absence of sulphur compounds in the glycerine as well as in the reagents can, of course, be demonstrated by repeating the experiment with a piece of lead paper, which is much more readily affected by sulphuretted hydrogen than the mercury paper. If the lead paper remains unstained after ten minutes exposure, or if it should only show a very faint or doubtful stain, it may be taken for granted that there is no sulphur present sufficient to stain the mercuric paper in the test for arsenic. Should, however, the lead paper give a decided indication of sulphur the latter may be rendered harmless in the test for arsenic by adding to the mixture of glycerine and acid, previous to the introduction of the zinc, a drop of weak iodine solution, or just enough to produce a visible coloration, as recommended by me many years ago in connection with the testing of wall-papers.

The drying up of the drop of mercuric chloride solution on the filter paper, instead of using the paper wet, seems to me to increase the delicacy and distinctness of the test, and renders unnecessary the introduction of a layer of dry filtering paper between the mouth of the tube and the test-paper, as recommended by Flückiger.

Arsenic in glycerin is considered to emanate from the sulphuric acid used in the manufacture of the latter; and I have little doubt that this is the main, if not the only source. A few days ago it occurred to me that this impurity might possibly also emanate, partly at least, from the glass of the bottles in which the glycerine is kept. It will be within the recollection of members of this Conference that years ago I traced the presence of lead in liquor ammoniæ acetatis to the solvent action of this liquid on the lead of the glass. What suggested to me a similar action in the present case was the well-known and very powerful solvent action of glycerine on arsenious acid, and the observation during my recent experiments that samples of a certain brand of glycerine which had been kept in bottles for a long time contained arsenic, while this impurity was absent from samples of the same brand drawn from tins. This difference may have been purely accidental, but it certainly renders it desirable to study the action, if any, of pure glycerine on bottles of various kinds of glass; and this I am at present engaged in investigating. Up to the present my experiments in this direction have given negative results; but as they have only extended over a few days they do not as yet admit of any conclusion. With reference to the bottled glycerine in which I found arsenic, while a sample of the same make from a tin contained none, I may add that this glycerine was contained in bottles in the glass of which I had no difficulty in demonstrating the presence of arsenic. It is well known that certain kinds of glass used extensively for chemical apparatus contain arsenious acid; and according to recent observations the proportion of the latter in such glass occasionally amounts to as much as 0·1 to 0·4 per cent. I shall refer to this subject again as soon as my experiments now in progress are completed.

The **President** said this matter was a very important one. Glycerine was so largely consumed for medicinal purposes and was handled so freely by the public that if arsenic was present in the best or ordinary specimens used for household and medicinal purposes it ought to be known. At the same time it was necessary to be very careful not to create a scare among the public on this subject. They should approach the subject with open minds, recognizing the fact that arsenic was to be found in glycerine, and the question then arose where did it come from? Was it from an imperfection in its manufacture, arising from the sulphuric acid used in the process, from the glass in which it was stored, or from the tin which was put on the inside of the iron vessels in which it was largely packed, or from the solder put round the packages? It would be necessary to be very careful in examining the origin of these arsenical contaminations. He was very glad that some perfectly pure glycerine was to be found in the trade, and he should like to ask Mr. Siebold if arsenic were present as a defect in the manufacture, what he would suggest for its removal. The question was very important, both from a chemical point of view, and also from that of Medical Officers of Health.

Mr. A. H. **Allen** having listened with great interest to this paper congratulated Mr. Siebold on having found a test which seemed so simple and satisfactory. He had been listening all through the paper with the feeling that the results might be vitiated by the presence of sulphur compounds, and was glad at last to find it pointed out how easy it was to avoid their influence. Personally, when he had been troubled in that sort of way he had used a drop of permanganate instead of iodine, but he was inclined to think the iodine was equally good, and perhaps more elegant. The sulphur compounds might have three sources, the acid, the zinc, and the glycerine itself. Glycerine was of a very variable character; there were various qualities in the market, and on that account it was very likely that there was that distinction drawn by Mr. Siebold, who said he was able to trace the pure kinds of glycerine to one source, or perhaps it would have been better to have said to one process of manufacture. First of all there was the method of decomposition of fats by superheated steam, and with or without the addition of lime. In that case you got fatty acids which might be sometimes not so good for soap-making as the manufacturers desired, but the process yielded first-rate glycerine, which only required to be redistilled and concentrated to be extremely pure. In that case the glycerine had no chance of being contaminated by arsenic from any acid, because none was used in the manufacture. There might be some used to neutralize the lime subsequently, but that was after the glycerine was distilled over, and where it was obtained by such means it was likely to be pure. On the other hand a large quantity was made under very different circumstances, and from different materials—soap leys. These were now concentrated and distilled for the sake of the glycerine, and the largest works in England were those in Lancashire. This glycerine was chiefly employed for the manufacture of dynamite. Messrs. Nobel used several tons of glycerine a day to make nitroglycerine, and this being so it would be seen there might be a large quantity of arsenic pass off in that way, but they insisted on a certain known quality of glycerine for this purpose, and would resent any appreciable quantity of arsenic being present. Otherwise there would be arsenical hydrochloric acid used for neutralizing the soap leys, and those sort of things, in the production of glycerine. The glycerine was tested rigidly for certain impurities which were dangerous in the manufacture of nitroglycerine. Amongst the tests used was a nitrate of silver test, which would be likely to detect any arsenic existing in the distilled glycerine; and he did not think distillation would remove any arsenious acid previously existing in the glycerine. Mr. Siebold had suggested various sources of arsenic, and the President others, such as the solder of the tins. He did not think this was very probable; and as to the arsenic in glass, at Castleford, which was a glass-making town, they used more than a ton of arsenic a week, but he always had the idea that the greater part of that went into the air and poisoned the inhabitants, and not into the bottles. At any rate it was rather a novelty to hear that ordinary glass contained so large a proportion as 0·4 per cent. of arsenic, and he should like to know whether that was the proportion of material used in making the glass, or what remained after the glass had been heated to a white heat. Mr. Siebold had shown the way to detect arsenic in glass, but he was not aware of any published series of analyses showing such large amounts of arsenic in glass, and could hardly think that glass was the source of the arsenic found in certain specimens of glycerine, because, as Mr. Siebold said, the glycerine which he had traced to one process of manufacture was free from arsenic, although kept in bottles. There were other ways by which arsenic could get into glycerine. It was mentioned in connection with a late popular heroine that glycerine was found containing arsenic, and although that might have been introduced purposely, it was a curious matter in connection with this paper that arsenic should occur accidentally in connection with glycerine, and it gave rise to a train of thought which would naturally occur to everyone.

Dr. **Thresh** said he had listened to Mr. Allen's remarks with great interest, and they would all recognize the great importance of the subject. To medical men it was of great importance to have pointed out all the possible sources by which their patients might receive into the system traces of poisons like arsenic and lead. He had seen numbers of cases of lead poisoning in which the medical attendants had been utterly baffled in tracing the source of the lead. He remembered distinctly two cases, a father and son, in which the physicians were perfectly certain they were suffering from arsenical poisoning. Though they had seen similar cases traced to wall papers, in this case they could not trace it to anything. It might possibly have been that they had been taking some mixture containing glycerine which also contained arsenic. At any rate, if he had known at that time that such considerable quantities of arsenic might have been found in a drug like glycerine, his attention would have been directed to that point. The importance of the paper from a toxicological point of view could not be over estimated, but he did not think it was desirable to dwell at any length on that point. He should agree with Mr. Allen that it was due to the process of manufacture rather than to anything else.

Glycerine distilled with superheated steam was very unlikely to show any trace of arsenic. It was probably found in specimens prepared by other processes in which chemicals well known to contain arsenic were used.

The **President** said it was desirable to avoid bringing into the discussion the question of arsenic which might be present in raw crude glycerine. Those present cared nothing about what was used for manufacturing dynamite, whether it contained arsenic to the extent of one part in 1000 or 2000; they were more concerned with the presence of arsenic in minute quantities in glycerine used for medicinal purposes.

Mr. **A. H. Mason** said with regard to the possibility of the arsenic being derived from glass bottles if he understood correctly arsenic was only used in the manufacture of white flint glass. Ordinary bottles were not made with arsenic.

Mr. **Conroy** said most of them would be very much relieved by the last remarks made by Mr. Siebold, viz., that he found the class of glycerine used medicinally to be free from arsenic. He further understood, and this was at variance with the remarks of Mr. Allen, that Mr. Siebold was able to trace the source of the contaminated glycerine. It was implied in what Mr. Allen said that Mr. Siebold was able to trace the source of the glycerine which was free from arsenic, and that was a most important point which he should like Mr. Siebold to further elucidate in his reply.

Mr. **Sidney Plowman** agreed that the Conference should be very careful to avoid anything like a scare in connection with the presence of arsenic in glycerine, but when it was found that it existed to a considerable extent—one in 4000 or one in 6000, and in some cases to a larger extent still—they were bound to admit that that was a serious quantity, and they must not shut their eyes to the fact, but if possible find out the source of it, and prevent it occurring. He remembered some time ago Mr. Fletcher reading a paper on the presence of arsenic in solution in chloride of iron, and a considerable discussion arose as to whether the whole of the arsenic came over as arseniuretted hydrogen, and reduced the nitrate of silver. He kept the suspected solution together with the reagents in a generating bottle for five or ten minutes and certainly got very fair results. He wished to ask Mr. Siebold what length of time he kept the suspected solution in contact with the zinc and hydrochloric acid in his quantitative experiments, and whether he considered nearly all the arsenicum came off as arseniuretted hydrogen. If not whether he could give any idea of the allowance to be made for the arsenicum remaining in the generating bottle.

Mr. **Benger** asked if it was not possible that slight contaminations arose from the soldering liquor used. He knew by some practical experience in the manufacture of tins that the men were very careless in the use of that liquid, which consisted of zinc dissolved in common hydrochloric acid. They brushed it very freely along the joint and then ran their iron over it. Of course the quantity which got inside the tin would be very small, but it might give a trace of arsenic in some cases.

Mr. **Proctor** thought it was quite clear that the quantity of arsenic spoken of by Mr. Siebold could only get into the glycerine in the manufacturing process by which it was produced. These theories of the arsenic being contained in the tin or the soldering solution or glass were all outside the question of the presence of arsenic in so large a proportion as one in 4000; it was quite inconceivable that glass should yield so much as that to the contents of the bottle. They might satisfy themselves that the arsenic which was present in such quantities as to be a serious matter in pharmacy did not exist in those glycerines which pharmacists generally used. Mr. Siebold had already stated this, and it was simply to be borne in mind as a caution to use those qualities only for medicinal purposes which were prepared for that purpose, and could be relied upon not to contain this large proportion of arsenic. The proportion alluded to of 1 in 4000 or 1 in 6000 would make a teaspoonful of glycerine equal to 1½ or 3 drops of Fowler's solution for a dose, which was a very serious matter, but was a condition which he hoped and believed did not exist in the ordinary use of glycerine by pharmacists. It was well to have the caution that glycerine prepared from soap lees ought to be entirely excluded from pharmacy; he hoped it was so in general, and would be so entirely in future.

Mr. **Dott** did not desire to say one word in depreciation of the valuable paper they had heard, but it must be borne in mind that all processes for determining traces of substances, with the exception perhaps of spectrum analysis, were to be received with a certain amount of caution. Mistakes had arisen with regard to selenium, and perhaps other elements which were supposed to be arsenic. All processes which indicated very slight traces were to be received with caution.

Mr. **Siebold** said that he wished, in the first place, to correct an erroneous impression which some of the gentlemen present seemed to have received (from his remarks) to the effect that he had found all the glycerine from one particular firm of manufacturers to be free from arsenic. What he really said or meant to say was that nearly all the samples he found to be quite free from arsenic were traceable to one particular process of manufacture. He entirely concurred in the statement of one of the speakers that the process of distillation, if carefully conducted, would leave behind any arsenic emanating from the materials used in the manufacture of glycerine, and would yield a product entirely free from that contamination.

Mr. **Allen** said that was not exactly what he said. He said that if it were prepared by steam distillation originally it would never have any arsenic in it. He was rather under the impression that the arsenic would go over with the glycerine if it were once in it.

Mr. **Siebold** said he quite agreed with Mr. Allen that there would be no arsenic in glycerine obtained by the steam distillation process; and he was further of opinion that any glycerine containing arsenic could be freed from it by such distillation. But there was no necessity for pharmacists to resort to any process of purification, as he had shown that there was no difficulty whatever in obtaining a supply of glycerine free from even the smallest traces of arsenic, and that the very kind of glycerine generally used in the dispensing of prescriptions was of that high degree of purity. As to the source of the arsenic, he was afraid he had been misunderstood by some of the speakers, who seemed to think that he regarded the glass of the bottles as the most likely source of contamination. This was not the case; he believed the sulphuric acid used in the manufacture of the glycerine to be the main if not the only source, but he thought it possible that some arsenic might also be dissolved from the glass bottles. His experiments, as far as they went at present, had not established this supposition, but they required to be carried on further in order to definitely settle this point. The occurrence of arsenic in glass used for bottles and chemical apparatus was no new observation, attention having been drawn to it by W. Fresenius in the *Zeitschrift für analytische Chemie* six years ago. It was well known that arsenious acid is often used in the manufacture of glass, as a decolorizing agent, and nowadays it was more generally and more abundantly present in glass than formerly, either from a more copious addition of arsenious acid, or from the use of strongly arseniferous materials. The proportion of 0·1 to 0·4 per cent., which he had mentioned, was found in a number of determinations by J. Marshall and C. S. Potts, whose report on this subject would be found extracted in the current volume of the 'Year-Book of Pharmacy.' He could not tell how the proportion of arsenic found in glass compared with the quantity introduced in the making of it. He had repeatedly convinced himself of the presence of arsenic in German and Bohemian glass apparatus, and had also found it in some French and German glass bottles. If glass thus contaminated were finely powdered, intimately mixed with potassium cyanide and soda, and then heated in a suitable combustion tube, a distinct arsenical mirror would be obtained. As to the determination of arsenic in glycerine by passing it in the form of arseniuretted hydrogen through a solution of silver nitrate, he found that from three to four hours were amply sufficient to complete the process. The current of hydrogen ought to be a slow and steady one all through. He believed this process to be the most rapid and convenient for estimating minute traces of arsenic occurring as an impurity in pharmaceutical preparations, and to be sufficiently accurate for such purposes. He found that the qualitative test he had described at full length for the detection of arsenic in glycerine could also be turned to account for the purpose of approximate qualitative estimations, by performing the test simultaneously with samples of pure glycerine to which various known quantities of arsenious acid had been added, and comparing the results; but great care had to be taken in such a case to see that all other conditions were strictly equal. As to the question of arsenic being dissolved by glycerine from the tin or solder, he did not regard this as a likely mode of contamination, since he had found certain samples of glycerine kept in tin to be quite free from arsenic. He had also heated pure glycerine in tin bottles by the heat of a water bath for twenty-four hours, and found it to be still quite free from arsenic. To Mr. Dott's question he would reply that he had not solely relied in his experiments on the test described, but had also carefully verified the results by Marsh's test, but he could assure the meeting that the test he had particularly recommended was as trustworthy as it was convenient and sensitive, and it seemed to him to deserve to be strongly recommended to the general attention of pharmacists.

Mr. N. H. **Martin** asked if Mr. Siebold satisfied himself that all the reagents he used were chemically pure, because reagents sold as pure for analysis very frequently contained traces of arsenic or some other impurity.

The **President** said this was a very important point.

Mr. **Siebold** said he ought really to have mentioned in the course of his paper that it was necessary in performing this test to precede it by a blank experiment, in order to make sure of the purity of the zinc and hydrochloric acid employed. If no stain was produced in such an experiment within a quarter of an hour, the reagents might be considered as free from arsenic.

(*To be continued.*)

Obituary.

Notice has been received of the death of the following:—

On the 24th of September, Mr. Thomas Hepburn Sclater, Chemist and Druggist, Kirkwall, Orkney. Aged 51 years.

On the 26th of September, Mr. Samuel Wylde, Chemist and Druggist, Walton, near Liverpool. Aged 44 years.

On the 28th of September, Mr. George Samuel Hankinson, Chemist and Druggist, Grange-over-Sands, Lancashire. Aged 58 years.

Parliamentary and Law Proceedings.

Poisoning by Carbolic Acid.

On Wednesday, October 2, Dr. George Danford Thomas held an inquest at the Paddington Coroner's Court relative to the death of Bridget Lyons, aged 52 years, lately residing at Lisson Grove, whose death took place from carbolic acid poisoning.

The evidence showed that the deceased, the wife of a labourer, had been addicted very much to excessive drinking, her favourite drink being rum. On the previous Saturday she got the worse for drink, and after having her tea she lay down to sleep. About 8 o'clock the same night her daughter returned home and found her lying on the floor, breathing very heavily and in an insensible condition, her mouth being charred. It was then found that she had drunk a quantity of carbolic acid from a bottle which was kept in the house, unlabelled, for disinfecting purposes, and it was the opinion of her relatives that she had in her drunken condition mistaken the carbolic acid for rum, she being in the habit of bringing rum home in bottles similar to the one in which the poison was kept. She was removed to St. Mary's Hospital, where she died some half-hour after admission.

The jury returned a verdict of "Death from misadventure."—*Times.*

BOOKS RECEIVED.

A Guide to the Alterations in the British Pharmacopœia (1885). By Prosser James, M.D. Third Edition. London: J. and A. Churchill. From the Publishers.

Report of the Fourth Indian National Congress held at Allahabad, December, 1888. London: Indian Political Agency. From the Publishers.

Pharmacographia Indica. A History of the Principal Drugs of Vegetable Origin met with in India. By William Dymock, C. H. J. Warden and David Hooper. Part I. London: Trubner. 1889. From the Authors.

Watts' Dictionary of Chemistry. Revised and Entirely Rewritten. By M. M. Pattison Muir, M.A., and H. Forster Morley, M.A., D.Sc., assisted by Eminent Contributors. Vol. II. London: Longmans, Green and Co., 1889. From the Publishers.

Watts' Manual of Chemistry: Theoretical and Practical. (Based on Fownes' Manual.) Vol. I. Physical and Inorganic Chemistry. Second Edition. By William A. Tilden, D.Sc., F.R.S. London: J. and A. Churchill, 1889. From the Publishers.

What to do in Cases of Poisoning. By William Murrell, M.D., F.R.C.P. Sixth edition. London: H. K. Lewis. 1889. From the Publisher.

A Text-Book of Organic Chemistry. By A. Bernthsen, Ph.D. Translated by George M. Gowan, Ph.D. London: Blackie and Son. 1889. From the Publishers.

ANSWERS TO CORRESPONDENTS.

R. J.—*Polygonium cuspidatum.*

Nemo.—(1) The properties of a potash compound with the fat acids. (2) An oxide of phosphorus. (3) The reaction would depend upon the composition of the coin; probably there would be a solution of the nitrates of silver and copper formed, with evolution of nitric oxide gas and nitric anhydride.

Inquirer.—We do not think the formation of a precipitate could be avoided.

Communications, Letters, etc., have been received from Messrs. Clague, Martin, Thresh, Salmon, Sleath.

SENNA PODS.

BY E. F. SALMON,

Pharmaceutical Chemist.

In the *Lancet* of July 27, 1889,[*] appeared a "Note on the Therapeutic Action of Senna Pods," written by Dr. Macfarlane, Examiner in Forensic Medicine, University, Glasgow. My attention was directed to it by a member of the medical profession, who requested me to procure some of the pods, and prepare an active preparation of the same, as had already been done for Dr. Macfarlane by Mr. Borland. This I did, and prepared a fluid extract which has since been prescribed and used with very satisfactory results. As probably other pharmacists will be applied to on the same subject, the following notes may be of interest:—

The active purgative principle of senna is cathartin, which is a combination of cathartic and phosphoric acids with magnesium and calcium bases; this substance may be thrown out of an aqueous solution by alcohol, first adding sufficient to throw down the gum, albumen, etc., and then an excess to precipitate the cathartin.[†] Two comparative experiments showed that the pods are richer in this substance than the leaves, the latter yielding 2 and the former 2½ per cent. when treated as above. In addition to cathartin there is found in the leaves a resinous principle and a volatile oil; these are practically absent in the pods.

The pod or legume consists of the two valves of the carpellary leaf, bearing about half a dozen seeds attached by a capillary funiculus to the marginal placentas; each valve consists of three layers, the outer, epidermis, pierced with stomata and easily pervious to water; next, a central mass of parenchyma traversed by the "veins;" it is in this layer that the cathartin is stored; lastly, a fibrous tissue devoid of active principle.

The advantages claimed by Dr. Macfarlane in the use of the pods over the leaves are the absence of nauseous taste and of tendency to cause griping pains, both of which are associated with the use of the leaves. It was shown in a paper printed in the *Pharmaceutical Journal*, March 18, 1876, by C. L. Diehl, that senna leaves, when previously treated with alcohol and then dried, will give preparations which, while possessing the purgative qualities, are tasteless and do not gripe.

The treatment with alcohol had removed the resinous and odorous principles to which the griping and nauseous taste are due, leaving the cathartin unchanged, it being insoluble in alcohol.

The pods being richer in cathartin, and not containing either resin or oil, render them especially well adapted for use as an efficient aperient, and one not too rapid in action.

Cold water readily dissolves out the cathartin from the pod, which it will not do from the leaf, owing to the impervious nature of its epidermis. Accordingly for the preparation of a fluid extract, cold water will be found the best menstruum. Two macerations of the carefully picked over pods, which should also be torn in pieces, will be found to practically exhaustt hem. The first maceration should be for twenty-four hours, for the second twelve is sufficient. For 1 lb. of pods six pints of cold distilled water for the first and about three pints for the second maceration, is a sufficient quantity to use, the liquors when strained off to be evaporated to 13 fluid ounces and the usual 4 ounces (25 p. c.) of spirit added, and after standing a few hours to be filtered, and if necessary made up to 16 fluid ounces with distilled water.

This makes an almost black looking liquid of specific gravity 1040 (average), perfectly tasteless, and of which the adult dose is ½ to 2 fluid drachms, the smaller dose seldom failing to produce purgation.

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[*] See *Pharmaceutical Journal*, August 31, p. 164.

[†] 'Pharmacographia,' p. 219.

NOTES ON ESSENTIAL OILS FROM MESSRS. SCHIMMEL AND CO.'S OCTOBER REPORT.

(*Continued from page* 264.)

CLOVE OIL.—Criticizing the specific gravity of 1·041 to 1·060 given in the German Pharmacopœia for oil of cloves, Messrs. Schimmel state as their experience that genuine oil of cloves has a specific gravity of 1·067 and oil of clove-stalks one of 1·063. They therefore think the requirement should be altered to a specific gravity of not under 1·060.

ELEMI OIL.—Oil distilled from elemi resin by Messrs. Schimmel has been examined by O. Wallach, who found it to have a specific gravity of 0·900 and to be dextrorotatory. It contains considerable quantities of right-handed phellandrene, whilst in the portion boiling between 175° and 180° C. there is so large a quantity of dipentene that the oil would appear suited for the preparation of dipentene compounds. In addition there is a large quantity of constituents having higher boiling-points and the amyrin of the resin appears to be represented in the oil.

EUCALYPTUS OIL.—Some oil that has been received from Australia as a product from *Eucalyptus odorata* is spoken of very favourably. It has a specific gravity of 0·907 at 15° C. and gives with hydrobromic acid a strong eucalyptol reaction. It is said to answer to the requirements of a good oil and to be as suitable for therapeutic purposes as the oil of *Eucalyptus Globulus*. This Australian oil is packed somewhat differently from the *E. amygdalina* oil hitherto received, the case containing four tins, each holding 18 lbs. of oil. From the south of Spain an oil of *E. Globulus* has been received that is so rich in eucalyptol, or cineol, that upon placing it in a cooling mixture it solidifies to a paste. It has a specific gravity of 0·931 at 15° C. The Californian oil from *E. Globulus* is reported to have shown lately considerable variation in the amount of eucalyptol it contained, probably on account of some having been removed; a normal oil should contain from 50 to 70 per cent. of eucalyptol. The oil of *Eucalyptus dumosa* also contains a large quantity of eucalyptol.

FENNEL (Japanese).—Under the name "anise" a sample of Japanese fennel has made its appearance in the market, which although it had the aroma and taste of fennel, presented an extraordinary similarity to anise in the form and size of the grain. Any doubt that might have existed was removed by the plants that resulted from sowing of some of the seed. According to Rein the Japanese fennel is derived from the same species as the European,—*Fœniculum vulgare*, Gaertner (*F. capillaceum*, Gilibert),—and is much used in Japan as a pastry spice. Arrangements have been made for a supply of the seeds with a view of examining the oil that they yield.

KESSO ROOT OIL.—The oil distilled from the Japanese "kesso" roots (*Valeriana officinalis*, L., var. *angustifolia*) is, in Messrs. Schimmel's opinion, probably to be esteemed quite equal in its practical characters to the German distillate and may be used unreservedly in its place for technical purposes. The high specific gravity of the kesso oil is attributed to the presence of a heavy constituent having a high boiling point, which is at present unknown and has not been observed in ordinary valerian oil.

Kuro-moji Oil.—Further information has been received from Japan respecting the kuro-moji oil referred to in the last previous report (*Pharm. Journ.*, April 20, p. 844). Mr. Murai, of the Sanitary Laboratory, Tokio, writes that the oil was unknown in the Japanese market until the last few years, but the plant from which it is derived (*Lindera sericea*, Blume) is a tree indigenous in every district in the country. The wood, together with the bark of the tree, is used in the preparation of a dentifrice on account of its pleasant odour.

Olibanum Oil.—Wallach has found that the terpene of this oil, which has hitherto been called "olibene," is identical with pinene, and further that the oil also contains a small quantity of dipentene.

Orange-Flower Oil.—An interesting experiment has been made this year in the transmission of freshly-picked orange-flowers from the south of Spain to Germany. The flowers were packed in casks, from which the air was pumped out after filling, and are said to have borne their transport well. They proved to have been gathered from the sweet orange (*Citrus vulgaris*) and yielded the known, but not esteemed neroli-portugal oil. From 800 kilos of flowers 1·150 kilo of pure essential oil was obtained, but the orange-flower water produced was worthless. The bitter orange (*Citrus vulgaris*, Risso; *Citrus aurantium amara*, L.), which yields the fine orange-flower oil and water, appears to be only little cultivated in southern Spain.

Rosemary Oil.—A sample of pure Italian rosemary oil of the year 1887 was found to have a specific gravity of 0·902; 89 per cent. of it distilled at a temperature of 200° C. and under, and 5 per cent. between 200° and 220° C. A sample of the year 1888 had a specific gravity of 0·905; 88 per cent. passed over at a temperature of 200° C. and under, and 6 per cent. between 200° and 220° C. These data are of importance in view of the fact that oil of rosemary is now used largely in Germany for the denaturizing of spirit, and the official regulations require that for this purpose the oil shall have a specific gravity of 0·900, and that at least 90 per cent. of the oil shall distil over at 200° C. It is pointed out that in order to bring a genuine oil within these requirements it would be necessary to remove part of the heavier and higher-boiling constituents, which are camphor and borneol.

Thyme Oil.—The German Pharmacopœia requires that oil of thyme, when dissolved in half its weight of spirit should not give a yellowish red colour upon the addition of a drop of ferric chloride solution. In this report it is stated that an oil from which the thymol has been removed by shaking it with soda solution may answer to this test, but that a pure oil, not deprived of its thymol, will give with ferric chloride a dirty greenish-brown colour, afterwards changing to red. The reaction is said to be due to a phenol that accompanies thymol in the oil.

The novelties mentioned in this report are as follows:

Garlic Oil.—From bulbs of *Allium sativum*, L. From 900 kilos of raw material Messrs. Schimmel obtained 800 grams of a pure oil, having an intense odour and taste of garlic, which it is thought might be used in the preparation of piquant sauces, pickles, etc. Experiment seemed to show 10 grams of the oil to be equal to about 11 kilos of fresh garlic. The oil has a sp. gr. of 1·053 at 15° C., and is to be further investigated.

Spanish Oils.—The following essential oils have been received from a newly established manufactory in the province of Granada, in the south of Spain. The information immediately following the name has been supplied by the distillers. Some remarks by Messrs. Schimmel are enclosed between brackets:—

Oleum Aristolochiæ Subglaucæ.—Distilled from the fresh flowering shoots of *Aristolochia subglauca*, Lank. et Brot. (*A. glauca*, Desf.). The yield of oil is very low and the plant is not widely distributed. The oil is used as an emmenagogue. [Has a disagreeable valerian-like odour. Useless for perfumery purposes.]

Oleum Artemisiæ Barellieri.—This oil, obtained from the dried flower racemes and fresh young shoots, might probably be used as a substitute for oil of wormwood. This species of *Artemisia* yields a carminative used in the district apparently with good results in colic (even in severe lead colic), and hysterical and epileptic attacks. [Sp. gr. 0·923 at 15°. Boils between 180° and 210°. In odour this oil resembles strongly oil of tansy, it being agreeably and powerfully aromatic.]

Oleum Artemisiæ Hispanicæ.—Distilled from the fresh young shoots of *Artemisia hispanica*, which although somewhat less frequent than *A. Barellieri*, would allow of the production of a considerable quantity of oil. Both species are said to be used in the manufacture of Algerian absinthe. The plant is popularly reputed to exercise a depressing influence on the genital organs. [This oil would be difficult to make use of practically. In odour it somewhat resembles wild fennel.]

Oleum Cisti Ladaniferi.—Obtained from the leaves, a decoction of which is used generally against rheumatism, syphilitic complaints and affections of the respiratory organs. [Sp. gr. 0·925 at 15° C. Boils between 165° and 280° under partial decomposition with a strong odour of acetic acid. The odour of the oil is unpleasantly narcotic and stupefying. The ladanum is said to be obtained in Spain by boiling the branches.]

Oleum Fœniculi.—From the young shoots of the wild fennel, which attains in the district a height exceeding two meters. [This oil is identical with the so-called "bitter fennel oil," as distilled in the south of France.]

Oleum Helichrysi Stœchadis.—Obtained from the flowering plant, which is used in bladder and kidney affections. [About three-fourths boils between 155° and 170°, and one-fourth between 170° and 260°. Specific gravity 0·873 at 15° C. The oil has an odour similar to that of the distillates of the smaller coniferæ. Most probably contains much pinene.]

Oleum Juniperi Oxycedri.—Prepared from the fresh tops of the branches, which are used as a powerful abortive, and especially in female disorders. The yield is very small. [This oil has not been closely examined, since it has no practical importance. It resembles in odour a fine pine-needle oil.]

Oleum Lavandulæ Dentatæ.—The therapeutic properties attributed to previous oils of this class are alleged to be possessed by this oil in even a still higher degree. It is said to promote the healing of sluggish wounds, and when used in the form of inhalation to have given good results in severe catarrh and in two cases of diphtheria. [Specific gravity 0·926 at 15° C. It distils almost completely between 170° and 200°. Cineol was detected in it. In odour it strongly suggests rosemary oil and camphor.]

Oleum Lavandulæ Stœchadis Flor.—Obtained from the freshly collected flowering tops of *Lavandula Stœchas*. The plant is known in Spain as "romero santo" (sacred rosemary), and its essential oil, as well as that of *L. dentata*, is obtained for household use by suspending the fresh flowering stalks, flowers downwards, in closed bottles and exposing them for some time to the sun's rays. A mixture collects at the bottom of water and essential oil, which is used as a hæmostatic and for cleansing wounds. [Sp. gr. 0·942 at 15° C. Boils between 180° and 245°, cineol being present in the lowest boiling fraction

The odour of the oil in no way suggests that of lavender, but resembles more that of oil of rosemary, with which it has the camphoraceous smell in common.]

OLEUM MARRUBII ALYSSON.—Obtained from the flowering tops of *M. Alysson*, L., var. *lanatum*, Casson. The plant has a reputation as a remedy for affections of the chest and throat, and possibly possesses febrifuge properties.

OLEUM MENTHÆ AQUATICÆ.—From the fresh young shoots of the water-mint, which in some of the ravine districts of South Spain grows abundantly and luxuriantly to a height of two metres. [Yellowish-green oil, with a pennyroyal-like mint odour.]

OLEUM ROSMARINÆ.—Obtained from freshly collected young shoots and leaves. [In parallel experiments it was ascertained that this Spanish oil contains the same constituents as French oil of rosemary, but in different proportions. Pinene was recognized through the pinene-nitrol-piperidin compound, m. p. 118° C. Specific gravity of the oil 0·892 at 15°. The oil is scarcely to be distinguished from fine French oil.]

OLEUM RUTÆ. — Obtained from fresh flowering stalks of *Ruta graveolens*, attaining a height of 1½ metres. [This oil is superior in quality. Sp. gr. 0·859 at 15° C.].

OLEUM SATUREJÆ THYMBRÆ.—Obtained from the fresh herb, which by the ancient Greeks was consecrated to Pryapos, and in Spain is used generally as a spice, and especially for olives. It has also a reputation as a powerful stimulant and disinfectant. [The oil has a specific gravity of 0·906 at 15° and contains 19 per cent. of thymol. Upon careful fractionation it yielded pinene in the portion boiling at 160°, but the greater portion of the oil consisted of cymol, boiling at 175°. In the following fraction a small quantity of dipentene was found, and upon saponification of the portion boiling at over 200° borneol and acetic acid were obtained, these two bodies consequently existing in the oil in the form of the acetic acid bornyl ether. The oil has an extremely powerful and penetrating thymol odour.]

OLEUM SOLIDAGINIS.—Distilled from the fresh young shoots of a species of *Solidago* growing in the south of Spain to a height of 2 metres, and popularly esteemed as a hæmostatic and blood purifier. The yield of oil is small. [The oil has an aromatic and somewhat mint-like odour, like that of the American golden rod oil. Practically it has scarcely any value.]

OLEUM TEUCRII FUNKIANI.—Distilled from the flowering herb of the strongly aromatic bitter *T. Funkianum*, Willk. The collection of the plant is expensive and the yield of oil small. [The oil has an undefinable odour.]

OLEUM THYMI CAPITATI. — Prepared from the freshly mowed herb of the classic honey plant of Mount Hymettus. The freshly distilled oil has a specific gravity of 0·888 at 18° C. A characteristic reaction of the oil is that when shaken with water it imparts to the latter a peach-red colour. [The oil much resembles in its composition the oleum saturejæ thymbræ. It has a specific gravity of 0·901 at 15° C., but the quantity of thymol is considerably smaller, amounting to about 6 per cent. Besides thymol there is present another liquid phenol, the boiling point of which is near to that of thymol. The other constituents are the same as those in the oil of *Satureja Thymbra*, consisting of pinene, cymol, dipentene and acetic acid bornyl ether. The oil has a powerful thyme-like odour recalling that of origanum.

ANDROPOGON FRAGRANS OIL.—Under the name "Huile essentielle de Pataque Malgache" a new oil has been introduced from the island of Reunion, which is represented to be a distillate from *Andropogon fragrans*. It is a yellowish thick liquid having an odour undistinguishable from that of East Indian ginger-grass oil (*Andropogon Schœnanthus*).

The Pharmaceutical Journal.

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SATURDAY, OCTOBER 12, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed* "*Pharm. Journ.*"

THE SALE OF DEFECTIVE AND SPURIOUS MEDICINAL PREPARATIONS.

A FEW days since the London papers commented on some cases of prosecution under the Food and Drugs Act, which were in one instance represented as being "calculated to give a rude shock to our confidence in chemists' preparations." The prosecutions in question took place at Wakefield, in Yorkshire, and it was stated that extremely defective sweet spirit of nitre, as well as paregoric "without opium," had been supplied by a "chemist." Upon making inquiries, however, it turns out that the seller of these articles was a grocer, and that one of them had been specially manufactured to enable the seller to steer clear of the Pharmacy Act. It is satisfactory to find that this ingenious but discreditable device was not a complete immunity, for the magistrates held that in trying to evade the Pharmacy Act the seller of this article under the name of paregoric had broken the Food and Drugs Act, and he was condemned to pay a fine and costs amounting to £2 15*s*. So far as concerning the apprehended "rude shock to our confidence in chemists' preparations," it will be seen that the circumstances of these prosecutions do not afford any ground for it. The reputation of chemists was in no degree affected by the disclosures that took place, except in so far as every person selling drugs or medicinal preparations is, in popular estimation, set down as a chemist whether he be so or not, the discredit of selling defective or spurious preparations being thus often unjustly cast upon his class when in fact the offence is committed by unqualified dealers, who are the cause of serious damage to chemists by their competition.

If the subject were not one of serious importance, no less to the general public than to registered chemists, the mode in which these cases are dealt with in a local paper would be amusing. In an article upon the prosecutions the *Wakefield Express* holds the opinion that the public will no doubt "sympathize with the tradesman who was the defendant," as he is regarded by that paper as the unconscious and innocent medium through which preparations were obtained which were not what they ought to be. Surely this is a strange basis for claiming sympathy. But in addition to this it is urged in favour of the defendant, that the admitted carelessness in keeping sweet spirit of nitre alleged to be the cause of its defective character was only that sort of carelessness which arises from ignorance of the ingredients of this article and of the volatile character of its essential constituent. This is at best but a lame defence, and to our apprehension it partakes more of the nature of a severe condemnation that a person should venture to deal in articles of whose nature he is ignorant. In the case of all drugs and medicinal preparations it is of the first importance that the seller should have a thorough knowledge of the articles he deals in. It is only where this important necessity is disregarded either by sellers or purchasers that there is any real danger of a rude shock to confidence in chemists' preparations. The public as a rule is much too little cognizant of this fact, and hence it is a common practice to obtain supplies of drugs and medicines from shops kept by persons who have no kind of qualification for dealing in such articles.

There is, however, another point of view from which the cases above mentioned become of especial interest for readers of this Journal, and for all those who desire to protect the general interests of pharmacy as a business. We refer now to the evidence that was given to show that the illegitimate trade in medicinal preparations, such as the Wakefield grocers appear to have carried on, is actually assisted, if not promoted, by members of the body that is directly damaged and prejudiced by the practice. Such a state of things might well be regarded as inconceivable, if it were not that the persons so engaged in supplying grocers with defective and even fictitious articles for sale under the name of well-known medicinal preparations came forward and testified to the fact. There does not indeed appear to have been any disposition to reticence on their part, such as might have been expected, but on the contrary it was suggested as a justification of this system that it was the "common practice of the trade." Accepting that representation as correct, it may well be asked what opportunity can there be under such a state of things for that protection of trade interests which we so often hear that pharmacists and even chemists and druggists are in need of? Is it not requisite that there should be some better recognition of the pharmacist's duty to his neighbour and, we may add, even of his duty to himself? Of what avail can it be for the individual chemist to be punctilious in regard to the quality of the articles he supplies to his own customers if at the same time he countenances a pernicious practice of furnishing grocers and general dealers with inferior articles that he would not venture to sell himself? Even if he is not directly a party to such practices it is incumbent upon him to condemn them and to offer every possible assistance towards their suppression. In the cases now referred to, however, we find that these obligations are not recognized. Registered chemists and druggists acknowledge that they support the irregular competition of grocers in the sale of medicinal preparations by supplying them with articles such as paregoric "without opium," ostensibly in order that they may escape the penalties of the Pharmacy Act, and actually that they may, by selling such spurious medicines at a lower price than chemists can supply the genuine article, carry on an unfair competition with the men who are alone competent to carry on the business of pharmacy. In the case of wholesale houses it may be that we shall be told that it is impossible to resist the demands made upon them to supply just what their customers require; but whatever foundation there may be for such a plea, it behoves chemists to be careful that it is not acted upon to their own detriment. It is especially necessary that this should be done now when so much of the detail of pharmacists' work has been taken in hand by the wholesale druggist. It is not only needful that the preparations obtained from such sources should be carefully tested; but it is also requisite to ascertain that wholesale houses are not providing irregular means of competition with chemists.

According to a prospectus issued by the executive of the North of England Pharmaceutical Association, the following arrangements have been made for classes at the Durham College of Science, Newcastle-upon-Tyne, in which instruction shall be given adapted to the requirements of students in pharmacy. In the division of Chemistry, which is under the superintendence of Professor Bedson, there will be a course of about sixty lectures on Theoretical Chemistry, delivered on Tuesday and Wednesday evenings, between 8 and 9 o'clock, and the Chemical Laboratory will be open for practical work on Tuesday and Friday evenings from 6 to 8 o'clock. The Botany class will meet on Friday evenings at 8 o'clock, until the end of March, the lecturer being Mr. C. E. Stuart. A course of similar length on Materia Medica will be conducted on Wednesday evenings between 7 and 8 o'clock, by Mr. Alfred Wright. Lastly, Mr. B. S. Proctor will, on Monday evenings, from 8 to 9 o'clock, deliver a course of about ten lectures on Pharmacy, which will consist of an exposition of pharmaceutical operations. Copies of the prospectus and other particulars may be obtained from the Secretary to the Association, Mr. Ford, care of Ismay and Sons, Groat Market, Newcastle.

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The first meeting of the Liverpool Pharmaceutical Students' Society will be held on Friday, October 18, at 8.30 p.m., in the drawing-room of the Young Mens' Christian Association, Mount Pleasant, when the President and Vice-President will be elected for the ensuing session.

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According to the *Pharmaceutische Zeitung* an order has been issued by the Russian Medical Department to the effect that in future antifebrin, antipyrin, phenacetin and cocaine shall only be supplied by pharmacists upon the prescription of a medical practitioner.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

October 8, 1889.

The following are the questions that were set for the Preliminary examination on the 8th inst.:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin:—*

1. The army of Ariovistus, the King of the Germans, had conquered the Gauls.
2. He will do it if he is able.
3. No animal is more faithful to man than the dog.
4. The name of Brutus was given to the youth.
5. At what price did you buy the bread? For a small sum.

II. Translate into English either A. (Cæsar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CÆSAR.

1. Quum ea ita sint, tamen, si obsides ab iis sibi dentur, uti ea, quæ *polliceantur*, facturos intelligat, et si Æduis de injuriis, quas ipsis sociisque eorum intulerint, item si Allobrogibus satisfaciant, sese cum iis pacem esse facturum. Divico respondit: Ita Helvetios a majoribus suis institutos esse, uti obsides accipere, non dare, *consuerint*; ejus rei Populum Romanum esse testem. Hoc responso dato, *discessit*.

2. Id ne accideret, magnopere sibi præcavendum Cæsar existimabat; namque omnium rerum, quæ ad bellum usui erant, summa erat in eo oppido facultas; idque natura loci sic muniebatur, ut magnam ad ducendum bellum daret facultatem, propterea quod flumen Dubis, ut circino circumductum, paene totum oppidum cingit, reliquum spatium, quod est non amplius pedum sexcentorum, qua flumen intermittit, mons continet magna altitudine, ita ut radices ejus montis ex utraque parte ripæ fluminis contingant.

Grammatical Questions.—For those only who take Cæsar.

1. Decline in full—*omnium rerum, summa facultas, ejus montis* (par. 2).
2. Write in full the indicative present and subjunctive pluperfect of the verbs in italics (par. 1).
3. Write down the comparative and superlative degrees of *liber, gracilis, multus, parvus.*
4. Write in Latin—12, 37, 18*th*, 76*th*, *six each*, *fifteen each*, *twice*, *seven times*.

B. VIRGIL.

1. Parce metu, Cytherea; manent immota tuorum
Fata tibi; cernes urbem et promissa Lavini
Mœnia, sublimemque feres ad sidera cœli
Magnaninum Æneam; neque me sententia vertit.
Hic—tibi fabor enim, quando haec te cura remordet,
Longius et volvens fatorum arcana movebo—
Bellum ingens geret Italia, populosque feroces
Contundet, moresque viris et mœnia ponet,
Tertia dum Latio regnantem viderit aestas,
Ternaque transierint Rutulis hiberna subactis.

2. Necnon et vario noctem sermone *trahebat*
Infelix Dido, longumque bibebat amorem,
Multo super Priamo rogitans, super Hectore multa;
Nunc, quibus Auroræ venisset filius armis;
Nunc, quales Diomedis equi; nunc, quantus Achilles.
Immo age, et a prima *dic*, hospes, origine nobis
Insidias, *inquit*, Danaum, casusque tuorum,
Erroresque tuos; nam te jam septima portat
Omnibus errantem terris et fluctibus aestas.

Grammatical Questions.—For those only who take Virgil.

1. Decline in full—*haec cura, populos feroces, bellum ingens* (par 1).
2. Write in full the indicative present and subjunctive pluperfect of the verbs in italics (par 2).
3. Write down the comparative and superlative degrees of *liber, gracilis, multus, parvus.*
4. Write in Latin—12, 37, 18*th*, 76*th*, *six each*, *fifteen each*, *twice*, *seven times*.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. Multiply 5 oz. 2 scr. 10 gr. by 1069.
2. How long will it take to walk round a square field containing 13 acres, 81 yards, at the rate of 3½ miles an hour?
3. What fraction of ¾ of 10*s*. 6*d*. is ½ of ⅘ of 6*s*. 5*d*.?
4. Reduce $\frac{8}{13}$ of £10 6*s*. 7¾*d*. to the decimal of £·015.
5. How many yards of paper $1·41\dot{6}$ feet broad will be required for a room $13·\dot{3}$ feet high, 15·5 feet long, and $7·1\dot{6}$ feet broad?
6. If a man walks 4½ miles in 72 minutes, how many *metres* does he walk in 1 hour?
7. A bankrupt paid 10*s*. 6*d*. in the £. He owed £575 10*s*. to two persons, one of whom received £147. How much did he owe the other?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

[Read carefully the following passage before answering questions 1, 2, and 3, which refer to it.]

"Alas! regardless of their doom,
The little victims play!
No sense have they of ills to come,
Nor care beyond to-day.
Yet see how all around them wait
The ministers of human fate,
And black Misfortune's baleful train!
Ah, show them where in ambush stand,
To seize their prey, the murderous band!
Ah, tell them they are men."

1. Parse fully the words *alas, regardless, beyond, show, where, their.*
2. Name the subjects, and where possible the objects, of the verbs *play, have, wait, show, stand.*
3. Write out a list of all the adjectives, and where possible give their degrees of comparison.
4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where requisite:—is mrs varden at home said mr chester sir returned sim eyeing him over with a look of concentrated expression she is did you wish to see her mr chester nodded then come this way sir said sim wiping his face upon his apron follow me sir would you permit me to whisper in your ear one half a second by all means.

*5. Give a short biography of some eminent English statesman or soldier of the eighteenth century, *or* an outline of one of Shakespeare's plays.

Pharmaceutical Society of Ireland.

OCTOBER LICENSE EXAMINATION.

The following candidates have successfully passed the Society's examination:—Messrs. Albert Edward O'Connell, Charles Marshall, and William Hanna.

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* This must be attempted by every Candidate.

Provincial Transactions.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The inaugural address, in connection with the first session of the Association, was delivered in Speed's Hall, Commercial Street, on Thursday evening, October 3, by Mr. W. Gilmour, F.R.S.E., Chairman of the Scottish Executive of the Pharmaceutical Society. There was a large attendance of masters, assistants and apprentices, about 130 being present. Ex-Bailie Doig, one of the honorary Vice-Presidents, occupied the chair.

The Chairman, in the course of a few introductory remarks, referred to the fact that an Association, such as they were about to inaugurate, had existed in Dundee about twenty-five years ago, but that the removal of some of the leading spirits, and other causes, had brought that Association to an untimely end. He was glad, however, to have the opportunity of once more being present at such a meeting, and congratulated the members on the very successful start which had been made. He trusted that, among other advantages, they would obtain shorter hours. The Association had been the outcome of the half-holiday, a movement which he hoped they would carry out again next year, and that they would not stand alone in Scotland in this respect. Mr. Doig thereafter touched upon educational matters as concerning the younger members of the craft present. He reminded them of the exceptional facilities they possessed in Dundee for the acquirement of the necessary knowledge in those technical subjects which they particularly require, and pointed out that at all the classes the fees were no barrier. He appealed to the masters present, that they should endeavour to give their students the time for study, and in concluding an eloquent and earnest speech, reminded the young men that youth is the seed-time, that we are sowing now, and that we shall reap hereafter. He had the greatest pleasure to preside on this occasion, and he was confident that by the members binding themselves one to another and helping each other, not only the assistants themselves but also their principals, would be benefited by the work of the Association. He had much pleasure in calling on Mr. Gilmour, and had to acknowledge their deep debt of gratitude to him for having so kindly undertaken to deliver—

THE INAUGURAL ADDRESS.

Mr. Gilmour, who was received with hearty applause, said: Gentlemen, It is not my intention to take up your time with any lengthened apology for appearing before you this evening. There are some duties which press in upon one in his official or semi-official capacity, which would probably never be undertaken in one's private individuality, and the duty of giving an Inaugural Address is, I think, one of them. However, I did feel when I received the invitation from your Secretary, Mr. Henderson, that some recognition was due to the enterprise and energy which, against many adverse circumstances, had successfully floated your Association, and while entirely ignoring my own individuality, I resolved to come north and give you my heartiest sympathy, as well as the little influence which my presence amongst you was calculated to afford.

Now, gentlemen, I intend to-night not to give you any elaborate address, but rather to have a plain simple practical talk with you. In my experience many inaugural addresses, as well as closing addresses, partake too much of the sermonizing element, the "let us be up and doing" style, which certainly does for a time excite the feelings, but which produces only evanescent effects, being very much like the morning cloud and early dew. I would rather to-night seek to talk to you for a short time in the plainest of language, a little about your Association, a little about yourselves, a good deal about your profession, touching also upon the question of education, and finishing up, for appearance sake, with the orthodox finally and in conclusion. In carrying out this programme you will, I hope, quite understand that I will endeavour to ignore the personal pronoun, and yet you may trace in my remarks, or rather, as I should say, in my talk, very much of my own life and experience.

Is this not after all the best experience I could give for young men entering upon your career? I have been a student all my life, and I hope I will continue a student until the receptive faculties fail me, and whether from the living lips or inspired book do we not all in the highest sense remain students to the end of the chapter? It is thus in this sense, namely that of a student, that I would like you first of all to approach and undertake the work of your Association. No one has, and no one ever can, reach perfection, whatever his calling may be; but we can all aim at perfection, and the higher our standard the higher will be our results, and every endeavour will be something gained, leaving us on a higher platform than before.

Now I confess that I am here at this point very much tempted to sermonize regarding this higher platform, and all that sort of thing; as it is rather a favourite subject of mine, but I think my better plan will be to refer this for the application, if I ever get to this point. You assistants and apprentices have certainly reached a higher platform—not the highest by any means—but one higher than you have ever reached before, in combining and forming yourselves into an Association for your mutual improvement and edification. I know of no means better calculated to ballast and educate young men than such an Association as that which you have now formed. I purposely say ballast and educate, for I believe that there is not a young man who does not recognize the fact that the theatre, the beer saloon, the billard-room, or the racecourse, are quite incompatible with the steadying, educating force which emanates from such associations.

I cannot point to a better illustration of what I mean than to the influence which the Edinburgh Assistants and Apprentices' Association has exerted on the young men there. Never in all my experience have I known a superior class of young men, either morally, intellectually, and I think I might also add physically, than is now to be found in Edinburgh, and this I ascribe in a very great degree to the Association which has flourished there for so many years. The reason is obvious. There is a healthy *esprit de corps* engendered; the young men get to know and respect each other, friendships are formed, information is given and received, and, above all, a centre is formed which draws and retains young men with aspirations probable undefinable in their very immaturity, but aspirations which under the maturing influence of such associations may develope in the future into any possibility.

Yes; I am glad for the sake of pharmacy, and above all, I am glad for your own sakes, that an Association has been formed in such a large and important centre as Dundee, and just in proportion to your success will be the pleasure that I was present at the inauguration of its first session. Now let me for a moment just refer to one or two little points; little, but not unimportant, because they may make or mar your Association. One point is ever to remember that you are gentlemen, gentle men in the true sense of the word, namely, in that you are ever kind and courteous to one another and everyone with whom you associate. Young blood is very hot and very hasty, and the temptation may often be very strong to say a smart thing or pass a severe criticism upon a weak brother. Now I hope you will not misunderstand me. I believe in calling a spade a spade, and not in calling it by the more euphonious title of an agricultural instrument; I also believe that an honest, straightforward criticism will always do good and not harm. At the same time I have observed that more associations are ruined or crippled by the attempt of members to pass smart criticisms and clever comments on the papers of their brother members than from any other cause. Whenever anyone differs from you, and especially if your feelings are very high, you are very apt to style him a fool, or in more vulgar language still an ass. Now, brothers, this is not gentlemanly, nor is it true. This is not calling a spade a spade; it is simply stigmatising your friend, or who should be your friend, and attempting to bring him into ridicule, and quite naturally suspicions, jealousies, evil speaking and all other angry passions rise.

The world is wide enough for all opinions, and one of the first lessons and most important in our younger years, which we have to learn, is to be tolerant; that is to say, gentlemanly regarding our fellow men's opinions. Be just then in all your criticisms, ever leaning to mercy's side, and ever remembering that some timid shrinking spirit may for ever, or at least for long, be extinguished under the lash of your severe sarcasm.

Another point in connection with your Association is that you must all be workers. Drones are, to say the least, drags upon an association; they add, no doubt, to its numbers, but do not add to its strength.

Every member should be a worker, and every member should therefore endeavour to contribute his mite to the general information and general good of the Association.

Now you may do this in two ways; you may do it by contributing short practical papers upon what you observe or upon what you discover in your daily work, or you may do it by short pointed observations on the papers read. Regarding the first of these methods I have often been asked the question, "But what can we investigate or write upon?" My young friend, in reply to this I tell you that there is not a single department, far less a single subject in pharmacy, upon which you may not experiment and discover something new. Take the commonest subject you can think of, take an ounce of epsom salts or a pennyworth of sulphur, and investigate them in all their chemical, physical, and even medicinal properties, and I will be bound to say that you will be astonished at the undeveloped potentialities which will lie even in these commonplace substances. There is scarcely a mixture which you make up, or an operation which you perform, or a substance which you handle that does not contain some unknown factor in its physical, chemical or medicinal futurity. Herein lies I think one of the greatest features of our profession, and one which distinguishes it from all others, and makes even the most commonplace operation interesting.

There is practically no end to the variety and scope to our investigations and operations. In connection with this keep in mind that a short concise practical paper upon an every day subject is infinitely better than the most elaborate essay. You may get applause for the last, but it will be the applause of a fagged out, wearied meeting, glad in the fact that you are simply finished. For the former you will get the hearty thanks of all, and probably, what is equally important, be the means of inaugurating an interesting debate. Now in debate I would not advocate talking for talking's sake. There are some men who can talk on for ever, and from whom words flow as water from a sieve. What is required is that your ideas be focussed into clear pithy language, and this can only be done after much experience. When a very little boy, I remember frequently having occasion to go into a certain agent's office, on the walls of which was suspended in a conspicuous position the following legend, which I dare say would nowadays be considered more pithy than polite: "Notice: This office is conducted on business principles, you are therefore requested to do your business in business hours, and when you have done your business, go about your business, and leave business men to do their business." I recall this at present because it is always associated in my mind with the advice which a shrewd old minister once gave to a young co-Presbyter: "John, tak my advice and never rise to speak unless when you have got something to say, and when you have said it sit down." But while admitting that life is too short and earnest to admit of spending much of it in hearing lengthy or frothy speeches, nay, let me say that it is because of this that I would advise every one of you to take part in any debate or criticism going on from time to time in your Association. You may wonder at me dwelling on a point so small seemingly; but by-and-bye, if ever you rise to any public position, as I hope many of you will, indeed as I hope all of you will, as prominent members of the Pharmaceutical Society, not to speak of other societies, social and political, you will never regret having learned the art of expressing your thoughts fluently and concisely. I know of no greater acquirement for influencing men and leading men than that of being able to express your opinions in elegant, powerful, finished sentences, and depend upon it this is a power which is never, or which is at least but seldom acquired on the inspiration of a moment. It is generally the result of long, painful experiences, but were these experiences ever so painful to you I would still advise you to go through them.

Turning now for a minute or two to one or two points of a personal character; but let me here once say that although they are intended for personal application they will none the less reflect their influence upon your Association. Let me press upon you first of all the necessity for constant and intelligent observation and reflection. You remember the words which John Brown put into the lips of the painter when he was asked how he mixed his paints, "With brains, sir." Well, I know of no single operation which you can perform or substance which you can handle where the brains are not required. To cultivate the habit of observation and reflection I put in the very forefront of our self-education. I say self-education purposely, because we may read books and attend lectures, and spend any amount of time and money in acquiring education, and yet fail miserably if we have not cultivated this habit. I press this the more strongly upon you, as I find after long experience that it is the weakest point in the education as it also is in the examination of our young men.

Probably as many young students fail when they enter the examination room through the want of cultivating these habits as from any other cause. Now these gifts of observation and reflection can no more be acquired by inspiration than others of which I have already spoken. It must be a daily, yes even an hourly habit with us, and we can best cultivate them by examining into and noting the why and wherefore of every combination, reaction and test given in the text books, as well as the changes and reactions which occur in our everyday experience.

No reaction or unexpected change in any mixture or compound should ever be passed over without a note being taken of it and afterwards examined, and in this way the reflective faculty would not only be cultivated, but the foundation would be laid for many a fresh and interesting paper for your Association. You may probably think that I am making too much of this point, but I tell you as a matter of fact that it is one of the weakest spots in every candidate who enters the examination rooms.

How many hundreds, I might even say thousands of cases I could give you from my own personal experience. I would not for the world hurt the susceptibilities of any young man presenting himself for examination, and therefore my remarks here must be considered very general indeed, but I would like to give you one or two cases in point, and they are so common that no one can possibly take offence. How few, for example, have any knowledge of crystallography, so as at once to identify such well-defined crystals as borax, alum, tartaric acid, citric acid, iodide of potassium, chlorate of potassium and twenty others which I might mention, from their external physical characteristics. And yet this should be as much a part of your training as distinguishing a false from a true aconite root, or in fact the detection of any substance in the materia medica. It is by the eye that we detect the very commonest chemical reaction, and we trust the eye in these operations in every case, and therefore why not in the very decided and characteristic physical characters of many crystals, thus saving time and trouble and often very many regrets, by going straight for the substance which a primary inspection has all but decided. Again, I should say that about one-half of the young men when testing begin with the flame test. Probably they are taught to do this to discover the sodium, potassium, or lithium flame, but in doing this the great majority will fail to detect the other significant reactions which are going on. The charring, the volatilizing, the deflagration, the colour changes in many non-volatile salts and other reactions, are entirely ignored, simply by reason of their not being mentioned in the charts. It is by the chart they go, and by the chart they strictly abide, and so they flounder on, probably in the end failing to find what they should have discovered in the very initial process of their investigation.

Again, I am not in the least exaggerating when I say that the fact has almost become notorious that scarcely a young man who presents himself for examination has even an elementary knowledge of physics. It has become a common question with the government visitor at our examinations (Sir Douglas MacLagan), "Have you come across that candidate yet who knows his physics, for if you do I want to see him." He is certainly a "rara avis." No doubt the lack in this department is due to a very great extent to our educational system, and I would therefore not be too hard on this subject, but surely the construction and principle upon which the barometer, thermometer, and specific gravity bottle operates, should at least be understood by every candidate, seeing these enter so largely into all our operations.

Turning now to another point still: I believe in young men having a hobby, at least so long as it is an honest going, thorough hobby. Of course, we should all endeavour theoretically to be all round men, but even then all round men have their angularities, and I daresay we like them all the better because of these angularities, as it makes them all the more human by giving them individuality. Now I believe in hobbies for several reasons; I believe in them because I know that if a young man has a hobby he will almost excel in that subject or department above his fellows. I believe in them because I believe in the truth of "Old Watts'" hymn,

> "That Satan finds some mischief still
> For idle hands to do."

I believe in them above all, as from my life experience I can testify that not a young man who has devoted his whole energy to any department of study or investigation has ever gone wrong or failed in the battle of life. It is one of the saddest thoughts of my life to find when I look around me how many who began life with me have fallen down, down, down, even to an early grave, simply through the want of some absorbing influence which could carry them out of their grosser nature. Now I find, unfortunately, that you have no great facilities in Dundee for prosecuting your studies. You have a college of which you well may be proud, but as far as I can learn it gives you no direct facilities for studies which would be specially useful to you. The more needful, therefore, for you to have a meeting place of your own, and no education next to that of special training is equal to that obtained in such associations as yours now formed.

One man's hobby is materia medica, another's is pharmacy, another's chemistry, while a fourth may think that botany excels all subjects. Let such young men who excel in departments step into the breach and take the lead, and soon they will be looked up to as authorities, and thus an educating process will go on second only in importance to that of a well trained class. I knew a young lad, a dull, obtuse looking youth whose hobby was—well, I daresay you would never guess what it was—it was *snakes*.

You should have seen how the face of that lad brightened up when his favourite subject was touched upon. It literally glowed with enthusiasm as he told you the history of every snake in his possession and its habits, and when I met him I was never sure but that he would produce a snake out of each pocket of his trousers to gratify me. Depend upon it that lad was a born naturalist, and I could not help respecting him from the simple fact that he knew so much more than I did on his special hobby. Closely connected with this is another point, and this is probably a hobby of mine. Your assistants and apprentices have not as a rule much money to come and go upon, but what they really have they are very apt to part with, and what they do part with is very much better to be diverted into a proper channel. Well I know of no better channel, or to put it in other words, I know of no better investment than books. Good books of every kind, but especially books of reference, are about the safest investment, next to the national savings bank, which young men can make. Satan finds a lot of mischief not only for idle hands but for too full purses also; and I can scarcely believe that a well filled bookcase and an empty purse are in any way compatible with the theatre, bar saloon, or other grovelling amusements of that kind. I remember the time when, possibly like some of you young men before me to-night, I had to look at both sides of a shilling before parting with it, and yet few pleasures have been so keen in my life as that when I first invested in a few works of reference. Not one of these books, I can safely say, but what has literally returned me forty and even a hundredfold, while no one can tell from what temptations I have been kept both by the companionship which they gave me and the empty purse which they occasioned me.

Again, I daresay you will be wondering why I dwell upon a point so minute, but I know that life histories appeal to young men, and while I have been in the midst of these notes, several incidents have occurred which have impressed me exceedingly, and now they naturally flow from the point of my pen. Being in Newcastle lately, I took the opportunity of seeing through one of the largest chemical works on the Tyne, and I can assure you that my first impression was one of deep depression at the littleness of everything pharmaceutical.

All the operations were conducted on so large a scale that they sunk into perfect insignificance our petty operations.

Here were hundreds of tons of carbonate of soda in process of crystallization; in another department so many tons of lime in process of chlorination, while hydrochloric acid was flowing constantly night and day in a large stream to the reservoir, and yet the utmost order, purity and precision prevailed over the whole. Passing, for example, the chlorinating chambers, which were numerous and large, I could not help remarking that there was not the faintest smell of free chlorine, and on going into all the different departments I noticed also various large test-tubes attached to chambers in the chimney walls, through which the different gases passing up the chimney might pass and thus waste be detected and checked. I remarked upon these features to the chemist who was conducting us through the works, and his reply was very significant. He said when a company can pay dividends to the extent of 15 or 20 per cent. to its shareholders it does not require to be careful of waste, but when dividends fall to 3 or 5 per cent. it is the waste that pays. Now I have often thought of this remark within the last few days. It is the waste in all our lives that pays in the end; the waste moments, the waste pence, the waste strength, and books of reference in many of our difficulties will help us and save many an hour's, and even many a day's investigation, besides helping us on in other directions. There are not many lives which yield a dividend of 15 or 20 per cent.; they are all made up of small details, and in the end these small details pay, and so with these reflections I came back to pharmaceutical life once more, comforted. My reminiscences of this visit, however, would not be complete did I not add one more fact, and one, too, which bears very directly on the points which I am now touching upon, and which bears still more on the possibilities of every young man now before me.

The chemist who conducted us through the whole works, who is now one of the managing partners in the concern, who has eight or ten chemists under him and some seventy or eighty different foremen of departments to look after, was once a chemist and druggist's assistant. He came to Edinburgh as a turnover apprentice and was asked the composition of hydrochloric acid, and knowing nothing at all about it, his ignorance cost him *that* situation. In fact he knew nothing of chemistry whatever, but his very ignorance spurred him on to gain all the knowledge he could, first from books, for he could not then afford lectures, but afterwards from lectures, and now he fully ascribes all his success in life to these three things, viz.:—

1st. His pharmaceutical training, which taught him the beauty and necessity of minute attention to manipulation. 2nd. His books, which gave him his first start in chemical training. 3rd. The lectures which gave him his finished training.

Now that I have touched upon books, let me just say one word upon education. I have no intention of entering upon the proposed curriculum scheme. I think it might well form a subject for a good debate at one of the evening meetings of your Association, and of this I am quite assured, namely, that after you have thoroughly thrashed the whole subject out you will be astonished to find how much can be said for it as well as against it.

This, however, I may say, that while the "old Adam" rises up very much against the "Thou shalt" and the "Thou shalt not" of a curriculum scheme, as indeed it does against every command, there is more in the words "Thou shalt" than in any other new feature which the proposed curriculum imposes.

After examining a young man I often ask him, Have you attended any classes? You will quite understand that I am careful never to put such a question or indeed any question to him previous to examination, so as to avoid the slightest appearance of being influenced by any external consideration. Well, in nine cases out of ten, I might almost say nineteen out of twenty, the reply is, "Yes, we have attended so-and-so's classes." With this experience the conviction is forced in upon me that every one of these young men would have been better trained, and probably also more cheaply trained, had they attended a well defined and recognized course of pharmaceutical education. Notice this, that at the present time pharmaceutical education, strictly speaking, is to a great extent in chaos. There is no defined course of study, no special classes, if we except some of the larger centres, where, in the majority of cases, the teaching follows the line of examination instead of the reverse. A curriculum would therefore do this good, it would define and definitely fix the course and limit of your studies, and thus concentrate your energies and your means likewise. Education under any circumstances is good, but well directed and systematic education is in every way much better. One word here to any masters present. Encourage your young men and give them every opportunity for study. I know from personal experience that it is next to impossible to personally supervise these studies, and yet much can be done in the way of directing and guiding them. By doing this rest assured we get better services, more intelligent service, and heartier service, while at the same time we are advancing the true cause of pharmacy. I always feel proud of my calling, and with years this feeling only increases. I would like to infuse some of this enthusiasm into you young men. I believe that next to the clerical and medical, pharmacy takes the place in representing and carrying out the purposes designed for the good of our fellow men, and if this idea of its high vocation once permeates our whole being depend upon it the feeling will ooze out at our very finger points. When I think of all this I look upon stores and cutting shops with comparative indifference, mere incidents in the history of pharmacy, accentuating only its progress and probably also helping it to rise to something higher.

Pounds, shillings and pence tend no more to constitute the true existence of pharmacy than does the abundance of what we shall eat and what we shall drink constitute the true existence of man. No; there is something higher and nobler than this in pharmacy, and we need never fear failure so long as we continue in the future as in the past to infuse our whole life's power and influence and intelligence into our work, ever keeping in mind that

> "Whether doing, suffering, or forbearing,
> We can do much by persevering."

The address throughout was attentively listened to, and very frequently applauded, and on Mr. Gilmour taking his seat he received a hearty round of applause.

The Chairman then said that before proceeding with the votes of thanks he would call on Mr. J. Rutherford Hill to address the meeting.

Mr. Hill, who on rising was greeted with applause, expressed the pleasure he felt at being present on such an auspicious occasion. He had to congratulate the assistants and apprentices of Dundee on the commencement they had made, and compliment them on the energy and pluck they had displayed in bringing their Association to its present condition. At the same time he warned them that there must be no drones in such a Society as this, that all must be active. While he was in entire sympathy with the movement for shorter hours he would also offer a word of warning. The Association, he thought, should not set this before it as part of its work as an Association. He had found by experience that the adoption of such a course is a mistake. It is a common complaint with young men who wish to study that their hours are far too long, but while he had no desire to damp in the slightest degree the enthusiasm of that evening, he would say that it was perfectly possible to study and pass in spite of long hours. If we look over the page of history we find that it has not been the men who have had the shortest hours who have made their mark. It is those who have triumphed over adverse circumstances such as these. He strongly advocated the system, and endorsed the opinion of Mr. Gilmour, of inviting short papers by their members. He had found it a most successful idea, and he had found from experience that it was the most practical and educative method. He earnestly recommended all to keep before them these three great points—observe—record—report—observe the common occurrences, record them, and report to the Association. He could not help expressing with all his heart his cordial sympathy with the Association, and he earnestly hoped that it might go on and increase, that everyone would put his shoulder to the wheel, and then they would see the result in the days to come.

Mr. D. McD. Skinner (Vice-President), having been called upon by the Chairman, said that in the absence of their President, Mr. John Forsyth, he had a very pleasant duty to perform, and that was to ask them to accord a very hearty vote of thanks to Mr. Gilmour for the excellent address he had given them. In the course of his remarks he said that Mr. Gilmour had proved himself on this, as on all other occasions, the true friend of the chemist's assistant and apprentice, and that by acting up to the suggestions and advice given that night this was sure to be a successful Association, and it would always be a pleasure to look back and remember who it was that delivered the Inaugural Address.

Mr. Gilmour, in acknowledging the compliment, said he had just to express the great pleasure it afforded him at being present, and hoped the Association would go on and prosper.

Mr. T. C. Henderson then asked the meeting to accord a like compliment to all who had come forward and given the Association financial aid. In doing so he said that in a great measure the success of their Association depended on the funds. The lack of an Association had long been felt in Dundee, and when at last it was formed they saw that to carry on the movement successfully they must obtain rooms of their own. To do this it was decided to appeal to the local chemists, and also the wholesale firms doing business in Dundee. That appeal had met with success, and as an Association they were much indebted to all who had subscribed to their funds.

Mr. Charles Kerr and Mr. Frank W. Young having spoken,

Mr. Jno. W. Russell moved a vote of thanks to Mr. Hill for his address, and Mr. Robert Lindsay did the same to Mr. Doig, for the admirable way he had occupied the chair.

Both gentlemen having replied, the meeting, which all through was a complete success, then terminated.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The Inaugural Meeting of the fifth session of the School of Pharmacy in connection with the above Association, was held on Thursday evening in the new rooms, New Surrey Street, Sheffield. The chair was taken at half-past seven o'clock by the President, Mr. A. R. Fox, who after a few suitable words of introduction called upon Mr. S. R. Atkins, of Salisbury, who delivered the following—

Inaugural Sessional Address.

Gentlemen,—In addressing you this evening I am fully conscious of the disadvantage under which I labour in following a succession of distinguished pharmacists who have so exhaustively reaped the field of educational and technical inquiry as to leave but the gleanings of the harvest for myself.

On the other hand, I am not unmindful of the fact that I speak to a large extent to a new set of men, and that it sometimes happens that old truths receive a new setting from a fresh speaker.

Let me at once say how thoroughly I appreciate the honour of being thus invited to speak to you gentlemen and students of the Sheffield School of Pharmacy, and how solicitous I am that something uttered to-night may prove an incentive to vigorous, sustained study, and assist towards the formation of a decision on the part of some hesitating youth, not merely to devote a life to pharmaceutical labour, but also to resolve that success shall be deserved, and, if possible, achieved.

Believe me when I say it that I have an intense sympathy with you. I cannot but regard you, with your bright, hopeful temperaments, with all the capabilities and possibilities of your future, with a strong desire that your career may be alike honourable and useful.

"Oh, Life! how pleasant is thy morning,
Young Fancy's rays the hills adorning."

Looking at the position you occupy in this year 1889, the vantage ground held by you as students in this School, I cannot but congratulate you most heartily as I contrast it with the corresponding period of my own life. At that time there was no pharmaceutical literature worthy the name; the standard works on chemistry were fast becoming antiquated in face of new discoveries and new modes of teaching. The School at Bloomsbury Square, recently established, was slowly fighting its way to recognition, despite the active antagonism of some and the supineness of others, but its influence on technical education in the country was practically nil.

The chemist of that day failed, except in rare and highly honourable instances, to realize his responsibilities to his apprentices. Few books, little apparatus, and that of an antediluvian type, small encouragement to study, less guidance, and no definite or adequate time allowed for it—such were the average environments of the average druggist of the period referred to.

Do not, however, let me be unjust. I am not wholly complaining of those days. In the process of necessary evolution they answered their purpose, and have given place to others in some, though not all, respects better.

We were happy enough in our blissful ignorance; we worked, I think, harder, longer, I am quite sure, than the young men of to-day, but it was mainly manual, not mental labour.

Our incapacity to pass an examination was not revealed, for the needful, but painful test had not yet been invented, certainly had not been applied.

That the voluntary system of education and examination was not wholly inoperative for good is proved by the number of competent,—aye, let me gladly add,—distinguished pharmacists, traceable to the particular epoch indicated, which I venture to describe as the very "Renaissance of Pharmacy," many of whom survive to this present day, and to whom we confidently look as the vanguard of progress. Some of these men were recently with us at Newcastle; others would have been gladly welcomed there; mentioning names were alike invidious and superfluous.

But in addition to these men, whose names are not likely to perish, enshrined as they are in our archives, there are many others who have passed away and left no widely-known record of their life, but I assure you it is worth searching after and finding.

In every part of the country there have been, and still are, men of rich culture, wide and varied reading, highest probity, possessing the confidence and esteem of the society in which they mingled. I often recall the memories of pleasant surprises in my ramblings of past years, here and there, as I have come across such choice spirits, and wished I could have introduced them to the wider fraternity of pharmacists.

It is only half the truth, and that the lesser half, to say with Gray,

"Full many a flower, etc;"

the whole rounded truth lies in a true life wherever lived.

Compared, however, with the men to whom I have thus briefly referred, your position as students in Sheffield is one of distinguished privilege; let us for a moment consider it. That there are special and peculiar difficulties in your path a prior generation was unacquainted with, I readily admit, but coming as they will, after your direct student life is over, I need not dwell on them at length.

You will be called on to encounter a competition, not simply of labour and capital, but of brains, that will probably intensify as population becomes denser. For that competition in the race you are now training, and what I wish specially to emphasize is the fact that in the facilities for adequate and efficient training now within your reach, energetically seized, lies, other things being equal, the result you desire—success.

I assume that you have commenced with the priceless boon of a sound liberal education at school, which you have wisely availed; that you have already passed the Preliminary examination of the Pharmaceutical Society of Great Britain, or its equivalent; that you have now deliberately chosen the trade of a pharmacist, or the profession of pharmacy, call it which you like; that in the various establishments of this great manufacturing town, you are acquiring a practical knowledge of the details of your business behind the counter and in the laboratory, and that you have entered this School to acquire a knowledge of those varied subjects on which the science or art of your craft is built, and the quality and quantity of which knowledge will bye and bye be tested in the examination room.

I congratulate the successful students on the good use they have made of their advantages. I congratulate every man who has honestly worked here, whether a prize winner or not. The syllabus of study is an admirable one, its measured proportions of theoretical and practical instruction are most judicious, the inadequately remunerated self-sacrificing service of the teaching staff beyond all praise.

If I were to indulge in any apprehensions for the future of your School, it would be that you cannot expect a perennial supply of such instruction on such terms.

Another fact in your history as a School is its rapid growth, the surprising increase in the number of students, the high percentage of attendances, and as a result the substantial character of the work that has been done here.

I speak subject to correction, but I believe I am correct in saying that your School is independent of the famous institution of Sheffield, the Firth College. Unconsciously I may be treading on delicate ground, but I venture to utter the conviction that it would be a good thing for this School to be in affiliated relations with Firth College. I watch with deepest interest the marvellous growth of the great universities and colleges in various parts of the kingdom. Newcastle, Nottingham, Liverpool, Leeds, Manchester, Hull, Sheffield, Bristol and other important towns are the first-fruits of a harvest destined to scatter sound educational influence over the entire country.

If at present you are not indebted to your distinguished benefactor, Mr. Firth, for any portion of your technical instruction, you have the excellent college in Sheffield, with its broad basis of higher instruction in the wide area of belle-lettres, available by you, according to your taste and opportunity.

Provincial education, or, to speak more correctly, pharmaceutical education in the provinces, is a theme on which much has been written and said, and on which a great deal more remains to be uttered.

For the most part, the experiments have been lamentable failures. Schools have been started, libraries and museums formed, lecturers and teachers engaged, local subscriptions collected, the whole subsidized by grants from head quarters, with results I forbear to describe in detail, the evident reason for such disappointing failures being the inversion of the proper order of procedure, furnishing the supply before the demand existed, or indeed the possibility of its existence, save in rare personal instances.

The endeavour to meet the needs of these rare instances of innate love of study is a commercial failure, and to a certain degree may be deemed superfluous. Such men would triumph over any difficulty, indeed make the very difficulty itself a stepping-stone to success. Such men do voluntarily what most attempt only under pressure, hence my strong conviction that a prolonged curriculum enforced is indispensable for our young men.

I have at considerable length elsewhere argued on this matter; I may in a sentence now say that a careful and sustained consideration of the results of the examinations at Bloomsbury Square has convinced my judgment.

I am quite aware that I am open to the reply that the description I have given of the former condition of pharmacy in Great Britain goes to show that the voluntary system of education was not a failure.

To that argument I venture the rejoinder that the voluntary system of education harmonized with the voluntary system of examination.

But all that is changed.

Let us, however, suppose that the crusade recently commenced against examinations was successful, I would still urge the importance of compulsory training for its own sake, under the changed conditions of commercial and professional life. The brain fight of the age is not slackening and will not.

The standard of intellectual attainment is being raised all round; pre-eminently true of our learned professions, it is also relatively true of a craft like our own, standing in close proximity to one of these professions.

The *future of pharmacy* is a matter of anxiety to many persons and of speculation to others. I do not share the fears of the fearful if only we are found true to ourselves, but I repeat and emphasize the conviction I have in another place expressed that our numbers will suffer diminution. A process of natural selection will prevail, chemists and druggists will dissolve partnership; the former to practice pharmacy with a higher recognized status than he now enjoys, the latter (the druggist) with a lower qualification, and, it may be, a limited licence, supplying more as a drysalter the varied requirements of society.

Such a division of labour, such a differentiation of talent, does not necessarily need legislation to effect the severance, it is rapidly progressing to-day in a revolution more or less pregnant with consequences because so silent.

To-night we are concerned only with the first of these two classes, and as students I regard you as its representatives. If in the period of your school life you had the advantage of receiving at the same time some amount of scientific and technical instruction, so much the better; just to that extent has time been saved, and the foundation laid for the specific work you are now doing.

I have long thought that the elementary education of this country should be partly book and partly industrial or manual. Just so should the education of the middle classes be jointly literary and technical.

I would ask you still to preserve this combination, though it may be necessary for a time to invert the proportions of these two sides of your educational career, and there can be no serious difficulty in the way with the facilities afforded alike by this School and by the Firth College.

This leads me, in passing, to offer a remark on the process of decentralization now going on. I have referred to it in connection with the development of provincial Universities and their affiliated Colleges. I think as time goes on it will become true of provincial schools of pharmacy, such schools furnishing the full course of instruction required for our examinations, constituting recognized centres where the examination should be conducted by a peripatetic examining board, with possibly—but on this point I hesitate to express a definite opinion—a provincial mint with power to impress the hall mark of efficiency when acquired.

London has grown and is growing to dimensions utterly baffling all earlier forecasts as to population and area. What may be the future growth of our mighty capital it would be idle to speculate upon.

The very greatness of our empire and the corresponding magnitude of its chief city are strengthening the demand for decentralization, a principle which applied to the matter now under our consideration gives a dignity and importance to such schools as the one I am now addressing.

In order that you may be enabled to utilize to their full extent the courses of instruction now within your reach permit me to offer you one or two suggestions.

In the first place I would express the hope that you have a *definite aim in life*, and that to be an educated and in its best sense a successful pharmacist.

Pray do not misunderstand me.

I do not say on the one hand that this should be your sole or highest aim; it is not for me this evening to invade the domain of our highest form of life, my own convictions on this subject are deep and strong. Nor do I affirm that even this constitutes the entire sphere of human life. Be grave and gay as occasion demands, laugh as heartily as you like, only at the right time and the thing worth laughing at. Body and soul have each their claims which must not be neglected, but I have not come to Sheffield specially to remind you of these, but the rather to press you to win your way into the foremost rank of pharmacy, for it is no contradiction to assert that in the front rank you will find more breathing space—the greatest crush will always and increasingly be with the rank and file.

I press this sense of ambition on you, not simply for your own sakes—the substantial rewards of reputation are wealth—but for its relative value to others. We are members of a guild or craft called on to contribute something to the general good, and if possible contribute the lustre of an honourable career in the world of pharmacy.

The ideas of *individualism* and *confederate action*, although seemingly divorced, are not really so; the best work in the world is accomplished by the former, the association and combination of individual workers s essential to large results in society. It was a profound saying of an Eastern philosopher, "Progress is attained by the perfection of the individual."

"Prospiciens et Respiciens" is a sentiment covering the entire field of human energy. Yours is the former attitude. An aimless life is a useless one. It is said of Lancaster, the celebrated educational reformer, that he not merely gave prizes to successful scholars, but that he had them constantly suspended before their eyes as incentives.

Napoleon at St. Helena was an exile in whom the fire of ambition had burnt down to a few bitter ashes of disappointed hopes, and he said, "I can now live only in the past." Macaulay tells us in graphic language how young Warren Hastings resolved to buy back the estate of his ancestors, and how he kept his word; and you remember that Charles Dickens, struggling with limited means, fixed his heart on one day settling in the mansion at Gadshill—and did it.

Concentration of effort on the thing in hand is another suggestion I venture to offer. This is not easy, but most essential; strenuously let me insist upon it. I know from personal experience how difficult it is to train the mind to this habit of concentration, but nothing really becomes your own until this is achieved. The powers of acquisition and assimilation work then at their full bent, and can be turned off and on to other fields of inquiry with delightful ease. Just as in certain kinds of athletic exercises different sets of muscles are brought into play, you acquire definiteness and depth of mental impression just in the measure of your fixedness of thought.

You will readily remember in your readings in English literature the names of celebrated men noted for this faculty. My valued friend, the late Henry Fawcett, told me that to this habit of mental concentration he owed the facility with which he could seize and retain mental impressions.

You know how he could fix the attention of the House of Commons, whilst at extraordinary length he would marshall figures and facts he only heard of, but never saw, and elaborate his views on Indian politics and finance.

The great Napoleon had this quality of attention in perfection without allowing it to run into ridiculous abstraction. "My mind," he said, "is like a chest of drawers. When I have done with one subject, I shut it up. Thus I have no confusion of ideas."

George Stephenson and Hugh Miller as working men are noted examples of the same faculty.

Another remark I may offer is one affecting the practical side of your student life, and it is this—cultivate the habits of *observation* and *independent reflection*.

Behind the dispensing counter and in the laboratory you will be constantly observing phenomena of the greatest interest and importance. Let not one of these pass unchallenged as to its meaning. Some will be familiar, and so will be the explanation; others will give rise to thought as to the why and wherefore.

Necessarily, you will not always be able either to inquire or reflect at the moment; carry your note book in your pocket and make use of it; in other words chew the cud at your leisure.

The text book will come to your aid for the most part, for the path you tread has been well worn by previous travellers; none the less do not accept the explanation without independent proof.

I do not agree with Carlyle's cynical estimate of the intelligence of the population of the British Isles, but I do believe that the habit of real earnest independent thought is a rare one.

How enriched your life will be with a mind replete with facts and accustomed to reflect upon them.

How full of significance the world around you, ever suggesting, ever stimulating inquiry, how dignified your work, though done in a humble sphere, and to a large extent how superior it will ultimately place you to the chafing influence of little cares. Pray do not imagine that I am in the realm of metaphysics or poetry in thus talking to you. I am speaking as a man of the world, who in early life had not your scientific advantages, who knew in the first years of his business career what working and waiting for results meant, but who found in the intellectual pursuits to which reference has been made a fascination I fain would have you conscious of.

I have pressed upon your consideration as students the habits of *definiteness of purpose*, *concentration of thought*, associated in the practical arena of your daily life with *observation* and *reflection*.

By-and-by, and all too soon, the training will have ended and the real earnest work of life will begin.

> "There is a Providence that shapes our ends
> Rough-hew them how we may."

In various parts of this or it may be of other lands, you will become, I trust, the men of light and leading, and whilst authorities in your special pursuits, you will need other and more varied furnishing to make you the all-round men with whom we like to mingle. The vast, practically limitless worlds of mind and matter lie before you; try to cultivate an acquaintance with some portions of them. You have, I hope, a love of books; foster diligently this love of reading.

Sir John Herschell says, "that if he were to crave a taste which should stand by him under every variety of circumstances, and be a source of cheerfulness to him at all time, that taste shall be reading."

But for relaxation you will need your "hobby." I shall not attempt to choose for you; the field of choice is ample and varied, but simply ask you to excel in the recreation, as well as in the work of life.

You are, I hope, as apprentices or students, already connected with the Pharmaceutical Society of Great Britain. May that connection continue and your attachment to that important institution grow.

I do not ask for gratitude for what it has already done for your School, and, I believe, is prepared yet to do for it. In passing, I can assure you that the Council of our Society watches with keen interest the experiment of provincial education being worked out in this town, and I know is prepared to back its sympathy with further pecuniary assistance when it sees, as I do this evening, a large and continuous supply of students, and the liberal support of the School by local pharmacists.

But I base my appeal for your sympathy and support of the Pharmaceutical Society in the after years of your life, because I think it deserves it, and, I regretfully add, needs it.

It is an Institution much misunderstood and even more abused. I hold no brief from headquarters. I am prepared to admit that we make mistakes and will accept my individual share of responsibility for them; at the same time I declare my strong conviction that the Society deserves the confidence of the trade, and that nothing can be more suicidal than for chemists to stand outside it, or being inside, hinder its usefulness by traducing it.

The confidence of the public, of the medical profession, of the Government departments of the State, and absolutely and completely of foreign countries, are alike the results of higher education and a keener sense of our responsibility to the State. That we may have been somewhat tardy and conservative in the exercise of existing powers or the acquisition of fresh ones, I will not deny, but a long and close official connection with the Council at 17, Bloomsbury Square, warrants me in saying that the charge of indifference to trade interests is not true.

How, then, can we explain the palpable fact of widespread unpopularity? The answer, I think, is twofold. In the first place we are an examining body, and with the disastrously large percentage of failures in the examination room we incur the dislike of the unsuccessful.

The enforcement of the penal clauses of our Acts of Parliament alienates many others. But by far the most potent source of estrangement lies in the fierce competition which chemists have to encounter, much of it unfairly, I admit, but which for the most part cannot be touched by legislation.

It would not be difficult to write a prescription for many of the ills which afflict us, but I know not the pharmacy where I could get it dispensed. Certainly the House of Commons, with its tardy and limping legislation, is not of much service to us.

The remedy is that the old days, the good old days, should revisit us, when we had plenty to do, and were well paid for doing it; when stores, bogus drug companies, cutting chemists were not dreamed of.

"Could those days but come again," all would be well. But they cannot, and we must accommodate ourselves to the altered aspect of affairs.

As students you are doing so by better scientific training for life, and I trust an impartial recognition of the Pharmaceutical Society in your sympathy and support when you are in a position to render them.

Let this thought be your future inspiration—

> "He lives most
> Who thinks most, feels the noblest, acts the best."

At the conclusion of the address, Mr. Atkins proceeded to distribute the prizes to the successful students of the previous session, accompanying each presentation with suitable words of encouragement and advice. The names of the prize winners will be found on p. 259 of a previous number of this Journal.

A vote of thanks to Mr. Atkins, proposed by Mr. Learoyd, seconded by Mr. Bradwall, and supported by Mr. Ward, was carried by acclamation.

It is pleasant to be able to add that the Society's new rooms appear excellently well adapted to the educational purposes for which they are intended and are especially well fitted up.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The session 1889-90 of the Midland Counties Chemists' Association was opened at the Midland Hotel, New Street, Birmingham, on Tuesday by a Conversazione, at which the President (Mr. W. F. Wyley) delivered an inaugural address. There was a large attendance including many ladies. Several letters of apology for non-attendance were read.

Professor Tilden proposed a vote of thanks to the President for his interesting and instructive address. He said reference had been made in that address to the conditions under which apprentices studied their business as pharmacists. Notwithstanding the reforms which have been effected in the matter of education, there were still very many schools in which such subjects as chemistry, physics, natural history and other sciences were not taught. If they were taught, however, a youth leaving school, say, at seventeen years of age, would have the foundation laid of the principles of chemistry, and then he would have a better opportunity of applying those principles to his business as a pharmacist. Then employers, instead of taking apprentices, should look upon them as pupils as well as assistants, and a due proportion of time should be allotted for study. It was unreasonable to expect young men who had been hard at work all day to devote the whole of their leisure to the study of that interesting volume, the Pharmacopœia. As to the price of goods, he thought that might be regulated to some extent by pharmacists charging a fee for their skill as pharmacists. Medical men charged for their skill, and he did not see why pharmacists should not do the same, and then add the cost of the drug. The public would soon become educated to the system, which would eventually give satisfaction all round.

Mr. A. Southall seconded the proposition, and spoke of the desirability of more support being given to the Pharmaceutical Society. It was complained that the Society did not give sufficient attention to trade matters, but if chemists as a body supported the organization they could make it what they thought proper.

The motion was agreed to, and the President briefly replied.

A vocal and instrumental entertainment followed.

British Pharmaceutical Conference.

MEETING AT NEWCASTLE-UPON-TYNE.

SECOND DAY'S PROCEEDINGS.

Wednesday, September 11.

(*Continued from page* 280.)

The next paper read was entitled:—

NEGATIVE EVIDENCE OF LEAD IN DRINKING WATER.

BY R. REYNOLDS, F.I.C., F.C.S.

At the outset, I will disclaim the possession of any new discovery with reference to the action of drinking water upon lead. But, there are cases in which no new discovery can be announced, where the importance of the subject, as affecting the public welfare, may have enormously increased. It seems to me that the question of the contamination of drinking water by lead is one of these, and I trust that this enhanced importance will justify the present communication.

In the West Riding of Yorkshire it has been found, during the past few years, that the public water supplies of some very important towns are capable of acting energetically upon lead, and the almost universal employment of lead for service pipes places vast populations under conditions of much peril. The water supplies of Sheffield, Bradford, Huddersfield and Keighley may be specially named as having furnished many cases of lead poisoning. The neighbouring county, Lancashire, can supply similar illustrations.

The general principles upon which these water supplies have been selected have been the endeavour to secure water beyond the suspicion of contamination by impurities of human origin, or from agricultural land, combined with the possession of the smallest possible amount of solid matter. The example of Glasgow in taking the soft water of Loch Katrine has been emulated, as a standard to be aimed at in the interest of economy of soap and for the advantage of various manufactures. The absence of organic impurity might have been secured by taking the supplies from springs where these furnished an adequate volume, but the combined conditions of organic purity and softness were found only in waters gathered in high moorland districts. These waters are now recognized as frequently having acid qualities, which cause them to attack lead.

The literature of the subject is now indicating that its practical importance is realized, and during the past few months some valuable papers and reports of discussions have been published. Amongst these are a paper "On the Action of Water on Lead," by Professor Percy F. Frankland, Ph.D., etc., read before the Society of Chemical Industry, April 1, 1889, whilst the discussion which followed its reading brought out valuable facts and opinions from Mr. A. H. Allen, of Sheffield, whose knowledge of the subject is exceptionally comprehensive. At the meeting of the British Medical Association in Leeds, August, 1889, Dr. Sinclair White, lecturer on state medicine, etc., Sheffield Medical School, gave a valuable paper on the subject, with notices of the experiments made by Mr. Allen. It is clearly established that the new factor in such waters is a free acid. They are appreciably acid to litmus paper, and concentration of the water increases the acidity. Water found stagnant in pools on the surface of peat has the maximum degree of acidity.

We yet await the isolation and determination of the exact nature of this acid, inorganic or organic. The belief that it is sulphuric acid, derived from decomposed iron pyrites, is giving way to its reference to peat as a more probable source. The maximum amount reported at Sheffield was the equivalent of 0·7 grain of sulphuric acid per gallon.

It is not within the province of the present paper to discuss the various remedies proposed, such as the introduction into the water of silica, by Messrs. Crookes, Odling and Tidy; carbonate of soda, by Professor Percy F. Frankland; or lime or limestone by other authorities. Of these remedies, limestone has already rendered good service, although there is difficulty in keeping it in a perpetually active condition. The introduction of relatively small proportions of harder spring-water, containing much lime, is another expedient that has been recommended. Temporary protective measures within the power of the consumer consist in the adoption of almost any description of water-filter. Even a flower-pot, filled with wood-charcoal, has made an efficient filter. Of course, such measures are palliatives only, and not to be recommended as remedies.

My present object is to point out that the report of a chemical analyst on the presence or absence of lead in any particular sample of water should be so guarded that the public may not accept it, to their own detriment, in a more general sense than is justifiable. In the paper by Dr. Sinclair White, already referred to, it was pointed out that the size, age and purity of the lead-piping employed, the length of time the water remained in contact with the lead, the pressure, temperature and admixture of air, had each more or less influence in determining the amount of lead dissolved. As all these factors are subject to variations, it is clear that the results of an analysis when their minimum influence was being exerted might have no relation to the results when more energetic or more prolonged action occurred.

Let me illustrate this by the case of a series of samples of water from one of the supplies already alluded to which passed through my hands. The following quantitative results are those found by Professor Attfield, F.R.S., etc.

	Grains of lead per gallon.
Source A.	
Sample drawn 7 a.m.	0·35
„ 10 a.m.	0·10
„ 3 p.m.	0·10
Filtered water	0·00
Source B.	
Sample drawn 6·30 a.m.	0·15
„ 9·0 a.m.	0·05

Special vigilance should be shown in the case of hot water supplies, as these have often been found contaminated by lead where the cold water was free from it. The bad habit, too common amongst servants, of filling tea-kettles from hot water cisterns, has, in several instances that have come under my observation, been productive of much injury to health. Again, there are the cases where varying amounts of the scale or coating which forms a protective covering to the inner surface of the lead-piping, are detached and suspended in the water, although no lead is found in solution. Such a case is before me now.

The moral which seems justified by the present position of the subject is, that an analyst reporting on the presence or absence of lead in drinking water ought to make it plain to his client that he speaks only of the sample placed before him, and if that sample has not been taken under the conditions most favourable to the presence of a maximum amount of lead, the analysis and report may have failed in their object. In the case of a commercial analysis of some article of trade, the technically skilled client who sends it will take care that a pound sample fairly represents a ship's cargo. But the client who wishes to know if his family may safely drink any particular water has no knowledge of the technicalities affecting the reactions of lead with water in all the varying moods and tenses of the latter. I think it follows that the analyst should direct that samples ought to have been in contact with the ordinary service pipes for a fixed period, say twenty-four hours. Where samples are delivered without the opportunity having been given for this injunction, it is desirable that a short printed statement should accompany the report, explaining the conditions which favour the action of water upon lead.

The PRESIDENT said this was a matter in which all present were very much interested, coming as they did between the public and the medical profession.

Mr. A. H. ALLEN (Sheffield) had listened with much pleasure to all Mr. Reynolds had said and agreed with him entirely. There was no doubt it was extremely important, especially as very frequently the effects of lead poisoning were very serious, though the origin of them was so obscure that the medical men did not suspect lead poisoning. Of course the report on any particular sample could only refer to that sample, and it was a great pity that the public could not be educated into a more intelligent way of selecting things to be sent to the chemist for analysis, because a great deal of their money and the chemist's time was wasted, and suspicion and doubt was occasionally thrown on the accuracy of analyses, simply because the parties had not taken the trouble to insure the proper conditions being present. There was one point not referred to by Mr. Reynolds which came very much home to him, because it occurred in his own household. Unfortunately at one time all the water which reached the inside of his house passed through a lead pipe and was contaminated. They had none uncontaminated; all they could do was to go down to the tap in the cellar, and after having let the water run for some time they could draw water containing as little as $\frac{1}{10}$th of a grain per gallon, but the other water was liable to contain as much as $\frac{4}{10}$ths, and it had been as much as one grain. This therefore became a serious matter. He had no further personal interest in it, because he cured it entirely by filtering. On that point he was not quite clear whether Mr. Reynolds said that wood charcoal or good charcoal would do, but if he said wood charcoal that was insufficient, it must necessarily be animal charcoal. The wood charcoal exercised a certain physical action in removing lead for a certain length of time, but it was the phosphates in the animal charcoal which really did the duty. The lead could be removed equally well with a bone-ash filter as with animal charcoal, and the efficiency of the charcoal could be judged of, so far as lead removing was concerned, by noticing whether the charcoal had turned white. As soon as the charcoal was saturated with phosphate of lead it became white or grey in colour, so that as long as there was a distinct portion of the charcoal still remaining black, it was still efficiently removing the lead; of course it might be desirable to change it for other reasons. That was a very important point, because it was quite clear that a filter which was not doing its duty was almost worse than none. He had put up a high-pressure filter arranged above the sink, through which the water ran in a stream as thick as a pencil absolutely free from lead. It went in with a third of a grain to the gallon and came out absolutely free. That was an animal charcoal filter, and had been at work for several years. But having taken all this trouble to remove the lead from the water, they were alarmed and troubled by finding that several members of his family still suffered from lead poisoning, and he could not for a long time fathom the mystery. At last the tea was found to contain lead. Their attention was directed to the tea leaves, which were found to be free, and ultimately the evil was traced to the kettle, which had been furred, and that fur contained a lead deposit, no doubt deposited there in the time before they knew what harm was being done. This deposit contained an enormous quantity of lead, and there was no cure for it except buying a new kettle, and he believed the ironmongers in Sheffield had made a good trade out of it. That showed how difficult it was to trace the source of lead poisoning, and how one might be thrown off the scent by finding there was no lead in the water which was being used, although there was actually death in the pot.

Mr. BRANSON (Leeds) said he had been examining the composition of water that caused a considerable epidemic at Pudsey this season, and on the authority of Professor Attfield it contained $\frac{7}{10}$ths of a grain per gallon. That water was drawn the first thing in the morning, and probably contained the maximum amount. He found the quantitative results were as follows:—The water was distinctly acid, of course. The term of acidity in sulphuric acid per gallon was ·114 grain; the total amount of sulphuric acid combined amounted to 1½ grains, so that there was plenty of sulphate present; but in the presence of free acid the sulphate was no protection against the action on lead. There was no temporary hardness; the permanent hardness was about 4 grains, and the total solids 6·7 grains; all the other constituents normal. That water caused a serious epidemic, in a large number of cases apparently suddenly. Last week another sample of water equally interesting came under his notice. It was proposed for a town supply, and it acted freely on lead. The terms of acidity were as much as ·9 grains of sulphuric acid per gallon; the total sulphuric acid present was less than one-tenth of the total acidity.

Mr. ALLEN asked how it was ascertained.

Mr. BRANSON said by precipitation with barium. The temporary hardness was nil, nitric acid about normal, and the chlorine ·7, total solids 4·9 grains. That quantity could hardly be due to organic acid, and was probably hydrochloric acid. He had not a sufficient quantity of water to determine that point, but he should apply himself to it on his return. If it were due to hydrochloric acid it rather pointed to the necessity for care in evaporating water, as if this is done, as usually, in a platinum dish, some of the hydrochloric acid might be lost. It would be apparently wise to distil the water and test the distillate for chlorine. This water was taken from a moorland stream.

Mr. LINFORD said, years ago, when he was at Canterbury, new waterworks were established, pumping from a deep well water which was very hard, nearly 20°. The Town Commissioners arranged to precipitate lime out of the water, and send it to the town as precipitated soft water. At that time there was considerable doubt whether this very soft water, containing 1½ grains of carbonate of lime, was safe to send through lead pipes, and it came into his hands to test. After keeping some forty-eight hours in a leaden vessel, giving it every possible opportunity of dissolving, it was found that 1½ grains of carbonate of lime per gallon was quite sufficient to prevent any solution of the lead by the water. That being spring water was not liable to contain acid such as the water spoken of by Mr. Reynolds. At the same time he thought it was a mistake of many of the public bodies to be searching for the possibility of supplying very soft water; they were beginning at the present time to find in Glasgow that the health, especially of the children, was not so good as when they had a water with more lime in it, although of course children taking milk took a tolerable amount of lime. In valleys where soft water was drunk there was a deficiency of lime for the health of growing children, and he believed a moderately hard water was much more wholesome to drink than quite a soft water. At the same time there was no difficulty with water which contained a fair amount of carbonate and sulphate of lime in softening the supply. He did it himself; he had a tub in which a certain amount of carbonate of soda and quicklime was placed, and it was filled up every two or three days, allowed to settle, and then used. When a deposit accumulated it was cleaned out, and the tub filled up again. He therefore always had water quite soft enough to wash in, but at the same time he drank that which did contain sulphate of lime. In many processes of manufacture, especially brewing, a certain amount of lime salt, especially sulphate, was necessary for the preservation of the aroma of the hop. He knew breweries where very soft water was used where they were unable to brew bitter beers, and to them he recommended putting a shelf round the water cistern and filling it with lumps of gypsum. This acted perfectly, and they now brew as good beer as anyone else. The public wanted educating to the idea that the softest water was not the best for drinking purposes.

Dr. Thresh said the question that they were considering was not so much whether soft or hard water was best for drinking purposes. Mr. Reynolds had offered a suggestion which was very valuable, which public analysts and others should take note of. It was desirable in all cases where an analyst was consulted in reference to a water supply, that the greatest importance should be laid on the point whether the water was likely to have any action on lead. The authorities who sent samples of water for analysis rarely seemed to think of it, and he had seen many reports sent in by analysts in which it had never been mentioned. He did not consider any report on water intended to be used for domestic purposes to be complete unless the analyst added something with reference to the action of that water on lead. In many cases it would be of the utmost value to the sender of the water to have this action pointed out. Mr. Linford's statement about the health of children being affected by soft water was a most startling one; they all knew that after Glasgow was supplied with soft water the death rate went rapidly down, and to be told now that the children were beginning to suffer was a somewhat alarming statement. He did not know what authority Mr. Linford had for the assertion.

Mr. Linford said two Glasgow medical men.

Dr. Thresh said he had never seen anything of that kind reported, and was much inclined to doubt it.

Mr. Dott said he believed it was the case that the medical officer for Glasgow thought the soft water from Loch Katrine had a bad effect on the health of the children in the city, but that was not the opinion held by the best authorities on the subject. He had no doubt it was a delusion. There were children in other districts where the water was as soft who were in perfect health. He had no doubt any ill effects were due to insufficient nourishment, and not to the softness of the water.

Mr. Kinninmont said there certainly was in the lower districts of Glasgow a good deal of limb distortion. Much of that depended on the want of lime, but that came from want of lime in the food; there was not enough milk or porridge; they took tea and bread, and the consumption of sugar was very great, owing to its cheapness, which had the effect of eliminating the lime from the system. However, in the districts inhabited by the upper classes, where they did use porridge considerably, the children seemed remarkably healthy, though in the east end and the poorer districts there was a great amount of sickness, and many children with distorted limbs. In the better class districts, and even in the lower classes, there was a great increase in the consumption of lime water, as the people had got it into their heads that they should take lime. In Pollokshields a large quantity of lime water was sold, and in the poorer districts the people made it themselves and added it to children's food, as they thought it would gradually eliminate this distortion which existed. The health of Glasgow was much improved since the city had been supplied with Loch Katrine water. He could remember when every autumn there was an immense amount of diarrhœa, but such a thing was almost unknown now. As for the action of soft water on lead, that might be obviated.

Mr. Chaplin (Wakefield) said there had recently been a new supply of water from the moor districts, and the public was rather inclined to be frightened, from the idea that such water had always an action on lead. Mr. Kinninmont said the water obtained from Loch Katrine had as great an action on lead as distilled water, and they knew that the water supplied to Huddersfield had been attended with bad effects, which were attributed to that action on lead. Consequently, when the new supply was turned on to Wakefield there were very great fears that there would be deleterious effects to the inhabitants. He had opportunities of looking into the subject, and although he had not examined it very minutely, he had done so roughly, and found, much to his surprise, that the water seemed to have no action on lead at all, or at any rate to a very slight extent. Comparing it with distilled water, the difference was extremely marked. He sent some of it to his son, who was an analyst, and he found that there was a certain amount of salts in the water, and on looking into Taylor's work on poisons he found it there stated that a certain amount of salts in water would act as a protective against the action on lead, and comparing the analysis of this water with the amount of salts mentioned by Taylor, it was found that the water contained a little more than the quantity mentioned as being a protection from the action on lead, namely, about 1 in 6000. He thought they ought to disabuse the public mind as much as possible of the unreasoning fear of the effect of water obtained from moorlands upon lead. It did not follow because it had an effect in one case that it would do so in every other. The strata over which the water flowed previous to collection must be taken into consideration.

Mr. Reynolds said whilst the paper certainly suggested the somewhat discursive remarks, to which probably it was not necessary to attempt any reply, it was gratifying to him that such authorities as Mr. Allen and Dr. Thresh recognized the fact that something ought to be done to make the analyst more definite in his verdict with regard to the waters submitted to him. No one could doubt that there was a very extensive evil; medical men could hardly appreciate yet the extent of mischief which might be attributed to lead poisoning, for it was much more insidious than many were aware of, and unless guarded against it would be likely to increase owing to the large scale on which these waters were now being used. The only directly contentious matter in the discussion was that coming from his friend Dr. Thresh, whose suggestion rather traversed his own in thinking it would be better, instead of informing the client how the water should be taken, that the analyst should himself make the experiments as to its maximum power of acting on lead. Now he would prefer that the conditions should be identical with those in the client's house. If the water came from Mr. Allen he should like to have the very [illegible] the very kettle that was used, instead of [illegible] pipe which would be used in the laborato[illegible] be perhaps the more severe test, [illegible] mative as if the client took a [illegible] fair conditions.

The next paper read wa[illegible]

VERMIN-KILLERS [illegible]

BY ALFRED [illegible]

The composition of [illegible] strychnine as the act[illegible] active interest for m[illegible] poisoning which o[illegible] in Derbyshire. Ka[illegible] life was insured, d[illegible] certificate being r[illegible] viscera were subsequently submitted to me for analysis. From the stomach I isolated 0·3 grain of strychnine, from the intestines 0·2 grain, and from the liver 0·3 grain. Taking the amount of strychnine absorbed in the system as five times the weight contained in the liver, and adding to this the quantities contained in the stomach and intestines, I estimated the weight of strychnine taken at about 2 grains. In the stomach and intestines there were numerous particles of blue colouring matter, some of which I distinctly proved to consist of ultramarine, though a few others were of less definite character. Before death, the child had stated that her "father had given her something blue out of a bottle in a cup," and hence it became extremely important to ascertain whether the prisoner had purchased any vermin-killer recently. In his confession made after conviction, the murderer admitted that he had purchased vermin-killer and had used it exactly in the way alleged. The police consequently obtained packets of vermin-killer from various shops in the neighbourhood of the murder and submitted them to me for analysis. The results appear to possess sufficient general interest to bring before the members of the Conference. They are remarkable as showing that while a few of the local pharmacists sell well-known vermin-killers, such as those of Battle, Steiner and Craven, the majority prefer to make up their own powders. I confess I was surprised to find this to be the case, but the discussion will probably show how far the practice obtains in other districts. In the following table the local powders are distinguished by letters, and those sold wholesale by numbers.

Name or Mark.	Weight of Powder in Grains.	Price.	Strychnine.		Nature of Starch.	Colouring Matter.
			Weight in grains.	Percentage.		
Local Preparations.						
A	—	2*d.*	—	—	Rice	Prussian blue.
B	—	—	—	—	Rice	Ultramarine.
C	14·7	3*d.*	1·05	7·2	Rice	Ultramarine.
D	—	1*d.*	—	—	Rice	Ultramarine.
E	11·5	3*d.*	0·60	5·4	Rice and Wheat	Carmine.
F	61·4	6*d.*	2·50	4·2	Rice	Ultramarine & Prussian blue.
G	14·5	—	—	—	Rice	None.
Wholesale Preparations.						
1	5·6	3*d.*	0·61	10·9	Wheat	?
2	11·8	3*d.*	0·80	6·7	Wheat	Ultramarine,
3	13·1	3*d.*	1·12	8·7	Rice	Ultramarine.
4	11·6	3*d.*	1·28	11·1	Rice	Ultramarine.
5	13·1	3*d.*	1·70	13·0	Rice	Ultramarine.
6	21·5	6*d.*	2·42	11·2	Wheat	Prussian blue.
7	49·2	3*d.*	2·85	5·8	Wheat	Soot.
8	30·5	3*d.*	3·45	11·3	Wheat	Prussian blue.
9	16·6	3*d.*	3·81	19·4	Rice	Carmine.
10	10·0	3*d.*	4·18	41·8	Rice	Ultramarine.

The wholesale preparations included the vermin killers of Barber, Battle, Butler, Clift, Craven, Floyd, Gibson, Hunter, Steiner and Thurston. The results show, somewhat contrary to my expectation, that ultramarine is the favourite colouring matter. It will be observed that sample G was wholly uncoloured, though on the wrapper it was duly announced that the contents were poisonous and contained strychnine. No. 1 was only very slightly tinted, being of a pale flesh tint, and No. 9 was only of a pale pink colour.

Sample F is of interest, as there is good reason to believe that it was the particular powder used by the murderer Horton, although no sale to him was recorded in the poison-book. The vendor of sample F stated that he had ceased to use ultramarine for some years, and that all the vermin-killer he had recently sold was coloured with prussian blue. On examination, the whole powder was found to be coloured uniformly with ultramarine, but it also contained particles of sensible size which I identified as prussian blue. Sample F is also remarkable for its great weight and for the large amount of strychnine contained in it.

E is interesting as an example of a preparation containing two kinds of starch and coloured with carmine.

Of the preparations containing strychnine quoted in wholesale price lists, Battle's vermin-killer is probably the best known and most extensively used. The colouring matter appears to have been uniformly prussian blue, but the following table shows that the composition ascribed to Battle's powder has varied in other respects at different periods:—

Authority.	A. S. Taylor.	A. J. Bernays.	T. Stevenson	A. H. Allen.	Tardieu.	Woodmann and Tidy.
Date	1862	1876	1882	1889	—	—
Price of packet	3*d.*	3*d.*	6*d.*	6*d.*	—	—
Weight of powder . . .	13 grs.	15 grs.	25 grs.	21·5 grs.	20 grs.	—
Colouring matter . . .	Prussn. blue	Prussn. blue	Prussn. blue	Prussn. blue	Prussn. blue	Prussn. blue
Starchy matter	Flour	Wheat flour	—	Wheat flour	Potato-starch	Flour
Strychnine; grains . . .	0·75	1·6	2·5	2·4	1·5	—
Strychnine; per cent. . .	5·8	10·7	10·0	11·2	7·7	23·0

Woodman and Tidy state that sugar is a constituent of Battle's vermin-killer. It is certainly not so at the present time. The proportion of strychnine (23 per cent.) given by Woodman and Tidy is largely in excess of that found by other chemists, and is probably incorrect.

No. 7 deserves notice as a preparation having a distinct individuality. The colouring matter is some kind of carbon, apparently soot, but the quantity used is only sufficient to make the powder grey. The preparation is apparently variable in composition, for in 1876 Dr. Bernays found one packet to consist of a mixture of flour, soot, and strychnine, whilst in another packet the strychnine was replaced by barium carbonate. At the present time, the powder contains both strychnine and barium carbonate, an analysis made in my laboratory showing:—

	Per cent.
Strychnine	5·8
Barium carbonate (native)	45·0
Flour and soot (by difference)	49·2
	100·0

The association of strychnine and barium carbonate in the same preparation is remarkable, and it would be of interest to learn the real or supposed advantage of the combination.

With regard to the identification of the colouring matters, ultramarine is readily recognized by the peculiar shade of blue it communicates to the powder, and which is wholly destroyed on agitating with dilute acid. If a little of the powder be placed on a silver coin and moistened with dilute acid, a brown stain will be produced on the coin by the sulphuretted hydrogen liberated from the ultramarine. Ultramarine retains its blue colour after ignition, whereas prussian blue leaves a brownish residue of oxide of iron, and indigo is more or less perfectly consumed, according to its purity. A distinct ferruginous ash is left by some specimens of indigo. Prussian blue and indigo are of course unaffected by treatment with dilute hydrochloric acid. If the washed residue left after heating the powder with dilute hydrochloric acid be treated with a caustic alkali, it will be unaffected if composed of indigo; but prussian blue will be turned brown and the filtered liquid will contain a ferrocyanide, and hence will yield a blue or green coloration or precipitate when it is acidulated with hydrochloric acid and ferric choride added.

The great variation in the amount and proportion of strychnine contained in the different preparations deserves attention. I have used two methods for the determination of strychnine. One has been to exhaust the dry powder with chloroform, then evaporate the solution to dryness and weigh the residue of strychnine. Benzene may be substituted for the chloroform. This process gives satisfactory results with free strychnine, but if the powder were to contain a salt of strychnine the extraction would be very incomplete. Error from such cause, however, may be readily avoided by testing the residual powder for strychnine by the taste and the oxidation-test. An alternative, and in many respects preferable, method is to treat the vermin-killer with water acidulated with acetic acid, until the residual powder has no bitter taste and gives no coloration by the oxidation-test. The solution is then treated with excess of ammonia and shaken with a mixture of chloroform and ether. The ether-chloroform layer is separated from the aqueous liquid, evaporated to dryness, and the residual strychnine weighed.

It does not seem to follow that the vermin-killer which contains the greatest weight or the largest proportion of strychnine is necessarily the best. Clearly, pure strychnine would be inefficient, and hence the object should be to compound a mixture which will have the most powerful poisonous effect compatible with its attractive and appetizing character. To effect this, the bitter taste of the strychnine should be masked as far as possible, and a suitable odorant should be added. This object seems to have been recognized in one instance, for the powder contained sugar and had a powerful smell of asafœtida and oil of anise. In most instances, the vermin-killers examined were odourless.

But besides rendering a vermin-killer attractive to the animals it is designed to kill, it is highly important that it should be so coloured as to preclude the chance of its being taken accidentally by a human being, and so as to facilitate its detection in cases where it has been used for the purpose of suicide or murder. It is not too much to say that had the blue colouring matter been absent from the vermin-killer which Horton gave his child the murderer would have escaped conviction, from the impossibility of connecting him with the administration of the poison.

From an inspection of the samples of vermin-killer of which I have given the analyses, it will be seen that many of them do not satisfy the condition which I maintain is necessary, namely, a colour sufficiently strong and characteristic to attract the attention of the taker. As already stated, sample G is purely white, and the flesh tint of No. 6 and pale pink of No. 10 afford no sufficient protection against accident or malpractice. The soot contained in No. 3 is not present in a sufficient proportion to serve its intended purpose, and the identification of minute particles of carbon would be difficult or impossible if in admixture with food. Teething powders are so generally coloured pink that they are not unfrequently asked for as "pink powders," and grey powders are equally common. The blue colouring matters present considerable advantages over such pigments as carbon and carmine. There is no food, drink, or medicine which has naturally a blue colour, and hence the tint at once attracts attention. Of the blue colours practically available each has its advantages and countervailing objections. Ultramarine is too readily destroyed by dilute acids, and by the gastric juice, to be quite suitable, though it has the advantage of being readily detected and of being undestroyed by ignition. Prussian blue is unaffected by acids, and is not very readily affected by dilute alkaline liquids. Indigo resists alkalies still better, and is not affected by acids, except nitric acid, though it is at once bleached by oxidizing agents, and is also decolorized by alkaline reducing agents. In minute quantity it is less easily recognized than prussian blue. A mixture of the three pigments would undoubtedly be preferable to any one or two of them.

On the whole, perhaps the most suitable pigment for colouring vermin-killers would be chrome-green (oxide of chromium). In it we have a bright green pigment of high colouring power, quite insoluble in water and in dilute acid and alkaline liquids. It is wholly permanent under all imaginable conditions, and is not affected by ignition. Chromium is not a natural constituent of the body, is not used internally as a medicine, and is not liable to be present accidentally, even in traces, in any beverage or article of food. It can be detected and determined with ease and certainty even when present in very minute quantity. Owing to its insolubility, oxide of chromium would remain wholly unabsorbed if taken internally. Hence if it were added to preparations of strychnine, etc., in a definite and invariable proportion, an estimate of the minimum amount of the poison taken by a deceased person could be arrived at by determining the quantity of chromium contained in the alimentary canal, even though the poison itself had been wholly absorbed or decomposed; and this could be effected with equal ease and certainty after prolonged inhumation, or even after cremation of the body.

The discussion of the best pigment for colouring vermin-killers has not merely an academic interest, for the present facilities of obtaining and misusing poisons have recently attracted much attention, and it is not improbable that next session further legislation may be attempted with reference to the sale of poisons. Every pharmacist is aware that special restrictions exist with regard to arsenic, which cannot legally be sold in quantities of less than 10 lbs. unless coloured with soot or indigo. This provision is good in theory, but badly devised. It prevents the sale of an ounce of unmixed white arsenic to a professional chemist like myself, for strictly proper purposes, but it does not prevent a would-be murderer from obtaining a large quantity of the poison, provided he can give some plausible excuse for requiring it. It is interesting to note that all the solid arsenic found in the house of the late Mr. Maybrick was mixed with charcoal (not with soot or indigo), while two bottles were also found containing some of the coloured arsenic mixed with water. The discovery of a stained handkerchief in association with this coloured arsenic suggests that an attempt was made to filter the solution from the charcoal, which proving unsuccessful, the experimenter had recourse to an infusion of arsenical fly-papers. As already pointed out, charcoal and soot are by no means suitable pigments for colouring poison, and indigo is not the best for the purpose. Pharmacists can do much to prevent accidental and intentional misuse of vermin-killers and such preparations if they will habitually add sufficient of a mineral pigment to colour the powder a decided blue or green, and will take more care to record sales of vermin-killer in the poison-book than is at present the practice in some districts. But it would be useless to enact that all preparations of arsenic, strychnine, and other deadly poisons sold as vermin-killers should be coloured with a certain proportion of mineral pigment if the sale of fly-papers containing a dangerous or fatal dose of arsenic or other poison is to be permitted with impunity. Clearly all such fly-papers should be impregnated with some soluble colouring matter which would colour the water in which they were soaked. Sulphonated indigo ("indigo-carmine") would be a suitable colouring matter for the purpose, though the coal-tar dye known as safranine would present some advantages.

But organic colouring matters can be removed from solution by simply immersing silk, wool, or mordanted cotton in the liquid, and hence are less suitable for the purpose in question than certain inorganic colouring matters. Of these the soluble salts of chromium present several advantages. Thus, if in the form of the double tartrate of chromium and potassium (or a mixture of chrome-alum and Rochelle salts) the chromium is not precipitable from its solution by alkalies, acids, sulphuretted hydrogen, sulphide of ammonium, or phosphates or carbonates of the alkali-metals, and cannot be withdrawn from solution by either animal or vegetable fibres. On the other hand, the chromium will not interfere with the detection and determination of arsenic, strychnine, and other poisons, and can be itself determined with ease and accuracy after evaporating the liquid to dryness and igniting the residue.

I have to acknowledge the assistance I have received from Mr. Chas. Harrison, Mr. Wm. Chattaway and Mr. T. H. Pearmain in making the analyses already referred to.

The PRESIDENT desired to thank Mr. Allen for his practical and very far seeing paper, in which he actually went so far as to foresee what might come of cremation. He was sure gentlemen would think it over when they got home, and would act upon it, for the suggestions made seemed most valuable, not only to pharmacists, but to the public, the medical practitioner, the toxicologist, and all concerned either with medicine or the health of the public.

Mr. NICOLL asked if the mineral coloring matters suggested were not used in the manufacture of confectionery?

The PRESIDENT said he thought these colours were now quite discarded and replaced by vegetable colouring matters.

Mr. FOGGAN said he was about to put a similar question, for a few days before he had seen a blancmange coloured and ornamented with a beautiful green. He thought if Mr. Allen's suggestion were adopted they might be laying a trap for themselves, and find strychnine mixed with their blanc-mange.

Mr. DAVID MACLAREN (Edinburgh) asked if confections were not coloured with that particular shade of colour which Mr. Allen suggested. If so, his theory that no article of food at present in existence bore that colour was not correct.

Mr. WARD (Leeds) thought some of the suggestions in this paper were well worthy of consideration. In listening to the paper it occurred to him that the colour of the vermin powder was not so important a matter as the percentage of strychnine it contained; but as Mr. Allen continued he saw that there was a very valuable suggestion in the idea of colouring with chromium compound. At the same time he did not see that any good would come of that unless it were enacted by Parliament that all vermin powders should have a definite composition, and that the percentage of chromium oxide, as well as the percentage of strychnine, should be specified. If that could be done then he could understand that the addition of a substance like oxide of chromium, which was difficult of solution and not assimilable, would be a matter of very great moment. He did not know whether the Conference had the means of representing the matter to any Parliamentary committee, but the Pharmaceutical Society might take up the question, and see if anything could be done. It would very greatly strengthen the hands of the analyst if he had this coincidence of the presence of chromium to assist him in detecting very small traces of strychnine. Mr. Allen had said that he did not know why carbonate of barium should be used, and he did not either, unless it was that it was often used as a poison for rats, and perhaps some people who were making these vermin-killers had an idea that it would answer as a poison for beetles also.

Mr. PROCTOR said there was always a negative side as well as a positive to a matter of this kind. One of the great advantages which Mr. Allen had pointed out as attending the use of oxide of chromium was that it was very difficult of solution; but on the other hand that might be a disadvantage, because a person who got a vermin killer might dissolve out all the poison and leave the chromium behind, and he would then have the poison free from all colouring matter, and therefore free from all evidence of its presence.

Mr. PLOWMAN said it struck him as most remarkable that any pharmacist should sell a vermin-killer containing 2½ grains of strychnine without the sale being registered; that was a most astonishing thing. He was interested in colouring matter contained in vermin-killers from a case he recently had to investigate of a suicide in South Lambeth, in which the residue left in the glass had been brought to him for analysis. The person who had taken the stuff was not actually dead and he found strychnine almost immediately. He then examined the blue colouring matter and found it mainly prussian blue, but there was some further blue colouring matter which he could not identify at the time, and he did not care to take it up again, but very possibly it was an admixture of ultramarine. He should like to ask Mr. Allen whether in examining these vermin-killers he ever found a sample consisting of arsenic. He was under the impression that some vermin-killers sold in old times used to consist of arsenic, but strychnine could be used now, and it was very cheap compared to what it used to be. He must take exception to one statement in the paper, if he understood Mr. Allen rightly, that the results of a poison depended on what was absorbed in the system, not what was found in the stomach, because there were many exceptions to that general statement.

Mr. **Schacht** remarked that one gentleman made the suggestion that it was possible in some future legislation on the subject of poisons that the Pharmaceutical Society, as representing pharmacists generally, might be able to assist. He should like to say, as almost the only member of the Council on that side of the table, that there was a generally understood impression in Governmental circles that though Pharmaceutical education might be relegated to the Pharmaceutical Society, all matters connected with poisons and the care of the public health should be absorbed by some Government department. He took this opportunity of saying that he hoped the publication of that day's proceedings might perchance serve in some measure to correct that impression, and convey even to the official mind the idea that possibly pharmacists knew something of that which concerned the public health.

Mr. **Branson** said the objection raised by Mr. Proctor could very well be met by the admixture both of a soluble salt of chromium and an insoluble salt.

Mr. **Allen**, in reply, said with regard to the question of the coloring of confectionery the oxide of chromium was simply an insoluble powder, and if introduced in any quantity into a jelly would very soon spoil its appearance. Such green colouring matters as were used in confectionery were usually derived from plants, chlorophyll, or something of that sort. If he found officially any chromium were employed for such a purpose he should think it his duty to report accordingly, but he was inclined to think that such practices were entirely obsolete. One gentleman had spoken of green blanc-mange; he did not know whether that gentleman was an Irishman, but it struck him as being rather an extraordinary expression, and perhaps it was a slip. What had been said about constant composition was distinctly foreshadowed in his paper, and he would say distinctly he thought they might hope for legislative action in the matter of poisons, so that it would not be possible to sell colorless vermin killers. It was monstrous that a fatal dose of colourless strychnine could be obtained for 3*d*. or even for 1*d*., and it was directly contrary to the principle of the Arsenic Act, which was that all poison when sold to the public ought to be coloured, and he hoped that would be extended to vermin killers containing strychnine or any other active poison. It was very possible that the Act would not necessarily specify the exact colouring matter to be used or the exact amount, although it ought to do so, otherwise they would be coloured by a small quantity of ultramarine or carmine, which was not sufficient. It was very desirable to choose a colouring matter which could not be readily removed, which no doubt was intended by the framer of the Act, who gave the choice of indigo or soot. But on the other hand he contended that the oxide of chromium was preferable to any other colouring matter; it was cheap, wholly insoluble, and could be detected with great facility; it was absolutely unacted on by any chemical reagent, except the most powerful oxidizing reagents like strong nitric acid, and even then only with great difficulty. Fresenius classed the oxide of chromium amongst the few substances insoluble in all acids, and which had to be fused with sodium carbonate and nitrate to bring them into solution. The facility with which it could be detected in small quantities placed it above all others for the purpose. He had concluded his paper by suggesting that perhaps sulphonated indigo, or indigo-carmine, as it was sometimes called, would be a suitable colouring matter for colouring fly papers. A soluble organic salt of chromium would be better even than the soluble indigo. Probably a mixture of one of these colouring matters and chrome green would be the best for solid vermin killers and would get over Mr. Proctor's difficulty. There would be a blue or green solution and a green residue, and the colour of the solution could not be destroyed by an acid or by an alkali, and the general run of poisoners would find a great difficulty in dealing with it. Of course the more intelligent class of murderers would not have occasion to use coloured vermin killers at all. He was aware that carbonate of barium was a very successful poison in some cases, for poisoning fowls amongst other animals, but it struck him as a curious combination to mix it with strychnine. It looked as if strychnine was not thought good enough by itself, and carbonate of barium not good enough, and therefore the two poisons were united in the same powder. Of course Mr. Plowman was quite right in saying that his statement that what poisoned a person was what passed into the system and not that which remained in the stomach was open to considerable limitation. He was thinking at the moment of strychnine especially. When they took white arsenic, which he hoped they would not, or gave white arsenic to a person, which he was sure they would not do, the white arsenic being in the solid state the coats of the stomach would necessarily be seriously irritated by contact with the poison; again, strong mineral acids would act in the same manner. In other words he intended to limit his remarks to strychnine, which might be absorbed, and pass out of the system, but the chromium green would remain.

(*To be continued.*)

Review.

Proceedings of the Chemists' Assistants' Association. No. V. 1889.

The appearance of this new volume, containing a report of the papers read and the discussions at the meetings of the Chemists' Assistants' Association during the session 1888–89, occurs most opportunely just as the work of another session is commencing. With one or two exceptions the papers and discussions are printed as they appeared in this Journal, so that our readers will already have had an opportunity of making themselves acquainted with the good work being done by this vigorous Association. It will, however, be admitted that the quality of the papers, as a rule, justifies their reproduction, whilst the convenience of having them gathered into a compact volume for the special benefit of the members must be evident. In respect of the printing and general appearance the present volume is perhaps hardly up to the standard of its predecessors. But this probably is due to financial considerations, and the wonder is that the members can, in return for so small an annual subscription, be supplied with so creditable a volume of "Proceedings," in addition to the other advantages accruing from connection with the Association.

ANSWERS TO CORRESPONDENTS.

L. Thomas.—Information respecting the curing of vanilla will be found in the *Pharmaceutical Journal* for April 20, p. 845, and August 31, p. 170.

Assistants for India.—A correspondent who has noticed the appearance of advertisements offering engagements in India at a salary of one hundred rupees a month, with board and lodging, expresses strongly the opinion that at the present value of the rupee such a sum is totally inadequate to meet the contingencies of the climate, as in order to make life tolerable in India expenses have to be incurred that would not be dreamt of at home.

Communications, Letters, etc., have been received from Messrs. Proctor, Macartney, Wright, Ellwood, Ferrall.

THE PARIS UNIVERSAL EXHIBITION.

(*Continued from page* 142.)

Argentine Republic.—The exhibit in this Court is large and well displayed. In the Agricultural Department there is a fine show of La Plata linseed, anise, cummin and several other crude products known in pharmacy. The collection of native remedies forms, however, a special collection, and comprises several hundred specimens representing the different provinces of Les Missiones, Tucuman, Yuging, Cordoba, Catamarca, San Luis and Pampas Central. No printed catalogue of these products was procurable in August, but an excellent manuscript list was placed at the disposal of the reporter by the officer in charge of the exhibit. This list is, however, so extensive, and so little has ever been published concerning the medicinal products of this country, that it will be given subsequently *in extenso* in the form of an appendix to the present brief notes.

Bolivia.—In this Court there are several objects of interest, but the information obtainable is very meagre. The cinchona barks exhibited by Messrs. J. and G. Ugarte and M. Leon Velasco form a fine show, especially the calisaya bark, the tree being now cultivated to an enormous extent (*Pharm. Journ.*, [3], xv., p. 383, xviii., p. 360). Iodine, dark-coloured balsam of copaiba, oil of maize varying in colour from a pale straw tint to brown, and linseed oil of a pale colour, matico leaves, mate, quillaia bark, hard dry balsam of tolu, guarana and coto bark, cassia fistula pods and china root are amongst the drugs familiar to Europeans exhibited in this Court. A crystalline substance obtained from boldo leaves, probably boldoglucine, is also exhibited, and two species of fine large coca leaves. Besides these a small number of native remedies are noticeable, but at the time of the reporter's visit the catalogue was not yet printed, and information concerning their botanical source was not obtainable. Some broad short pods of vanilla, having a peculiar odour, appear to be fit only for perfumery, not for confectionery. The specimen of coca labelled "Coca de Ootacoyes," differs somewhat from ordinary coca in the more markedly triangular or cuneate base of the leaf. Some candles of myrica wax are shown by M. Leon Velasco. These in burning are said to give off a fragrant odour. One very curious product in this Court consists of a potato, said to be not fit to eat until it has been frozen. It presents a dry, white and mealy appearance, and is about the size of a small kidney potato, and is quite hard. Before use these potatoes are soaked for twelve hours in water, and then washed to remove the poisonous principle. In the hard state they keep a long time.

One of the most important products of this country is the mate, or Paraguay tea, that grown in Missiones having the reputation of being the best that exists. It is recommended as having the advantage over tea of not producing sleeplessness, and of preventing constipation. The consumption of mate in the Argentine Republic alone is estimated at sixteen millions of kilos annually, whilst that of coffee does not exceed two and a half millions. The beverage is recommended to be made by putting a teaspoonful of powdered mate into a third of a litre of cold water, and boiling it for two or three minutes. Sugar and milk are then added, or rum. The mate, with half the quantity of fresh mate, is used a second time. If preferred, it can be flavoured by the addition of cinnamon, orange, or lemon peel.

Brazil. — The Brazilian exhibits are rather crowded in the building devoted to them, and the pharmaceutical products are scattered amongst other objects from the different provinces, so that many of them are easily overlooked. Catalogues of the products of Minas Geraes and Pernambuco were procurable, but the botanical names are so carelessly given and the typography is so bad, that it is impossible to identify many of the products.

From the province of Ceara a good collection of drugs is shown by Messrs. Boris frères. Through the kindness of Mr. F. Mason, of Paris, we have been able to obtain from this firm an account of the principal articles in this collection and their medicinal uses, Messrs. Boris having indeed taken the trouble to have a transcript in French made of the Portuguese catalogue. Some of these drugs are already well known in this country, as, for instance, the following:—

Jequirity seed, *Abrus precatorius*. Used for inflammation of the eyes.

Carnauba root, *Corypha cerifera*. Used in syphilis, diseases of the skin, and in fevers.

Jatropha Curcas, or pinhao, the milk of which is considered to be the best of vulneraries. The seed is emetic; it is given in diseases of the eye, apoplexy, and intermittent fevers. The dose of the oil is 36 to 70 drops.

Mulungu bark, *Erythrina Corallodendron*. Used as a nervous sedative, and in obstruction of the liver, and in baths as an emollient.

Pereiro bark, *Geissospermum læve* ? Used as an emetic and tonic in acute and chronic rheumatism.

Mangerioba, *Cassia occidentalis*, the seeds of which, used as coffee, are said to cure flatulence.

Others that appear to be generally used in Brazil, but are not as yet used in this country include—

Capeba, *Piper macrophyllum*. The root is considered useful in obstruction of the liver.

Mucambe, *Cleome heptophylla* (Capparidaceæ). A bath made from the leaves is employed for hæmorrhoids, and a decoction of the root sweetened is given internally in cases of gonorrhœa and leucorrhœa.

Gito, *Guarea purgans*. The root and bark are drastic purgatives; they are also employed in the form of a bath for swollen joints, and the decoction injected in small quantities is used to cure ascarides. It is also employed to procure abortion and in syphilis.

Andiroba, *Carapa guianensis* (Meliaceæ). The decoction of the root and bark is employed in intermittent fever as a vermifuge, and the oil of the seed externally for swellings and erysipelas.

Angico, *Acacia Angico*. The bark is used for leucorrhœa, inflammation and ulcers of the leg, and the "resin" or gum for phthisis.

Milhomens, *Aristolochia Milhomens*. The root is considered an excellent stimulant carminative in colic, and like jarinha (*Aristolochia cymbifera*) is used as an emmenagogue. A decoction of the leaves made with barley is used in erysipelas and colic.

Juca, *Lucuma gigantea* (Sapotaceæ). The root of the tree is purgative and is employed in dropsy, phthisis and asthma. The bark is used in the form of tincture for bruises, and is considered superior to arnica

Alcemega, *Hedwigea balsamifera* (Amyridaceæ). The resin is used externally to heal wounds, and internally, in the form of pills, as a diuretic.

Goiabeira, *Psidium pomiferum* (Myrtaceæ). The astringent bark of this tree is considered, when used in the form of decoction, to be the best remedy for gonorrhœa and leucorrhœa.

Beaume, *Myrospermum peruiferum*. The decoction of the bark is used for coughs, and the aromatic oil obtained from it, in various pharmaceutical preparations.

Jarinha or Onca, *Aristolochia cymbifera*. The root and leaves are employed as an infallible emmenagogue.

Velame, *Croton campestris* (Euphorbiaceæ). Considered to possess remarkable healing properties for the most troublesome wounds and syphilitic sores. Employed as an antiseptic in malignant fevers, and the powdered root is said to be good for gangrene.

Jurubeba, *Solanum paniculatum*. The decoction of the root is used in gonorrhœa and syphilis, and the fruit in abscesses and in obstruction of the liver.

Cabeça de negro. Bitter fecula, obtained from the root, which is used in doses of a teaspoonful eaten in the morning as a drastic purgative; yet it is used in diarrhœa, and it is stated that during an epidemic of cholera in Ceara none of those who took it died.

The medicinal uses of some of the drugs are curiously different from those of European countries. Thus *Pareira brava* is given as a stomachic in dropsy, and the juice of the leaves is employed as an antidote to the bite of serpents, a tea of the root being taken at the same time. The leaves of *Solanum nigrum* are applied as a poultice over the bladder to cause diuresis, and the seeds are given as a vermifuge. *Simaruba* is used for dysentery in Minas Geraës.

Pernambuco also exhibits an interesting collection of drugs, amongst which may be noticed the true jaborandi, jequirity, stigmata maidis, chrysarobin and white ipecacuanha, the majority of the specimens consisting of native remedies, some of which have been mentioned already. The best collections are those of J. Braza de C. Silva, of Pernambuco, and A. M. Veras. A special catalogue of Pernambuco exhibits is obtainable, but contains no information except the botanical names in some cases, and in a few instances the medicinal properties are briefly mentioned. It is curious to note that the plant which in this province bears the name of ipecacuanha is *Viola* (*Solea*) *campestris*, and that angico is referred not to *Acacia Angico*, but to *Pithecolobium gummiferum*, while Martius gives it as *P. Avaremotemo*. Also sicupira is referred to *Robinia coccinea*, and not to *Bowdichia major*. Messrs. Rouquayrol Frères, as well as A. M. Veras and Bartholomew and Co., are said to have sent descriptive catalogues of the drugs and pharmaceutical preparations, to be included in the general catalogue, but they do not seem to have been utilized in that manner.

Chili.—In this collection are shown bitter almonds in shell, walnuts, hempseed, linseed, colza, capsicum, and an abundance of haricots and vermicelli. There is no special collection illustrating pharmaceutical products.

Cochin China.—The products exhibited in this Court included star-anise (*Illicium verum*), citronelle, verbena and cassia oils, the thick bark of the cassia tree, so much prized by the Chinese, crude camphor, Ngai or Blumea camphor in the crude state and of a greenish tint, and several fixed oils, such as those of arachis and sesamum. Almost hidden away in one corner of the Court is a collection of small bottles containing the materia medica of the country. In this collection may be noticed nux vomica seeds, which form a regular article of export, coriander and castor oil seeds, both of small size, the former quite different from the large oval fruits grown in the Dutch East Indies, dill seed, brown mustard (*Brassica juncea*), papaw seed, and the seeds of *Jatropha Curcas*. A list of the less important drugs is published, but in many cases the native name only is given, the article not having been identified. It may, however, prove interesting to some of our readers if a few notes from this catalogue are quoted here, leaving the remainder to be dealt with in the form of a subsequent appendix. Logwood is employed as a vulnerary; benzoin for flatulence; mustard seed (*Brassica sinensis*), as a laxative; *Aconitum sinense* for hæmorrhage; *Verbena officinalis* in rheumatism, and turmeric to render the blood more fluid. Jujube fruits are given in asthma; *Lilium candidum* (the common white lily of English gardens) is given for cough; dill as a vermifuge and for colic and pain in the kidneys, and *Gentiana cruciata* is employed as an anthelmintic. For paralysis nux vomica is administered and also an oil obtained from nutmeg and mace; sandal wood is given for colic; the root of *Chelidonium majus* for diarrhœa, and the herb of *Teucrium Scordium* as an emmenagogue; myrrh and camphor are applied to cure itch, and oil of peppermint is used for the relief of headache, cough and asthma, and is considered to be an excellent emmenagogue. Acorus rhizome (*A. gramineus* probably) is put to a singular use, being suspended over the door of the house on the fifth day of the fifth month to keep off evil spirits! Conium root and that of *Angelica sylvestris* are employed for neuralgia. The quince is given in nervous and rachitic diseases; the common adder's tongue (*Ophioglossum vulgatum*) is given in angina and paralysis, and is also used as a vulnerary; dandelion root is applied in the form of a plaster to abscesses to cause them to burst; *Galium Aparine* is considered to be of value in diseases of the lymphatic system, and *Datura Stramonium* is said to be given as a vermifuge. It must not be inferred, however, that the natives use all their remedies in a manner different from other nations. A large number, such as valerian, umbelliferous fruits, croton oil, nux vomica, etc., are employed in a thoroughly orthodox manner. To the above may be added two or three other instances of the mixture of shrewdness and superstition indicated in the uses of drugs in Cochin China. It is believed that if a pregnant woman eats *Iris fœtidissima* she will bear a boy, and the Annamite mothers rub their infants with powdered saffron to strengthen the skin, whilst the corm is given for hæmorrhage, itch and diseases of the eye. Another exhibit in this Court consists of a series of specimens illustrating the lacquer manufacture, and amongst the articles used are gardenia fruits, yielding a yellow dye, seeds of sapindus, and those of *Aleurites cordata*, yielding the wood oil or tung oil described in a previous volume of this Journal ([3], xv., p. 636).

(*To be continued.*)

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE SALE OF POISON BY UNQUALIFIED PERSONS.

THE number of addresses delivered within the last two weeks, at various places throughout the country, and the large audiences to which they were addressed, appear to show that there is in the provinces a growing feeling of the importance of association among pharmacists, not only for the purpose of promoting the education of apprentices, but also for protecting the interests of those engaged in business as principals. At Dundee, Sheffield, Birmingham, Glasgow and Leicester, the annual meetings of the local associations have furnished opportunities for admonishing pharmaceutical students of their educational needs, and of offering a general review of pharmaceutical affairs. In most instances, we have been enabled to publish these addresses *in extenso*, and it will not therefore be necessary to do more than refer our readers to them as containing matter that is well worth their consideration. In some instances the annual gatherings of pharmacists have been taken advantage of for the purpose of discussing political matters of special interest. This was notably the case at Sheffield, where at the dinner which took place after the meeting, Mr. PRESTON, in proposing the toast of the Pharmaceutical Society, spoke of the recent case of poisoning by vermin killers and of the probability that the action of the coroner who conducted the inquiry into the circumstances would lead to prosecution of the actual seller of the poison, on the ground that he was unqualified in accordance with the requirements of the Pharmacy Act, 1868. Mr. PRESTON regarded this as a matter of serious importance to the pharmaceutical body, and one that should be very carefully considered in all its bearings. If it be, as the coroner considers, an offence against the law for an unqualified assistant to sell poisons, it cannot be doubted that in many instances chemists will require to adopt greater precautions in the sale of poisons than has always been the case hitherto. It has been considered that the qualification of the proprietor of a chemist's establishment sufficed to legalize the sale of poison by any person in his employment, subject to the observance of certain regulations as to the labelling of such articles, and in particular cases the registration of the sale. This, however, is not the view of the law taken by Mr. BRAXTON HICKS. He holds that it is not only necessary for every person who keeps an open shop for retailing, dispensing, or compounding poisons, to be registered as qualified, but also that any person who actually sells a poison shall be so qualified. This view as to the liability under the Pharmacy Act of the actual seller of poison is not by any means new. It has been frequently expressed by the judges before whom cases of prosecution have been heard, and also in the discussion that took place in the House of Lords in reference to the Pharmacy Act Amendment Bill. Indeed the qualification of the actual seller of poison has been in some instances regarded as the particular safeguard which is necessary in the interest of the public.

But if that view of the provisions of the Pharmacy Act in regard to the sale of poison be upheld, the immediate result will be that many chemists in the country will be placed in some difficulty. Some of them do not employ qualified assistants, and in such cases sales of poisons would have to be conducted by the principals, or in the event of their absence from business, they would have to be declined. This would no doubt entail much inconvenience, as Mr. PRESTON pointed out, especially in country places, where a small business did not allow of a qualified assistant being kept. However, if the view we have referred to be the correct interpretation of the Pharmacy Act, it will be incumbent upon chemists to adapt themselves to this state of things and to regulate the conduct of their business in accordance with these requirements. It might even be a matter of trade interest for a chemist to establish the rule that no poison should be sold in his shop except by a duly qualified person, and on that basis to commend his establishment to the public as one where the greatest precaution against accident could be relied upon. There is also another view of the matter, to which Mr. PRESTON referred as being one offering a prospect of benefit to chemists. It is not unfrequent to hear young men complain that there is not sufficient inducement to qualify themselves for registration, because the prospects of business are so poor, and the demand for qualified assistants is not great. But if the sale and dispensing of poisons can only be carried out by qualified persons, a general recognition of this necessity would increase the demand for qualified assistants, and many who now are content to remain unqualified would be induced to pass the requisite examination. The opening for assistants would be improved and the over competition that now prevails might be reduced. This expression of opinion created considerable interest, but as the occasion was not one favourable to discussion it was thought desirable that a special meeting should be held in Sheffield for that purpose.

So far we have dealt with this question entirely from the point of view in which chemists would be directly affected, but it so happened that the subject was afterwards spoken of by one of the outside public, and in a manner so especially worthy of attention, that we think it desirable to reproduce the speaker's remarks in full. In returning thanks for the toast of the visitors, Mr. ROBERTSHAW, the Chairman of the Sheffield Board of Guardians, said:

"I have been much edified and instructed by the very eloquent speeches which have been delivered, and one subject has been introduced about which I should like to offer a few brief remarks; I mean the sale of poisons by other than duly qualified persons, and the duty of the Pharmaceutical Society in regard to prosecuting in a case referred to. You have had granted by the legislature, through Her Majesty's Privy Council, a certain Charter. In making application for that Charter, doubtless one of the strongest points urged would be the protection, safety, and welfare of the people, by allowing none but those having the requisite specific knowledge to carry out your particular profession. Having by your Charter gained especial privileges, they bring with them specific responsibilities and duties, which I conceive you should carry out in all good faith, even though it may somewhat add to the necessary expenditure of your individual establishments. Many here tonight are not only visitors at your festive board, but we, as well as the various members of our families, are often visitors at your shops. In your hands our healths—nay, at times our very lives—are placed, and therefore it is of the utmost importance to us that you should fairly carry out the responsibilities which are incumbent upon you, and, if asked, aid the authorities in securing the conviction of those who disregard and infringe the law."

These remarks, offered on the spur of the moment, call for no comment; but we may ask our readers to consider what would be the estimate formed by Mr. ROBERTSHAW or other members of the outside public holding similar views as to the confidence to be placed in any chemist who held a contrary opinion? In this connection alone it seems to have been a wise provision for ensuring free discussion that the important question now at issue was not dealt with in open council.

Our American contemporary, the *National Druggist*, in reproducing certain laudatory statements in reference to a new chemical product recommended for use in medicine, remarks that if those statements may be credited the article in question is destined at once to take a front rank among medicinal agents. In explanation of this qualified prediction it is added that there is good reason for believing that the German scientific press has within the past two years shown itself to be quite as ready as that of England or America to lend itself to the seductions of the manufacturing chemist. It is certainly too much the practice in such cases to seek from editors of journals recommendatory notices and comments which would at best find a more appropriate place in ordinary advertisements, and it cannot be denied that the appearance of such notices in influential journals affords room for regret, if not for suspicion, such as that suggested by our American contemporary.

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A meeting of the Chemists' Assistants' Association will be held on Thursday, October 24th, when a paper will be read on "Bacteria," by Mr. F. Davis, B.Sc.

Pharmaceutical Society of Ireland.

ANNUAL MEETING.

The annual meeting of the members of the Pharmaceutical Society of Ireland was held on Monday evening, the 7th inst., in the rooms of the Society, 11, Harcourt Street, Dublin, at half-past seven o'clock.

The following members of the Council were present:—The President, Mr. Hogdson (Treasurer), Wells, McCormack, Professor Tichborne, Beggs, D'Arcy and Simpson. The members of the Society who attended were Messrs. J. T. Holmes, James N. Hardy, Michael F. O'Donnell, Albert Bell, P. J. Lyons, J. McCreery Hill, R. J. Downes, B. J. Costello, R. Duggan and A. Raynor.

The chair was taken by the President of the Society, Mr. Charles Evans.

The Registrar, Mr. Ferrall, read the minutes of the last annual meeting, which were signed.

The President said the first business was the appointment of scrutineers of a ballot for the election of members of the Council to fill the vacancies caused by outgoing members, who were the following: Messrs. William Hayes, William Nassau Allen, Charles R. C. Tichborne, LL.D., Alexander Elliott Doran, John Chilcott C. Payne, George Howell Grindley, and Charles Evans.

On the motion of Mr. Wells, seconded by Mr. Downes, Messrs. McCormack, Hardy and Hill were appointed scrutineers, and inspected the ballot papers. Their report having been made, the President announced that the following gentlemen had been elected: Dr. Tichborne, 60 votes; Mr. Charles Evans, 59; Mr. Grindley, 58; Mr. Doran, 55; Mr. Andrew McNaught, 53; Mr. Johnston Montgomery, 53; and Mr. William Hayes, 34.

The President then said: Gentlemen, allow me to make a few brief observations on the condition of the Society during the past year. We may congratulate ourselves on having made some progress in some respects. You all know the difficulties through which the Society passed during the last year, especially in connection with the failure to arrive at a unanimous conclusion respecting the Bill which was to be laid before Parliament. We must all regret the withdrawal of so many members from the Society, for no matter how we may have differed in judgment from those gentlemen, they worked zealously and well for what they considered to be the good of the Society. As to the examinations, the results have been very similar to those of the previous year. At the Preliminary there were 56 candidates, being one less than in the preceding year, and of these 34 were successful. For the license there were 38 candidates, being a decrease of 4 from from the previous year; and 21 of these passed. But you must remember that latterly the Society has been accepting the Preliminary examinations of several other licensing bodies, and therefore the number of candidates appearing at our own Preliminary examination in no way represents the number that we hope may come in for the license later on. With respect to the Law Committee, I can assure you that it has not been idle. It is the wish of everybody connected with the Society to put a stop to illegal compounding, and the Council is determined to do so. The most satisfactory intelligence that I have to give you is as to the increase of members. There are 123 members now as against 81 at the last annual meeting, showing an increase of 43; and indeed one might say 45, for two more have been nominated who will be elected as a matter of course. I would urge upon all licentiates that it is their duty to become members of the Society, so that it may be supported and supplied with the sinews of war for whatever it undertakes. I need not touch on the financial affairs of the Society, as I will now call on our Treasurer, Mr. Hodgson, to submit his annual statement to you.

Mr. Hodgson: Gentlemen, I have once again to lay before you a financial statement. It has been my duty to do so for a good many years past, and I am sorry to say that I have never had to report so small a balance in hand as on the present occasion. The figures that your worthy President has given you do not exactly correspond with mine, because mine simply represent the money that has been received, while his include those persons who have entered the Society, but in respect of whom no money has yet passed. In this year 22 gentlemen paid the licence fees, which produced an income of £115 10*s.* In 1888 the number who paid the licence fee was 28, producing an income of £147. This year we had 46 Preliminary examinations, producing £96 12*s.*, as against 53 last year, producing £111 16*s.* It was remarked to me just now that the re-examinations would pull up that deficiency; but I do not find that that has been the case. In 1888 we had 8 re-examinations for the licence, producing £12 12*s.*, whereas this year we had only 3. In 1888 we had 3 Preliminary re examinations producing £1 11*s.* 6*d.* This year we had 6 Preliminary re-examinations; but adding them together, the total of Preliminary and re-examinations for this year was 52 as against 56 in 1888. I find that the entire income derived from fees for the professional branch of our business, including £9 9*s.* paid for three licentiate apothecaries registered as pharmaceutical chemists, was £229 19*s.* this year, whereas in 1888 we had fees to the amount of £273 10*s.* 6*d.* In subscribers, however, we have had a substantial increase. Last year we had 60 subscribers, producing £63 to the funds of the Society; this year we have had 90, producing £94 10*s.* Adding £7 9*s.* dividends received, £4 8*s.* from the sale of Calendars, and £123 10*s.* 11*d.*, the balance with which you commenced the year, your total income for the year amounted to £463 3*s.* 7*d.* That has been applied as follows:—First in the payment of fees to your Examiners, £87. We returned a fee of 5 guineas; the salary paid to Mr. Ferrall was £52; for the reporting of our meetings £14 14*s.* was paid; and we had to make two payments of £20 each for the *Pharmaceutical Journal.* The rent of course is a standing item—£50 a year. Then we come to law costs. Messrs. Casey and Clays' bill for the Ballybay prosecutions amounted £60 4*s.* 5*d.* Travelling expenses of the President, Mr. Allen, and the Registrar, and some other outlay, made a total of £65 10*s.* 8*d.* for those prosecutions. Then Messrs. Clay and Close's bill of costs in connection with the promotion of the Parliamentary Bill—a separate item—came to £73 10*s.* Adding £13 13*s.* for travelling expenses and another item for sundry small expenses, the total of law costs in connection with the Parliamentary Bill came to £88 12*s.* 4*d.* An item of £4 5*s.* for printing that must come into the costs of that Bill, but which appears in a different part of the account, raises the amount to £92 17*s.*

Professor Tichborne: Does that include the last payment of ten guineas?

Mr. Hodgson; No, that is not in this year's statement. The entire year's expenses for the Bill amount to what I have stated. There is an item of £13 18*s.* 4*d.* paid for printing and stationery to Messrs. Gunn and Cameron. The Registrar's account for sundries, including postage, expended by him and checked by me, amounts to £25 4*s.* A variety of odds and ends, including fire insurance, chemicals from the Apothecaries' Hall for the examiners, bottles and specimens, etc., raise the account for "sundries" to £35 9*s.* 9*d.* The final result is a balance of £10 0*s.* 2*d.* to come into next year's account, my account, which shows that balance, being in agreement with your bank book. You have in stock a sum of £248 3*s.* 1*d.*, and adding the balance of £10 0*s.* 2*d.* there was to your credit on the 1st of October a sum of £258 3*s.* 3*d.* You will therefore perceive that you are running your finances exceedingly close. At the establishment of the Society it was laid down by our then President, Sir Dominic Corrigan—and Professor Tichborne will bear me out in this—that if we are to be a prosecuting body it must be at the expense of those who are to be benefited by the prosecutions. The Society must undertake them and bear the odium of them; but you have no funds out of which you can pay for those prosecutions. It it all very well for gentlemen to say that they will subscribe a certain sum which they are sure will cover the amount. But suppose it does not? The expenses of your Ballybay prosecutions ran up to between £50 and £60. It has always been the policy of the Society to put down illegality, and no one has a more keen desire to do so than I have. But law is a very expensive luxury; and you have no funds to pay law expenses. It has been the policy of the Society hitherto that when parties give us information of a case of illegality, we insist, before taking active steps in the matter, on having from them a letter of guarantee that the Society would be put to no pecuniary expense in the prosecution. When we obtained that we took all the steps necessary to put a stop to the illegality and accepted all the odium of it. The parties who were proceeded against did not know who had put the machinery in motion; but we insisted on the guarantee. The Society is at the present moment out of debt; but it has very little to work on, and it would be a very unfortunate thing if you should have to sell out any stock for the purpose of meeting current expenses. I have often said that your residence here should be only temporary, and that it should be your ambition to increase your funds in order to be able to get premises of your own. But if you indulge in law it will necessitate the selling out of stock and remove to a distant period the chance of your getting out of these premises. I beg to hand in my account, which I believe to be perfectly correct.

Professor Tichborne moved that the Treasurer's accounts be accepted and adopted. He perfectly appreciated Mr. Hodgson's anxiety, but took a more hopeful view of the prospects of the Society than he did. The fact that they had nearly doubled the number of their members—the increase being from 63 to 123—was most encouraging. It of course meant that the Society and its Council had the confidence of the licentiates. And this great increase in the number of members had only taken place within the last two or three months, so that the financial statement for the past twelve months, although perfectly correct, did not exactly represent the financial condition of the Society. Again there had been an extraordinary expenditure during the last year. A tremendous sum had been spent in law expenses in connection with the unfortunate Bill. The Ballybay outlay he did not call unfortunate, for reasons which he would give presently. He thought they might almost congratulate themselves on having a balance, however small. For his part he had not expected that there would be any balance, and had feared that they would be obliged to sell out stock in order to wipe out those extraordinary expenses. They had not, however, had to do so. As to the Ballybay expenditure the case was an exceptional one. It was undertaken to assert a perfectly legitimate function of the Society, namely, the putting an end to illegal compounding, and there was not the slightest doubt that if they had failed in it they might just put up their shutters at once, metaphorically speaking, for then any man who carried on illegal compounding would have been able to snap his fingers at them. Therefore, even though that prosecution should have cost double what it did they would have had to go on with it. But they had succeeded, and had taught the local magistrates a lesson. They had taught them a part of their business which they did not know, and they had established a precedent for them which they would have to follow in future. Therefore, that money was well expended. He quite agreed with Mr. Hodgson, however, that the expenses of these prosecutions should be guaranteed. They had not heretofore got the money, and it would be most injudicious to expend the little money they had. So far as he could see, however, what might be called the legitimate working expenses of the year had been only £130 or £140. The increase in the number of their licentiates would give them a larger area to work on in order to obtain increased membership of the Society. Therefore on the whole he thought the Society was in a wholesome condition.

Mr. Wells begged to second the motion. The report might at first sight appear a gloomy one; but still he thought he could endorse everything that had been said by Dr. Tichborne. If the law expenses were taken out of the expenditure the balance would be larger than it was last year. Still the Ballybay case, even if it had cost them all the money that they had, would have been worth that to them. The point that was decided in it was one of the greatest importance to the Society. When the Belfast prosecutions were undertaken, there would have been a lot of convictions had they had that ruling of the higher court. The Belfast magistrates held that according to their Act they should have had a register of chemists and druggists; and the prosecutions before them were thrown out on that point. The Ballybay magistrates took the same view. But when their decision was brought to the higher court the judges said that the law of the Ballybay magistrates was bad, and that the Society were not bound to have such a register; and that accordingly the magistrates should have convicted. If therefore the Society should undertake other prosecutions—and he hoped that they would have a good many more of them before the year was out—it would be done at much less expense. These magistrates in the country would not convict a man unless they could not help it. But now after the ruling of the higher court they would have to convict, whether they liked it or not. As to their Parliamentary business they got off very cheaply. It was money lost, no doubt; but he thought the majority of the gentlemen present would rejoice with him that the Bill was thrown out, and that the money was spent in getting it thrown out instead of passed. Their worthy Treasurer had alluded to the examination fees. A candidate rejected for the first time had a right to come in at a second examination without paying the examiner's fees; and that was the cause during the past year of their being considerably out of pocket, because they had to pay 30*s.* to the examiner in the case of each re-examined candidate, and during the year ended they had a considerable number of those examinations. The question was raised at the Council during the year as to whether they should not give up the *Pharmaceutical Journal*. He had been thinking a good deal over the matter, and he thought that if they were to give up the *Journal* and spend the money thus saved in prosecutions, the members of the Society would be better satisfied than they were at present. He did not believe that they would lose a member by such a change. It was for the members of the Society to say whether the proposal was agreeable to them or not. He thought that the licentiates of any neighbourhood where a prosecution was necessary ought to be very glad to band themselves together and come forward and give assistance in order to get convictions. As long as he should be on the Council he would vote for a certain amount of their income—if they should have sufficient means—being spent in prosecutions. He believed that it was their duty to prosecute in case of illegality, and that if they did not do so they would not have the support of the members of the Society.

The motion was then put and carried unanimously.

Mr. J. McCreery Hill said he wished to make a statement as the way in which gentlemen were encouraged to bring in new members. Some months ago he procured with some trouble several new members, and sent their names to one of the members of the Council, asking him to propose them while he seconded them himself. At the first meeting of the Council that took place afterwards that nomination was accepted; but at the next meeting, when the gentlemen should have been elected, they were renominated because he (Mr. Hill) was not a member of the Council. He asked how the President and Council got over the rule in the Calendar which said that a "Candidate for membership shall at a meeting of the Council be proposed and seconded by members of the Society."

Professor Tichborne: Were not those gentlemen elected members?

Mr. Hill: They were, but not for a month after they should have been elected. I am raising this point in the interest of members of the Society.

Professor Tichborne: The Council got over the difficulty the best way it could—you admit that?

Mr. Hill: Decidedly.

Mr. Hodgson said there was not the slightest intention of passing any slight upon Mr. Hill—quite the contrary—but the President pointed out that the first nomination was informal because Mr. Hill could not be a seconder, not being a member of the Council, and present at its meetings.

Mr. Hill: I certainly did not take it as any slight upon myself; but I think that the members of the Society should be allowed to have something to do with the election of members of their own body.

The President: I will read the two rules which bear on the subject. That as to "members of the Society" is—"A candidate for membership shall at a meeting of the Council be proposed and seconded by members of the Society, and the name and address of every candidate shall be inserted in the summonses for the next meeting of the Council, when the candidate may be admitted by a majority of votes."

Professor Tichborne: Of votes at the Council.

The President: The other rule is No. 13 of those relating to the meetings of the Council, and is as follows:—"Members of the Pharmaceutical Society when permitted by the Council may be present at its meetings, *but are not to take part in the proceedings*."

Mr. Hill maintained that the members of the Society who succeeded in getting new members ought to have the credit of bring them into the Society.

Professor Tichborne: We could not make any rule which would clash with the original set, and I think it states that no gentleman who is only a member of the Society can vote at meetings of the Council.

Mr. Downes said if members of the Society were allowed to propose and second candidates for admission into the Society at the annual meetings it would deprive the Council of the veto which they at present had under the rule, for the purpose of keeping out objectionable persons.

Mr. Wells said that as he was the guilty party in this matter he would like to say a word or two. Mr. Hill gave him those names, and he handed them in with Mr. Hill as seconder, not having in his mind at the time the two regulations which bore on the subject. The President afterwards pointed out the informality, and he (Mr. Wells) withdrew the nomination. He believed that if the gentlemen had been elected upon it they would have illegally become members of the Society, and the election of members of the Council that night would have been vitiated. He could assure Mr. Hill that he would have been very glad to leave the matter as it was; and if members thought that it was any advantage to them to have this privilege, the Council would think over the matter, but he did not see how they could get over the Act of Parliament, which prohibited members of the Society from taking part in the proceedings of the Council.

Mr. Hill: Gentlemen seem to have spoken of this as a personal matter, but I really do not take it as personal to myself at all. The two rules contradict one another, and you want to do away with the one that I hold to.

Mr. Wells: If you take the two rules together the matter is very plain.

Mr. Dawson Tate said he concurred in the opinion that the two rules should be read together.

The President (to Mr. Hill): Would you like to give a notice of motion on the subject?

Mr. Hill: I would, decidedly.

Mr. Wells: It would be better to address a letter to the Council, and we can discuss it there.

The President moved that the marked thanks of the Society were due to Mr. Hodgson, for the care and attention which he had bestowed during so many years on the financial affairs of the Society.

Professor Tichborne said he had much pleasure in seconding the motion. Mr. Hodgson had stood to the Society in times when it wanted a helping hand.

Mr. Beggs had great pleasure in supporting the motion. They needed such a man as Mr. Hodgson to conserve their resources. He was sure all present would record their confidence in their worthy treasurer.

The motion was passed unanimously.

Mr. Hodgson, in responding, said he had not anticipated any vote of thanks, but he had only to sincerely thank Professor Tichborne and his other friends who had spoken to the resolution, as well as the gentlemen present who had voted on it. He worked hard with Professor Tichborne to get the Society's original Pharmacy Act: and from that time to the present he (Mr. Hodgson) had taken an interest in the working of the Society, and he believed he was the only Treasurer it had ever had. His ambition had all along been that the Society should have premises of its own in which it could carry out educational and scientific arrangements and have a library; and if ever the finances should become sufficiently strong to enable it to attempt to carry out that object he would gladly contribute towards a fund for the purpose. He felt very much the confidence which had been expressed in him; and as long as he remained Treasurer he would do his best for the interests of the Society.

Mr. Wells said he felt it only right to state that during last year, on an occasion when some members of the Council were looking at houses to see whether they could take one, Mr. Hodgson went to the bank and offered to become security for a loan to the Society of a couple of thousand pounds, and the secretary of the bank informed him that the money would be given.

Professor Tichborne having been called to the chair,

Mr. Wells said he had great pleasure in moving a vote of thanks to the President. On a recent occasion when the Society was in a position of very great difficulty that gentleman came to the rescue and took the reins. When an officer ran away from his charge his men generally got disorganized, but though several members of the Society ran away, still they found that they had an able man in Mr. Charles Evans. Mr. Evans's name had been associated with pharmacy in Dublin for a great number of years. During the short time that they had had the honour of having him in the chair as President they had been in no way disappointed. He had done well for the Society, notwithstanding his short experience, under difficult circumstances, when so many old members of the Council had left; and he hoped that after they should have put him in the chair for the coming year he would be spared to work for them as he had done.

Mr. Tate said he had great pleasure in seconding the motion.

Professor Tichborne in putting the motion said no praise of Mr. Charles Evans was needed from him. Every member of the Council had been struck by the rapid manner in which Mr. Evans had mastered the details of the business of the Society; and he (Professor Tichborne) must confess that in his mind he was one of the most efficient Presidents the Society had ever had. He was sure the vote would pass by acclamation.

The President said he could only thank them for the too flattering manner in which they had spoken of him. He was very pleased that his services had been of use to the Society.

The proceedings then terminated.

October Preliminary Examination.

The following are the names of the candidates who were successful in passing this examination:—Messrs. Henry McNeil Gordon, Thomas Frederick Bell, William Redpath and James Fitzgerald. Four were rejected.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

The opening meeting of the session was held in the Waterloo Rooms, 77, Wellington Street, on the evening of Wednesday, the 9th inst., at 9.15, Mr. James Robb, President, in the chair. There was a large attendance.

The minutes of the last meeting having been read and approved, the Chairman said he had a very pleasant though somewhat unnecessary duty to perform. Mr. Kinninmont was too well known to require any introduction to a pharmaceutical audience in Glasgow or indeed in any part of Scotland. He had much pleasure in calling on their esteemed Honorary Vice-President, Mr. Alexander Kinninmont, F.C.S., to deliver

The Inaugural Address.

Mr. Kinninmont said he had much pleasure in meeting his audience, and in expressing an earnest desire for the prosperity of their Association. He was carried back in thought to the time when he himself was an assistant. That was now a long time ago, and he saw before him one who was an active member of the Assistants' Association of those days. He referred to his colleague in the Honorary Vice-Presidency, Mr. John McMillan. When asked to deliver an address at the opening of their session he felt that to do so was to undertake a rather formidable duty. He had always had a feeling of aversion to old men coming forward too much in meetings of younger men. He thought there was a risk of their seeking too much to play the part of giving advice, and their presence he always felt was apt to act as a kind of restriction on the free expression of opinion. He had an impression therefore that it would have been better had they been addressed on this occasion by a younger man, having a wider vista before him. He would also have to claim their indulgence. He had, as some of them knew, just lost an assistant who, after fifteen years of faithful service, had been suddenly cut off after an illness of two hours. This had given a shade of gloom to his thoughts, from which he felt it impossible to tear himself away. While personally he would have liked to see a younger man in the place he had been called to fill, he had great pleasure in undertaking the duty they had laid upon him. And, of course, there were many things that an old man could say with advantage. To the eye of an old man the flight of time appeared to be ever increasing in speed. The years were like a whirlpool of concentric circles which got smaller and smaller till they reached the centre and disappeared. Old men had got clear of the natural impatience of youth. They had a broader view of life and could see the effect of things more fully, and while they felt that for themselves the future had not much to disclose, they could hold out a picture of hopefulness and encouragement to younger men. It was now about forty-four years since he entered the drug trade, and looking back he could testify that the condition of things then was a very great deal worse than at the present day, and any improvement that had taken place had been largely due to the work of just such an Association as the one they were seeking to establish now. He was struck in listening to the address of Mr. Umney, at the recent Conference at Newcastle, to observe that he attributed the great advances made by pharmacy in recent years to the work and influence of the Conference. While not wishing to deny due honour to the Conference he felt that the work of local associations had also had a most important share in helping forward the good work. He was not going to indulge in praise of bygone times or assume the role of a *laudator temporis acti*. The old Association to which he had already referred did good work in its time, and it would rest with them to carry that good work on. The old Association originated in an agitation for early closing which met with considerable success. Before that time the community of chemists' assistants was in a very disintegrated state. There was a prevailing distrust of one another, and something very like a feeling of hostility. But when they met together in their Association they discovered that they were all very good fellows indeed, and they soon became very sociable. An early outcome of that Association's work was the appointment of a price list committee and the drawing up of a price list which was a very great benefit to the trade. He regretted that that price list was at present in abeyance, but he trusted it would soon be revived again. He was very pleased in looking over their syllabus to observe that they had been able to arrange for a series of interesting papers by themselves. He would strongly advise them to aim at supplying all the material for their meetings themselves. It was all very well to get lectures by specialists from outside, but it was rather an awkward thing to bring a public lecturer to address an audience of perhaps ten or fifteen people. One great object of their Association was to get the talents of the members for observation developed, and this could best be done by the course he suggested, and he trusted they would stick to it. They would perhaps allow him to give them one or two hints from his own experience in connection with the old Association. He would suggest that they should have no platform or pulpit, but that they should arrange the seats round the room and let each member take a part in any discussion that arose. Lord Bacon had said that there was the greatest possible difference between a long table and a round table, because with a long table a few at one end were apt to rule everything, whereas at a round table all were on an equal footing. They should endeavour to preserve an equality in their meetings, and he thought this might be best attained in the way he suggested. He would also advise them to take an interest in and support what he would call the politics of the trade. The old Association did good work in that connection and had considerable influence in the shaping of pharmaceutical legislation. At the present time they were suffering from what he could not but regard as a complete misinterpretation of the Pharmacy Act of 1868. The principle of that Act was to regard the master as alone responsible, but in recent decisions that principle had been ignored, and it was asserted that any man could carry on a drug business if only he were a member of a limited company. With all deference to the House of Lords, he submitted that its judgment was wrong and utterly beyond the intentions of the Act. It was now said that all assistants must be qualified. The application of such an interpretation would involve a great deal of difficulty. Had such an interpretation been put upon the Pharmacy Bill when it was before Parliament it would have been scouted out of existence. He did not believe such a principle could be carried out in practice. It would give rise to an agitation that would probably lead to a repeal of the Pharmacy Act altogether. He would be very sorry to see such a result, for there could be no doubt that on the whole the influence of the Pharmacy Acts on pharmacy had been beneficial, and had given a status to the profession which it would not otherwise have possessed. It would rest with them to take any action that might be required to defend the legitimate interests of chemists and druggists. He had now occupied the time allotted to him, and would conclude by again expressing the pleasure it had given him to meet them. The senior Association was at present in that condition of suspended animation with which it seemed to be periodically affected. He trusted it would, ere long, revive again, but the main part of the work would always be done by the assistants. He believed the library of the old Association was still in existence, and he trusted they would be able to recover it and get it into working order again. He had had more prepared and had begun not knowing whether it was to turn out a song or a sermon. He was afraid the feeling of sadness from which he suffered had tended to give it much of the character of the latter, but they would excuse him, and he cordially wished them all prosperity.

Mr. Rutherford Hill, Edinburgh, having been called upon, said he could cordially congratulate the members of the Association on a very auspicious beginning of their session and on the very interesting and suggestive address to which they had just listened. Should they feel disposed to act upon the suggestion to devote attention to pharmaceutical politics he would like to point out the necessity for making sure that they knew and accurately understood the existing Pharmacy Acts. He had been very greatly surprised to find that a great many chemists had never even seen the Pharmacy Act of 1868, and very few indeed were intimately acquainted with its actual provisions. They must have noticed that many who discussed these subjects very freely, and even writers in the trade journals, laboured under the fatal disadvantage of not knowing or misunderstanding what they were talking about, and that was a great pity. He would also strongly urge them to make the utmost possible use of the little spare time they had. He found that many assistants were doing nothing at their studies, and their unfailing excuse was a fruitless and melancholy complaint about long hours. Long hours were a heavy burden, but many men had risen to eminence in spite of them.

Mr. John McMillan, Honorary Vice-President, congratulated the Association on the excellent address with which the session had opened, and trusted Mr. Kinninmont might often be seen at their meetings.

Mr. Archibald Paterson said he had been asked to make a few remarks about the old Association, which was one of his earliest recollections in pharmacy. Their first meeting place was in the Angus Temperance Hotel in Argyle Street, where an enthusiastic band of young men spent many pleasant and profitable evenings under the genial presidency of Mr. Kinninmont who, as a rule, occupied the arm chair. Their meetings were characterised by a great amount of freeness. They had papers on a great variety of subjects. One he remembered by Mr. Macdonald of Virginia Street, another by Dr. Moffat, and another by the original R. T. Dun. Their next meeting place was in the Athenæum, where they met for several sessions. Then they removed to the Mechanics' Institute, where many pleasant meetings were held in the laboratory of Dr. Moffat, who had become famous as the inventor of the ammoniophone. Travelling eastwards they ultimately found a resting place in the Andersonian College. It was there that they first procured a materia medica cabinet and a library. They had regular courses of lectures on chemistry and also a course of lectures on botany, with most interesting Saturday afternoon excursions under the able and kindly guidance of the late Mr. Hennedy, and then they had their grand annual reunion, which generally took the form of a soirée, a kind of entertainment for which Glasgow was justly famous. He remembered on one occasion Mr. Stanford, of potassium iodide fame, told a striking story. A gentleman was passing along a London street when he observed an excited crowd. Pushing his way among them he discovered the cause of the crowd to be two fighting dogs. Each had got a firm hold of the other and neither would let go. He quietly took from his pocket a small snuff box, and put a small pinch on the nose of each dog. They instantly let go to get a good sneeze and the gentleman quietly repocketed his snuff box and walked away, making the significant remark "Knowledge is power." They had been hearing to-night what knowledge was, and his advice would be go on, persevere and gain that power which knowledge brings, especially to the chemist. He wished them every success, and he hoped they would speedily obtain possession of the materia medica cabinet, the microscope and the library which belonged to the old Association.

The Chairman proposed a vote of thanks to Mr. Kinninmont and the other speakers, which was cordially awarded with acclamation.

Mr. Kinninmont in returning thanks said he would like to give them a single instance of how one's future might be influenced by a chance sentence. He was reading Mr. Ince's paper on "Study," and was struck by the remark that by devoting one hour to study daily for three years they could acquire all the knowledge they required. He had for a long time thought of learning French and, acting on the suggestion, he began that very day and continued till he had acquired a serviceable mastery of the French language. In study not to advance was to go back, and he strongly advised them to keep steadily at it, trust to their own resources, and they would have a successful future.

The meeting then closed.

LIVERPOOL CHEMISTS' ASSOCIATION.

The sixth general meeting of the fortieth session of this Association was held at the Royal Institution on Thursday evening, October 10. The President, Mr. A. H. Samuel, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—'The Proceedings of the Liverpool Geological Society,' 30th Session. 'The Journal of the Liverpool Polytechnic Society,' 50th session. 'The Proceedings of the Liverpool Naturalists' Field Club,' 1888. Volume iii., no. 4, of *Ephemeris*, from Dr. Squibb, Brooklyn. 'Bulletin of the Chemical Society of Washington,' No. 4. 'The Twenty-fifth Annual Report on Alkali, etc., Works,' by Mr. A. E. Fletcher, Chief Inspector. 'The Twenty-fifth Annual Report of the Alumni Association of Philadelphia,' and the *Pharmaceutical Journal*, from the Society.

A vote of thanks was accorded to the respective donors, and the President said he should be glad to hear any miscellaneous communications that members might bring forward.

In response, Dr. Symes said there were two matters he wished briefly to mention. In the recess Dr. Rentoul had communicated with him, and possibly with some other members of the Council, concerning a matter in which he had much interested himself, viz., the relation of the present hospital system to medical practice and chemists with proposals for reform. He thought it might be well to consider whether that gentleman should not be invited at an early date to put his views before them in the form of a paper or otherwise. The other matter was the concluding part of the Pharmaceutical Council's proceedings in London on July 2, as reported in the *Pharmaceutical Journal*, and from which he gathered that it was intended to prosecute a young man, 21 years of age, a chemist's assistant, for selling a packet of rat poison, he not being registered. He would not anticipate what form the action would take, but he thought it tended to violate the principle of personal qualification and responsibility on the part of the proprietor which was recognized when the Act was framed. He knew there was much to be said on both sides of the question, and would not therefore ask the members present to go into the matter that evening, when there was other business on hand; but he thought it unfortunate that being a new departure, and of considerable importance to the whole trade, that it should have been dealt with by the Council in secret.

Mr. A. C. Abraham said he was opposed to the decision of the Council of the Pharmaceutical Society, and thought the subject worthy of the attention of this Association, and hoped it would be fully discussed by it.

The President said both the subjects brought forward by Dr. Symes were of great importance to the members of the Association, and he promised to bring them under the notice of the Council.

The President now called upon Dr. Symes to exhibit one of Bracher's automatic stills (improved form) in operation.

Dr. Symes said that he exhibited the original form of this apparatus at a meeting of the Association about a year ago and there were some criticisms on it and some suggestions for its improvement by Mr. Conroy, Mr. Abraham and others. These he had communicated to the maker, and by adopting them and the addition of a tap and syphon arrangement it had been made a really excellent piece of apparatus, and as nearly automatic as was practicable. He thought it due to the Association to show the members the result of their useful and practical suggestions. The still was shown working, and was afterwards taken apart from the condenser and explained in detail.

A short discussion followed, and a vote of thanks, proposed by Mr. Conroy and seconded by Mr. A. C. Abraham, was heartily accorded to Dr. Symes for bringing forward a matter of such practical interest.

The President then said that the next subject to come before the meeting was the following paper on—

ENAMELLED COOKING VESSELS.

BY EDWARD DAVIES, F.C.S., F.I.C., ETC.

The earliest cooking-vessels were no doubt earthenware, and in many respects these are the best for subjecting the material employed to a gentle, prolonged heating; in fact, stewing. There is no fear of metallic contamination, and the excellence of the French pot-au-feu is in a great measure due to the earthen vessel in which it is made. Every housewife knows how much better for making a really good cup of tea is the old black earthenware pot than its showy silver rival. But pots have their defects; they cannot be well used for boiling, and their proverbial fragility excludes them where they would, but for this, be welcomed. So metallic vessels came into use, and considerations of economy reduce the metals to iron, brass and copper. If silver were only cheap no metal could compare with it on account of its freedom from liability to oxidation, its insolubility in the acids used in cooking, and the facility of cleaning it. But at present we only occasionally hear of its use in this way, when a silver grid is advertised as an attraction to a chophouse, or in some very aristocratic cookery-book we are directed to boil a ham in champagne in a silver pan. So the baser metals are forced upon us, although iron communicates to any acid body a bad colour and an inky taste, and copper and brass, if not kept scrupulously clean, may communicate poisonous properties to food prepared in them, especially if the food is left in the vessel.

It is therefore not strange that efforts should have been made to combine metals with pottery or glass, so as to unite the advantages of each, the purity of the earthenware and the non-frangibility of the metal. Rather is it strange that as the art of enamelling on metals has long been known, the application of it to cooking vessels should be so recent. Beckman in his 'History of Inventions' makes no mention of it, although he describes enamel. The first mention of the application of enamel to cooking utensils that I can find, is in Ure's 'Dictionary,' from which it appears that an Englishman, Dr. Samuel Sandy Hickling, took out a patent in 1799 for this purpose, which was practically carried out, but given up for want of encouragement. Another patent was taken out in 1839 by Thomas and Charles Clarke, but they were unable to sustain it, and from that time the art has extended and improved, though it is yet only used to a limited extent.

An enamel is in principle a glass, or fusible porcelain, melted on the surface of some less fusible material, and is generally opaque. There are many requirements necessary in a perfect enamel. 1. It should be fusible at a moderate heat, to prevent fusion or distortion of the base. 2. It should adhere firmly to the surface of the base, so that it should not be detached by the blows to which the article may be subjected, or by heating and cooling. 3. It should not be acted on by acids or alkalies, at least such as may fairly be expected to be met with in cooking, such as the acids of fruit, sour milk and vinegar, or very dilute solutions of carbonate of soda. 4. It should contain no poisonous ingredients, so that if the third requirement be not perfectly complied with, the fancied security may not be a source of danger.

These conditions are not easily combined, for fusibility generally implies liability to be acted on by acids, and may most readily be attained by the use of oxide of lead, which infringes the fourth condition. Nevertheless the manufacture of enamelled vessels has been successful in fulfilling these conditions to a very satisfactory extent, and although doubt has been cast upon the freedom of glazes or enamels from arsenic, and a suggestion has been made that the arsenic may find its way into the food cooked in enamelled vessels, I hope to show that both of these assertions are unfounded, and that such vessels as are in the market at present are free from suspicion on this score. The making of enamels is a subject which has interested me for a long time, and for six months I was engaged in the attempt to coat moulds for making sugar loaves. From various causes the attempt was abandoned, but at the time, I used every effort to obtain information on the subject, and can therefore speak from more than mere book knowledge. Enamelling of cooking vessels has been practically confined to the protection of cast or wrought iron. Copper or brass are generally used as they are, or are tinned or silvered, so that I shall confine my remarks to iron vessels. The first operation is to obtain a clean metallic surface, as the adhesion of the enamel materially depends on this. Sulphuric acid is usually employed, and it should for this purpose, as for trimming or galvanizing, be free from arsenic, as this deposits on the iron and injures the surface, and also makes the hydrogen evolved poisonous from the presence of arseniuretted hydrogen. The articles are then scoured, washed in clean water, and are ready for the application of the enamel.

This is made of many very various materials. The aim is to produce a fusible glass or porcelain, and all the materials used for these purposes are available for the enamel maker. Silica and boracic acid or borax furnish the acids and soda, potash, alumina, lime, and oxide of tin the basis. The enamel is therefore a more or less complex silicate and borate of potassium, sodium, aluminium, calcium and tin. The oxide of tin is to make the enamel white and opaque. This effect can be produced by phosphate of calcium and cryolite, but not so well.

Every manufacturer has his own formula and proportions, and to give a long list of formulæ would be of very little use or interest. I will therefore give an example of an enamel, being the first proposed in Hickling's patent, and being the latest which I have seen.

Hickling's composition consists of—

Calcined flint	6 parts.
Litharge	9 „
Borax	6 „
Argillaceous earth	1 „
Nitre	1 „
Oxide of tin	6 „
Potash	1 „

or

Flint	4 „
Cornish stone	1 „
Nitre	2 „
Borax	8 „
White marble	1 „
Argillaceous earth	½ „
Oxide of tin	2 „

Reichel's composition—

Glass	16 „
Fluorspar	8 „
Borax	12 „
Nitre	4 „
Oxide of zinc	1 „

Although I have seen a great number of formulæ, I have not met with one in which arsenic entered.

Whatever composition is taken must be finely powdered, mixed, fused, ground when cold, sifted, and levigated with water. It is then made into a pap with water or gum water. This is brushed or poured over the vessel, dried and fused in a muffle.

The Prussian Government prohibited the use of lead or its compounds, many years ago, and so far as my experience goes it is not used in those of German make sold in Liverpool.

In order to ascertain what action would be exercised on enamel by cooking food in the vessels it is clearly not fair to use stronger acids than would in practice be met with. I am sorry that I have not had time to make more experiments, but I give the results which I have obtained.

I have used a 1 per cent. solution of lactic acid, and a 1 per cent. solution of acetic acid. To see if stronger acids would destroy the enamels, I have also tried the effect of a 1 per cent. solution of HCl and a 4 per cent. solution of HCl. The anhydrous acid is understood in each case. The pans used are, one bought in Bold Street, German make; one, a cheap one, of German make; and one of English make, Kenrick's. There is also a small dish, also of English make.

I give a table showing the effect.

	1 p.c. Lactic.	1 p c. Acetic.	1 p.c. HCl.
Best German	Trace of tin	Nothing	Much tin.
Cheap German	2 grs.	Nothing	Not tested.
Best English	Nothing	Nothing	Not acted on.
Bad English	Much lead	Lead	Not tested.

The best German above was tested with 10 per cent. HCl. 10,000 grams of the dilute acid was boiled for an hour in the pan, loss by evaporation being supplied. 5·44 grams of SnO_2 was dissolved, but there was only a slight coloration of copper in Reinsch's test for arsenic. I could not get distinct crystals, but I believe that there was a faint trace of arsenic. The amount was far too small to have any perceptible effect, and it could only be got at by the use of strong acid. None of the other tests showed the faintest trace of arsenic, so that there need be no fear of danger or of the slightest contamination with arsenic in using these enamelled articles.

Whether tin is injurious in the minute trace taken up from the good German make is a doubtful point. I regret that I have not had time to try the effect of citric and tartaric acids, and also of fruit. For non acid liquids all may be used safely, but there is no doubt that the best of the four is Kenrick's. The German are better-looking and lighter, but the enamel is more attacked by acids than Kenrick's. The other English enamel is very bad, yielding lead freely to weak organic acids.

We find from this examination that arsenic, if present at all, is in the faintest traces, and is not removed by dilute acids. That oxide of tin is soluble in these dilute organic acids in the foreign enamels, but only slightly so in the better quality. That there are still enamels containing oxide of lead, the use of which for cooking vessels should be prohibited.

A lengthy discussion followed, in which Dr. Nevins, Messrs. M. Conroy, A. C. Abraham, A. A. Barrett, Hocken, Ward, and the President took part, and a vote of thanks, proposed by Mr. M. Conroy and seconded by Mr. A. C. Abraham, was accorded Mr. Davies with acclamation.

Mr. Davies thanked those present for the manner in which they had received his remarks, and replied to the various points raised in the discussion.

The President said he would now ask the meeting to appoint a President for the next session, whereupon it was proposed by Mr. M. Conroy, seconded by the President, supported by Mr. E. Davies, and unanimously resolved:—"That Dr. Symes be elected President for the ensuing session."

Dr. Symes thanked the gentlemen who had in such kind terms moved, seconded and supported his election, and the meeting for the honour it had done him. Previously he had on two occasions served them as President, and he trusted on the present occasion to fill that office to the best of his ability, but he would remind them that he had very little time at his disposal, and that there were others who had more and could fill the office well.

This concluded the business, and the meeting terminated.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The annual general meeting of the above Association was held in the rooms of the Chemical Club, Victoria Hotel, on Wednesday, October 9, Mr. W. Wilkinson, Vice-President, in the chair.

The minutes of the last meeting having been read and confirmed, the reports of the Council and Treasurer were read and adopted, the Treasurer's report showing a balance carried forward of £13 12*s.* 4*d.* to the General Fund, and to the Library Fund of £5 18*s.* 8*d.*

Mr. Harold Woolley moved, and Mr. Lane seconded, that the officers of last session be re-elected, with the exception that Mr. Arrandale was placed on the Council, vice Mr. Hart, resigned.

The following form the Council for the ensuing session:—President, Mr. W. S. Brown; Vice-Presidents, Mr. W. Wilkinson, Mr. F. B. Benger; Treasurer, Mr. G. S. Woolley; Hon. Secretaries, Mr. W. Elborne, Mr. H. Wilson; Hon. Librarian, Mr. H. Wilson, together with Messrs. Boor, Botham, Robinson, Midgeley, Stones, Slack, Westmacott, Harold Woolley, Kemp, Arrandale and Bowden.

Opinions were expressed by various members that a dinner, smoking concert or conversazione would tend to promote good feeling and the welfare of the Association. The following were appointed a Committee to decide what form the conviviality should take, Messrs. Kemp, Smith (Pendleton), Bowden, Lane, Harold Woolley and Wilson.

At the close of the meeting several papers were promised for the session, and it was hoped the meetings would be very successful.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The second annual prize distribution and ball of this Association took place on Thursday evening, the 10th inst., at the Masonic Hall, Halford Street, Leicester, the Hall being crowded, including the Mayor of Leicester (Alderman E. Wood), the Mayor-Elect (Dr. Lankester), J. G. F. Richardson, Esq., J.P. (President of the Association), Drs. Bennett, Bremner, Douglas, Lewitt, Peake, Pope, Mason and Neale, Messrs. Broof, S. F. Burford, F.C.S., E. H. Butler, Cleaver, J. J. Edwards, Harvey, Hindle, W. Rowe, Sturgess, Thirlby, Wilby and G. Woolley; there was also a large attendance of ladies.

Letters of apology for absence were received from Dr. C. H. Marriott, Rev. J. Went, M.A., and Rev. E. Atkins, B.Sc.

In opening the proceedings, the President expressed his pleasure at having the Mayor present with them that evening, and that although he had so many engagements and had just been presiding at a meeting with which they were closely connected, viz., the Ambulance Society, he had been good enough to honour them with his company. Major Richardson continued: It is not my intention to give any special address this evening, but just to take the business in the simplest possible way. I should like to say before I present the prizes how delighted the Committee is that these prizes have had such very good results in bringing the young men into closer connection with their technical work than they have been in former years. The young men who have contested for these prizes have been singularly proficient in their different subjects. The winner of the first prize answered 99 questions out of 100, while in practical chemistry the first in the class positively answered 100 questions out of 100. I can only urge upon the young men, as I did last year, that we shall be perfectly satisfied if they will only attend to the work given them and to the work of technical instruction, which is so necessary. As a practical man of thirty years' experience, I may say that this is the golden part of your life, when you can make great progress in your work. I wish I could have had the opportunities you have, and I shall be glad to see you take advantage of them. I hope every young man connected with chemistry in Leicester will make it his duty to join the class. I am very glad that the Town Council have assisted us in our work by giving a magnificent botanical garden in the Abbey Park, which I believe to be one of the most successful in England. Not only is it a great help to us and those who study botany, but it gives satisfaction and pleasure to those who visit the park. The breach between pharmacy and the medical profession is becoming less and less every year, and I hope that it will always be the case that pharmacists will approach the medical profession with every desire earnestly to win its confidence, and that the profession will give pharmacists all its help in assisting us to carry on their work. There are political matters into which I should like to have gone if I had

had more time, but I may say that it is the intention of the Council of the Society to arrange meetings for members of the trade, at which we hope to discuss trade subjects which will probably be more interesting to the employers than to the young men.

Major Richardson then proceeded to distribute the prizes as follows:—Chemistry of the Pharmacopœia: (1) B. Lewitt; (2) A. P. Eldred.—Practical Chemistry: (1) F. O. Beale; (2) W. G. Kinton.—Botany: B. Lewitt and A. P. Eldred were equal in this subject, and received books of equal value.

The Mayor thanked the Chairman for his kind expressions, and said: I will refer to that part of chemistry which is used so much in our manufactures. It is impossible for anyone except those connected with the facts to realize the national loss we have sustained because chemistry has not been made a greater study of by our young men, and especially the branch of dyeing. The aniline products from our gas works have had to be sent to Germany to be made into dyes, and it is a pity that a country like this should be so far behind. Yarns spun in Leicester have to be sent to Germany to be dyed because we do not understand the process in England. It is the duty of young men who have chosen chemistry as their study to give this matter their attention. In the higher branches of chemistry there is a wide field for the study and research of our young men rising up into life. I trust it may be one of the objects of your Society to grapple with the subject. Our technical schools are doing something in this matter, but their power is limited. Only a month ago they were entirely dependent upon voluntary subscriptions for support, until a Bill came before the Parliament enabling the ratepayers to contribute, where demanded, towards the support of technical schools. I hope you will encourage the study of the higher branches of chemistry. I should also like to recommend you to read Sir Henry Roscoe's Address on Monday night. You will find material for your reflection and matter which cannot be but profitable. I hope that your Society may prosper, and that every student will distinguish himself, and one and all try to make his particular calling in life prosperous and successful in the highest degree.

The President said he had a very pleasing duty to perform, which was to present a slight memento to their late Secretary, Mr. Edwards, who for many years had been one of their most painstaking and efficient officers. He had seen the Society and stuck to it through its good and bad days, and they were now celebrating their second year since the resuscitation from the old Society. There was no one who had worked with greater effort and love for the cause than Mr. Edwards for fourteen or fifteen years, and this memento was to show their recognition of his work. The President then read the address as follows:—"Mr. James John Edwards, chemist by examination of the Pharmaceutical Society of Great Britain, Leicester.—We, the Council, members and associates of the Leicester and Leicestershire Chemists' Association hereby desire to recognize the zeal and interest which you have so long manifested for the principals and students connected with pharmacy in this town, and especially your services as Honorary Secretary of the above Association since its re-formation in February, 1886, in which capacity you have in no small degree contributed to its present prosperity. With the accompanying testimony of our esteem we offer our sincere wishes that you may long be spared to enjoy the respect of those you have so ably served; and that the great Disposer of events may bless you and yours in a continued period of health, happiness and prosperity. Signed on behalf of the Association this 10th day of October, 1889. Jno. Geo. Richardson, President. J. H. Shepherd, Hon. Secretary."

The address was illuminated and tastily designed, headed with the arms of the Pharmaceutical Society of Great Britain, and framed in oak. The "accompanying testimony" referred to in the address was a very handsome silver mounted cruet stand, the inscription on which read "J. J. E. from the L. and L. Chemists' Association."

Mr. Edwards assured his hearers from the bottom of his heart that it was no hypocrisy to say that was the proudest moment of his life. He never thought one day to be surprised with an event like this. He remembered the time when the young men managed the whole affairs of the Society amongst themselves. Mr. Clarke, the treasurer, stuck to them through thick and thin until they found they could not keep on any longer. In the moment of despair they sought the services of their worthy President, and he met them in a fair and liberal spirit, and they were grateful to him for it. Speaking to the students, Mr. Edwards said they were always students throughout their lives, because there was so much to be done and the field of research was so wide and the harvest still ungarnered and ripe. There were so many things to be done in the work and until they grew old and passed away they would have to continue at it in the same way. They had one cause in view, and that was the good of the young men, and no one could estimate the good that had been done by the Society. He had now withdrawn from office, but hoped the affairs would go on in the same way as in the past. Some people said societies like theirs were trifles, but trifles went to make perfection, and that was what they all wished to attain. The success of their class was simply because the young men in Leicester were determined to make the most of the means at their disposal, and instead of aspiring to obtain books and apparatus they made the best of what they had. Nothing could be done without hard work, and there was no royal road to chemistry.

"The heights by great men reached and kept,
Were not attained by sudden flight;
But they, while their companions slept,
Were toiling upwards in the night."

Dr. Lankester, rising to propose a vote of thanks to the President, said he was very pleased to see such proofs of the prosperity of the Association, believing the value of it to be so great. The great success of this Association seemed to be due to a great extent to the fraternal feeling between its members, to the respect in which they held the search for knowledge, and also very largely to Major Richardson's services. He was attached to it and helped it in every way he possibly could, and it must be a source of pleasure to him to see its success, the increase of members, and the interest the members took in it. He proposed that their best thanks should be given to their President.

Mr. E. H. Butler had very great pleasure in seconding the vote of thanks, and said, having been connected with the Association from its first days, he knew that it was to Major Richardson's efforts since its resurrection that its advantages and success were mainly owing. Had it not been for the helping hand he gave to them, they would not be in the position they were that evening. It was gratifying alike to the students and to the subscribing members to see the position the Society at present held.

The vote was then carried by acclamation, and

Major Richardson said in the success of the Society he was amply repaid for his efforts. All he wanted was to see the young men take advantage of the privileges laid before them. The Mayor had been speaking of the want of energy among chemical students. Perhaps he did not know how heavily handicapped they were in England. He (the speaker) thanked them for their vote, and as long as they wished him to stay in the position he now held he would be very happy to remain their President.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of the session was held on Thursday evening, October 10, in the Association Rooms, 74, Commercial Street. There was a large attendance. The Secretary read the minutes of the previous meeting, and these were duly confirmed.

The President (Mr. John Forsyth) then delivered an address to the members. After thanking the members for the honour they had done him in electing him to that important office, he stated that they must bear with him should he not come up to their expectations, and he would endeavour, as far as lay in his power, to further the interests of the Association. He then went on to speak for a short time on the work of the Association in general, and said he hoped that the splendid start they had made would be the means of encouraging them on during the coming session. He hoped that by acting up to the advice and suggestions thrown out at the Inaugural Meeting, coupled with what would be brought before them during the winter, they would feel at the close that much had been gained. He trusted all would derive some advantage from the Association, and that every one would aim at helping his neighbour as far as possible. Referring to the musical evenings, he was sure they would prove a success. They all felt in want of a little relaxation from the ordinary routine of work, and these evenings would prove a pleasant and harmless source of amusement, and at the same time they would be the means of keeping up a more friendly feeling amongst the members. He finished up by asking the members to try and keep up the attendance at the meetings as much as possible, also to take a lively interest in the work done.

On the motion of T. C. Henderson, seconded by Mr. W. Main, and supported by several members, a hearty vote of thanks was awarded to Mr. Forsyth for his address.

The Secretary then gave full particulars regarding the prize competitions, and intimated that the papers for the apprentices' competition must be in by November 28, and the "Progress in Pharmacy" prize papers are to be handed in not later than January 16, 1890.

A letter was read from Mr. Wm. G. Lamont offering to take up classes for the Preliminary Examination, provided a sufficient number of members wished to join, and asked the use of the room two nights a week for that purpose.

On the motion of Mr. W. McD. Skinner the request was unanimously granted, and it was also resolved that the sum of one guinea be given to Mr. Lamont to form two or more prizes to the students who make most progress.

The next meeting of the Association will be held on Thursday evening, October 24, when a paper entitled "Notes on a few Medicinal Syrups" will be read by T. C. Henderson.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first meeting of the above Association for the new session was held on Thursday evening, the 10th of October, at the rooms, Great Russell Street, when the President, Mr. T. A. Ellwood, delivered the following—

INAUGURAL ADDRESS.

Gentlemen,—The connection I have had with your Association for the last three or four years I did not at all think justified your Executive in electing me to fill the honourable position of President, but as I had allowed my name to appear as a candidate for the Council, I could not refuse to fill any position or office in which I was subsequently placed by them; and really, after all, the success of an Association does not depend so much upon its President, as it does upon the united and individual efforts of its members. Hence, gentlemen, I must trust to your hearty support and co-operation in making the ensuing session as successful as former years have been; to me the otherwise arduous task will then prove a pleasure. If we thus work together in unity we shall not only achieve an equal success with previous years, but shall surpass them, and retain the characteristic title of a "progressive Association."

The Association has now entered its teens, to-night being the inauguration of the thirteenth session. From the outside pharmaceutical world more will therefore naturally be expected from it, and we can, if we try, gratify those expectations. I speak advisedly: I say "*we can*;" it remains for you to say "*we will.*"

In this address it is not necessary for me to recapitulate the account of the formation of the Association, its gradual, yet continued progress up to the present, a progress, notwithstanding the opposing forces, the adverse criticisms, and the various vicissitudes it encountered in its infancy; it has been like the Herculean dragon, when one head has been cut off, seven others have appeared to substitute its place.

> "Its cradle was but lowliness,
> Its childhood little higher;
> In youth it took a nobler strand,
> Success did it inspire."

The history of the Association has been given by past Presidents, and now is on permanent record in the printed 'Proceedings' of the Association.

Last session was the best recorded, considerably excelling all previous years. The numerical strength of patrons and members was increased. The papers read at the ordinary meetings, most of which appear in weekly pharmaceutical literature, were useful, interesting and original. These papers are scanned with interest, not only by chemists' assistants in the metropolis and the provinces, but by proprietors, and even by professional scientists outside the pale of strict pharmacy.

The following is extracted from a letter written by a gentleman of high standing in the scientific world: "Your Association is a nursery for genius, and the papers emanating therefrom are worthy of more generally recognized institutions. The course you are pursuing will win the admiration of all interested in scientific work."

Another letter says: "The papers of your Association are familiar literature to me." Still another: "I read your papers with interest, and look upon your Association as a cradle for thought, and what is there shown in bud of infancy, should develope into maturity in the parent society of pharmacy, meeting in Bloomsbury Square." (Perhaps I should mention the writer of the latter is not a pharmacist.) Such are some of the few opinions expressed concerning us. Without being egotistical we may pride ourselves on our position in the eyes of those outside our scope, remembering what Cicero says:—

"It is not only arrogant, but it is profligate for a man to disregard the world's opinion of himself."

In thus speaking of the position this Association holds, I must here emphasize some of the work accomplished by it.

We are not mere nonentities in the arena of pharmacy; we are not merely collectors of other peoples ideas, though even that, when thoroughly done, and formulated, is a good work, and achieves useful results. No, our members have gone further into the field of labour than this; they have boldly entered the sacred precincts of research work. Which of you has read the prize essay, without perceiving the vast amount of original work therein contained, calling forth the compliment and comment of one of the leading analysts of the day. Again, in another paper by our members, needing a lot of real persistent labour, was shown the shape of an accurate, well-defined crystal of pure aconitine; and also was pointed out, I think for the first time, the botanical portion of the aconite root where the alkaloid seems to be stored.

I need not enumerate other original work of our members, these instances serving as types to support me in my previous statement that our members enter the field of original work. Goldsmith says: "The little mind who loves itself, will write and think with the vulgar; but the great mind will be bravely eccentric, and scorn the beaten road, from universal benevolence."

It was my privilege, at the last annual dinner of this Association, to propose the toast of the Pharmaceutical Society. The main argument of my speech was, that that Society had, throughout, accomplished the objects of its formation, and hence merited support of pharmacists generally. Since then I have been much twitted and ridiculed by members of our craft, for having taken such a position on the side of the Society. I am happy to say that such critics, who lift their heads so high as to look with disdain upon the work of the Pharmaceutical Society (and we must remember that empty things are most easily lifted), are not members of our Association, and few of them even of our fraternity "Assistants."

In now making the bold declaration, that—*This Association has fulfilled the intention of its founders, as expressed in rule one, which reads, "The objects of this Association shall be the promotion of intercourse among Chemists' Assistants, and the discussion of subjects tending to the welfare of all interested in pharmacy,"* I have no fear of contradiction or ridicule from those within or without our ranks. This Association certainly has no apology to make for its existence; the requisition for it is patent in the fact of its hitherto unbroken progress, and its present popularity, which must of themselves emphatically prove it a *sine quâ non*, founded for usefulness, even if not for ornament. It needs no prophet to foretell that so long as the same spirit animates the members which has been manifest in the past, so long will it continue a success, and be recognized as a useful institution.

Your President last year told us why chemists' assistants did not join our ranks. I ask, *In the very objects of the existence of the Association are there no inducements for them?* Let us consider, and if we find our foundation is imperfect, let us set about to rectify it; if not, then being on the side of right, we are not unreasonable in expecting support.

First Object.—"Promotion of intercourse among Chemists' Assistants."

A lofty idea is this, a noble aspiration on the part of the founders.

Are we, unlike the general tendency of the human race, anxious to plod along life's pathway alone, freed from the trammels of companionship? Surely not. Cicero says:—

"Friendship is the only thing in the world concerning the usefulness of which all mankind are agreed." Do we look upon chemists' assistants, barring ourselves, as too ignoble to have companions? "Certainly not!" you say.

Perhaps some are desirous that their circle of friends should be limited to their own immediate vicinity. If so, I would like to remind such of the old lady who had lived all her days in a valley, never having left it upon any occasion, and who, when taken to the top of one of the hills, and shown the vast expanse around, declared with surprise, "I did not think the world was so large."

Our Association provides a more extended world of company than a single neighbourhood, from which even these individuals may find a greater choice of friends, suited to their own congeniality or idiosyncrasy: "To be influenced by a passion for the same pursuits and to have similar dislikes is the rational groundwork of lasting friendship."

Mr. Benger in his Presidential Address last year before the British Pharmaceutical Conference, seemed to imply that the foundation of that institution was the commencement of good fellowship amongst pharmacists. I may say that this Association, having a similar object in view, does indeed tend to promote good fellowship amongst its members, and many of us have made lasting friendships through our connection with it, a friendship which we have not found to be "full of dregs," as Shakespeare once said it is. Although the Association has successfully performed this part of the programme, there still remains scope for a further development of it; success does not imply perfection, nor does perfection mean completeness.

Your Ex-President, in his valedictory address last May, called attention to a suggestion that had been made: *The formation of a Chemists' Assistants' Club.* This would tend to increase the sphere of usefulness of the Association. The project I cordially agree with, but it remains with you, gentlemen, to express your ideas, *pro* or *con* upon the subject, and I can say that your Council would not be long in taking the initiative of founding a club, should they be made aware that such an undertaking on their part was your sincere wish. Their aim is to procure the greatest benefit to the greatest number. Undoubtedly such an institution would be an acquisition to the inducements held out by the Association for additions to its ranks. The isolated feeling of some young men around us is caused by having no definite place to spend a few leisure moments. Why should there not be a happy and an innocent rendezvous for such? A home away from home. I leave this for conversation and discussion among yourselves. If the time is ripe the Council is ready, and will adopt the words of Addison:—"It is not in mortals to command success, but we will do more, Sempronius; we will deserve it."

Second Object.—Discussion of Subjects interesting to those engaged in Pharmacy.

This admits of very extensive application; it is wide in its scope. Has the Association in the past failed in accomplishing it? All of us are interested, not merely in pharmacy proper alone, but in all the sciences and arts that environ it, and especially in those branches which are embraced by the trade or calling we follow; indeed, in all things appertaining to its general welfare. Pharmacy is our main object, and demands our first attention; but in its pure and simple aspect, its requirement is so limited that its practice would retain but few of those who now gain a livelihood under its title, though combined with other branches of work. To narrow the scope of a business is to lessen the number of those who can subsist upon its earnings. With this fact in view, our subjects for discussion in the past have extended beyond what is included in the definition of pharmacy; and yet have been interesting to those thus engaged. We have always borne in mind that we are chemists and druggists as well as pharmacists, traders as well as professionals.

From our ranks have gone men who have made, or will make, a name and position in the pharmaceutical world. It would be interesting to know how many of our present members will owe their progress to the meetings and the proceedings of this Association, affording as it does a medium for conveying individual ideas, the results of research, or careful study, to others engaged as pharmacists.

The youngest of us may here air our ideas, with the full assurance we shall be patiently heard; whereas the surroundings of nobler walls, and the presence of more astute individuals would completely hush our voice, by bringing our hearts into our throats when commencing to speak; and thus the bud of promising success would be nipped rather than tended to and watered. Why is it

> "Full many a flower is born to blush unseen,
> And waste its sweetness on the desert air?"

The answer is, "Because its surroundings are unsuitable, or it is not in the position where it might be appreciated."

In the strictest sense of the term our Association is an *educating* body, having for its aim *the drawing out* of the ideas of its members, which, if new, it helps to formulate and exhibit for the world's inspection.

The science of chemistry is so closely allied to pharmacy that anything in connection with the one must also to a certain extent interest the other; at any rate, a new discovery in the one must make itself manifest in the other. Extensive as is the science of chemistry in its application and study, yet we find that some of the chief work connected with it, and some of the greatest discoveries, have been in relation to its fundamental laws and truths, which we may call its elementary portion, and at first sight declare it but simplicity. Let us not be too rash, but consider thoughtfully, since we have such men as Sir Henry Roscoe studying *Dalton's Atomic Theory*, and considering it not too simple and mean a subject to bring before the British Association; Professor Mendeleef working out the *Periodic Law*, Professor Crookes reading papers upon *Meta Elements, etc.*

In the face of this it appears that the simplest laws, and what we now call facts, require verifying and studying. What a field then lies before us. We assistants may not all attain to something lofty in our undertakings, but to use a popular phrase, "If we aim at the moon we shall hit something higher than a gooseberry bush." We can find subject matter for close study, thought and investigation, as these examples plainly illustrate.

Why need we despair because so many things are already discovered? In the mechanical world, some of the most useful and profitable inventions are amongst the most simple, the pen and the pin, for instance. In science it is the same.

We as young men seem not alive enough to the value of scientific research and persistent study in one direction, with a fixed aim in view; our business, certainly from its trading aspect, its long confinement, and its tedious nature, prevents and almost debars us entering upon such work, with anything like the requisite ardour to ensure success. Now that education in the various branches of the arts and sciences is so easily acquired by the mechanic, or others who have the desire for it, and the evening is to spare for attending classes where knowledge is imparted by the best of teachers at scarcely any cost, it needs but little thought on our part to decide upon the necessity of keeping abreast of the times, through careful reading and exchange of thoughts on current topics of scientific interest to which chemistry is closely related. Our Association affords means for the latter, thus inspiring the former.

Why should we not as pharmacists and supporters of the Pharmaceutical Society hope to see the Bloomsbury Square laboratories thrown open in the evenings for use of those anxious to practically investigate subjects interesting to pharmacy generally?

Someone will say: "But pharmacy is more closely allied to medicine than to chemistry." Admitted this fact; and we all know how much the medical world leaves the study of pharmacy to us; and the very limited knowledge of it required by their colleges or examinations evidence this. I am speaking of the *study* now rather than the *practice*, although I am pleased to notice that slowly even the practice is being abandoned by the doctor and left into the hands of those more qualified, from their study of its application, to perform it.

From our position as combined pharmacists and chemists, we are able to bring to the notice of the medical world many new and improved preparations, they in their turn reporting to us as to the physiological and therapeutical value possessed by such preparations. Also, by informing us of their requirements, we shall find that pharmacy will step in to supply their wants. The very able lecture on "*Relation between Chemical Structure and Physiological Action*," by Dr. Lauder Brunton, which we have doubtless all read in the pages of the *Pharmaceutical Journal* with keen interest, suggests to the pharmacist many practical ideas which, with the aid of chemistry, he may be enabled to successfully carry out.

No branch of science is yet perfect; pharmacy is far from complete. We may each find something to do in our own sphere to further develop it. Assertions need proving, discoveries need working upon, suggestions need trial, scientific recommendation needs practical application; and all of these are greatly benefited by criticism, and a declaration of opinion by those who have actually investigated them. That which may appear scientifically easy and simple, when put to a crucial test, often proves useless and an utter failure; and what may work successfully in model and theory, fails commercially. Certain ideas in connection with trade or science are considered good until better are discovered, when the old must gradually give way and ultimately succumb. As in everything else, the natural law is prevalent, "*survival of the fittest*."

The pharmacy of the ancient apothecary was considered good, and held its own until better was introduced, and now we ridicule what was then esteemed. Have we arrived at the zenith of perfection? Is it not probable that our ideas will soon become antiquated, and that our preparations and methods in pharmacy will have to give way for better? Yes! doubtless they will.

"All those things that are now held to be of the greatest antiquity were at one time new; what we to-day hold up by example will rank hereafter as precedent."

It is necessary, if we would keep up with the times (and the present age moves swiftly), that we should be fully cognizant of the latest discoveries and their best forms. Here is where the value of our Association is manifested, affording as it does an opportunity for mutual help in this direction. This is the case, especially on those evenings devoted to the reading of short papers.

We must ever bear in mind that we are not to keep all our work to ourselves. If the result is useful, let us share it; neither are we to fall into another delusion; that it is not necessary for us to trouble ourselves, as someone else will do the work, and we shall hear the result, and thus reap equal benefit without entailment of labour on our part.

The ground for all work and study should now be a scientific one, if we hope to attain success. This was the suggestion of the Ex-President of the Society of Chemical Industry, in a paper read by him at the Inaugural meeting of that Society in 1881. His remark was:—"Science tells us how far we are from attaining our industrial aims with anything approaching the theoretical expenditure of force. Science also tells us in what directions we may look forward to arriving at improvements. I might say that we are on the eve of creating a science of invention, that is, of developing scientific methods for solving industrial problems." This year he showed what discoveries he had made, working upon such a scientific basis.

The work of some is lost, unless they have a means of bringing it into prominent notice.

It may be a satisfaction to them to know, as Horace says: "He has lived not ill, who has lived and died unnoticed by the world." I think it would be a greater satisfaction for them to know they had lived for usefulness, and were noticed by the world.

Our Association affords a means of propagating the results of its members work. Knowledge possessed is power, and though imparted to others it does not diminish the source—

> "To give from the pocket means less for ourselves,
> To give from the mind the source remains full."

I have spoken thus far of the way in which the Association fulfils the intentions of its founders; I have also referred to advantages accruing to our members. Whilst I consider we ought to be a mutual improvement society, yet I think we should always justify our existence by endeavouring to make our work so useful and practical that its benefit will be felt by the outside pharmaceutical world. This we have done; our papers and discussions being thought worthy of publication is an evidence of this; and though we cannot do the work being done by the Pharmaceutical Conference, that not being within our scope, or even our ambition, yet it is satisfactory to note that abstracts from papers read before this Association are deemed useful enough for insertion in the Year-Book of Pharmacy.

Leaving now these few remarks, referring to the general work of the Association past and present, I must briefly refer to the—

Prospects of Pharmacy generally.—The past year has been a barren one, so far as pharmaceutical legislation is concerned, topics of far more general interest having been discussed by, and engrossed the attention of our imperial legislators; hence the small part of the community represented by pharmacists have again to wait for a convenient season.

The Pharmaceutical Society in the Curriculum Bill they this session recommended to Parliament were not ambitious in their requests. Everything that would tend to be restrictive to the British public in general was carefully left out, and the Bill only practically contained a wish that the power might be granted us to improve our own ranks, which would be an advantage to the general community, without putting upon them any burden or restraint. As is usual, all good measures meet with opposition, and this Bill did not prove an exception. Early in the session its supporters viewed it as doomed. I contend it was doomed, not so much from opposition as from the apathy towards it shown by those it was intended to benefit.

Notwithstanding objections to it have been raised by some opposers those objections are very shallow, being directed not against the objects of the Bill, but against it because it does not contain enough, is not embracing enough in its requests, and not wide enough in application. Any objection, however hollow it may be, if environed with numerous words and empty epithets, may appear hard to overcome, but as in nature hard materials are usually brittle, so should we find in these instances we have but to pull them about and they become shattered. I maintain there is much more to be said in favour of the Curriculum Bill than against it, and because it is not extensive are we to reject it? Why not get the thin end of the wedge in first?

Examination versus Curriculum may form a topic for discussion; but it is the almost unanimous decision of educationists that examination is not altogether an evidence of knowledge, but more frequently of tact and quickness of expressing mental ideas, and especially is this the case in *vivâ voce* examinations, such as pharmaceutical students have to undergo, and which to my mind is *the worst possible way of carrying out a bad principle.*

A strong protest was raised against the entire system of examination in November last. The ex-president of the Chemical Society in his address last March used the following words: "A most satisfactory feature is the adhesion to the protest of men who formerly were in favour of competitive examination as the test for entrance into civil or military service of the State."

This evil would be considerably overcome in regard to pharmaceutical qualification by a well instituted and regulated curriculum. What is required is actual systematic study, and the application of that study practically. The curriculum need not necessarily be so long as to be beyond the means of the student, nor is it absolutely necessary that the qualifying examination should be made more crucial, but if the course of study requisite for passing the examination, as at present conducted, extended over two or three years, instead of the same number of months, the ideas and truths gained and constantly applied or recalled would be more impressed upon the mind, and of more lasting benefit than at present is the case. Those who cram specially for examination cannot possibly equal those who study for the sake of knowledge, and undergo examination as a test of their progress. The present system, instead of teaching "knowledge is power," teaches that power is wrapped up for pharmaceutical students in the certificate obtained from the examiners.

Internal Reforms and Prospects.—If we cannot get a measure of reform from without our ranks, we must endeavour to get it from within. "Those only deserve help who try to help themselves."

The keen competition of the present day has rendered it imperative that many of our employers should meet it in reduced prices, and in some instances by extending the scope of the trading portion of their business. Nor are they to be blamed. It is necessary for the existence of ourselves, that not merely a legal educational qualification should be possessed, whatever that may imply, but also a business qualification, which will best advise a man as to the tactics he must pursue in his own special trade, adapted to his surrounding district. "The essence of knowledge is, having it, to apply it."

Can we hope for a better state of things in regard to prices and profits? I certainly think not, so we must make up our minds to submit to the inevitable. Competition is not on the wane, prices are not on the increase; neither are the public becoming more "respecters of persons," but rather their search is for the *best* article at the *lowest* price. Notwithstanding this, by a judicious combination of our educational acquirements and business tact, we may hope to be amongst the fittest who survive.

To achieve success, and to benefit our own fraternity we must, as stated by Mr. Groves so long ago as 1874, in his presidential address to the British Pharmaceutical Conference, "be prepared both to do and suffer in the cause. If trading instincts are allowed to smother professional feeling and practice, traders we shall and must remain; if otherwise pharmacy will eventually in this country attain the status it has so long enjoyed on the continent, and render services equally beneficial to the community."

Though fifteen years have elapsed since this was uttered, we as pharmacists still remain in much the same condition, and I think we may say the prophecy of Mr. Groves is correct. In many respects we are worse off than then, in few perhaps we have improved. Probably one improvement in our ranks may have commenced, since the suggestion of Mr. Greenish has been adopted by the British Pharmaceutical Conference.

We now are having published, through their instrumentality, reliable formulæ of what previously were *nostrums*, although someone may say, "Why should not each individual pharmacist imitate these preparations when they are required by the exigencies of his business?"

Surely it is better that when a preparation of definite name (I will not say composition, that frequently being unknown to the medical man) has gained some repute, a formula should be published for the benefit, not only of the pharmacist, but of the physician. Thus accuracy will be insured by a preparation of identical composition being supplied throughout British pharmacy.

Though we may deprecate the unlimited extension of such preparations, yet, doubtless, the more complicated pharmacy becomes the brighter is the prospect before us, for though it will inflict more labour upon us, it will have the effect of deciding the medical world to abandon pharmacy to those who are, as I have previously said, qualified from experience to carry it on.

I have touched upon a few only of the questions that will arise in connection with pharmaceutical interests. Perhaps you will say in some I have been moralizing, in others too severe or not practical. My desire is to help to create unity in working for what is already unity in wish, "benefit to ourselves, without prejudice to others."

Council Notices.—I must now, gentlemen, briefly call your attention to the Council notices and sessional arrangements.

For several years past the Council have, through the generosity of Messrs. Burroughs, Wellcome and Co., been enabled to offer a prize for the best essay on pharmaceutical improvements. This year they have the pleasure to announce that those gentlemen have further extended their liberality, and there will now be offered two prizes value £5 each, and with each of these prizes the Association's silver medal.

The one competition is for the *Research Prize* and Medal, awarded to the best *Original Pharmaceutical Investigation*; and the other for the *Essay Prize* and Medal, awarded for the best essay on *Recent Advances in Pharmacy*. The time for receiving competitions has been extended to March 31, in order to allow of more members competing. These distinct prizes now afford an opportunity to all our members to enter the competition, as those who have not conveniences necessary for carrying on original research work will be able to enter for the essay. Every inducement is thus offered to members; do not allow fear of failure to debar you entering, for the amount of knowledge gained in preparing a paper will amply repay for all the time and energy expended. "Knowledge is its own reward."

The 'Proceedings' of last session are ready for distribution, and will vie with former years in usefulness, and although not so bulky, yet an equal amount of matter is therein embodied, the type having been made smaller. Every member who was in connection with the Association last year can have a copy free on personal application, additional copies can be obtained at half the published price, at which price also members joining this session can be supplied. It is hoped that all will be disposed of, as the book must necessarily become a work of reference for the possessor.

The programme for the first half of this session contains some valuable subjects, and from the names of some of the gentlemen who have promised to read papers, I think you may safely look forward to a scientific treat as well as useful information. Much as we appreciate the presence of these gentlemen at our meetings, we are more desirous that our members should support them, and that they should join heartily in the discussion, and be stimulated themselves to prepare us something for the next half session. If they are too modest to monopolise a whole evening, then anything useful or interesting can be given on the night set apart for short papers, thus rendering mutual the working of the session.

Gentlemen,—In conclusion I must remind you that the success of the Association rests, as it ever has done, entirely with yourselves. I wish you individually to feel there is a duty devolving upon you to help on the progress and advance the interests of the Association for the benefit of those who may subsequently join its ranks. You can all help by your presence at the meetings and by joining in the discussions. With such assistance which I confidently look forward to, why should not this session be a progressive one?

It is by unity in our aims, determined and persistent perseverance in our undertakings, and an increased interest in our work that success is to be achieved. "Nothing succeeds like success," and we have this stimulus for the coming year. Let us take the advice of Sheridan, who said, "The surest way not to fail is to determine to succeed."

At the conclusion of the address,

Mr. Joseph Ince, in proposing a hearty vote of thanks to the President, called attention to the embarrassment incidental to the occupation of a presidential chair in selecting a topic for an introductory address, and illustrated his remarks by a recent example. He referred to the objects for which the Association was instituted, and emphasized the fact that whilst the more purely social character of the Association had been borne in mind, its literary and scientific progress had extended far beyond the pale of the members, and had been such as to merit the commendation of many eminent men of science. He was unable to fall in with the suggestion that evening lectures and laboratory instruction should be given at Bloomsbury Square, for the professors and teachers had already as much work as they could get through, and even professors were but mortal! He compared at some length the educational establishments of various continental countries with those of our own, and stated that for thoroughness and industry England stood out conspicuously, and in conclusion stated that so far as his experience went no Association kindred to the one he was addressing had ever been reared in the ranks of the continental pharmacist.

Mr. W. K. Hopkin seconded the proposal, and bore witness to the able manner in which the President had detailed the aims of the Association and to the good work that its members had accomplished in the past.

Mr. E. J. Millard, as a member of the Association, supported the remarks of the mover and seconder of the vote of thanks. Alluding to the fact that the Association was commencing its thirteenth session, he intimated that as time went on so did their responsibilities increase, and individual effort was needed to maintain a healthy and vigorous existence. The facilities afforded to the members for acquiring the very essential art of speaking in public could not be overestimated. He begged them to give the President their support during the ensuing session, and concluded by complimenting him upon his comprehensive and intellectually interesting address.

Mr. Ellwood, in returning thanks, said that in an Association of this kind the work fell not only to the lot of the President, each individual member had some share in it. In an address of this nature the President expresses his own ideas, and those ideas might at times be open to criticism. He thought the near future would see the President adopting the principle that was followed by the chief officer of various societies nowadays, which was to take a subject for discussion entirely outside the section of which he might be President; he, however, had not dared to do so upon this occasion, fearing that he might incur still greater criticism. He thanked the patrons and members who were present for honouring him by their attendance and for the cordial manner in which they had received his remarks.

British Pharmaceutical Conference.

MEETING AT NEWCASTLE-UPON-TYNE.

Wednesday, September 11.

(*Continued from page* 300.)

The next paper read was a—

NOTE ON A SCALE OF SMALL RESIDUES.

BY B. S. PROCTOR, F.I.C.

In washing precipitates or exhausting drugs by percolation it often becomes important to judge the amount of solid matter which the solvent is extracting. It rarely happens that the washing can be carried so far that a drop of the liquor evaporated on a clean slip of glass leaves no palpable amount of fixed residue, and, indeed, distilled water itself is rarely free from this evidence of impurity. In washing a precipitate of morphia the process may be continued till a drop of the filtrate leaves a residue considerably less than that left by an equal quantity of a saturated solution of morphia. If the washing is being conducted with pure water a point is reached at which the error involved by the solubility of the morphia is as great as the error resulting from the impurities which up to that time remain in the precipitate. If the washing be conducted with a saturated solution of pure morphia in pure water the washing may be continued to any desirable extent, and the extent which is desirable may be judged by evaporating side by side on a slip of glass a drop of the washings and a drop of the saturated solution of morphia; if the residue of the former is not appreciably greater than that of the latter, the washing may be considered complete.

In many operations where we have not this natural standard of comparison it is convenient to be able to judge approximately whether a drop of filtrate or percolate contains $\frac{1}{1000}$, $\frac{1}{10000}$, or $\frac{1}{100000}$ of a grain of fixed matter. And with the view of aiding this judgment I have constructed a scale of residues in which the evaporated drops contained $\frac{1}{1000}$th to $\frac{1}{1000000}$th of a grain of several fairly typical forms of soluble matter. The materials I have selected are calcium sulphate, potassium nitrate, gum acacia and gum tragacanth. These afford generally useful standards for comparison, but any operator having frequent work in any particular line would naturally reap most advantage from a scale prepared with the material most frequently requiring his judgment in this way.

In illustration, I have prepared plates of these residues, and have added a fifth series showing the same weights of suspended alumina.

In all cases I used distilled water for the first two liquors and rectified spirit for the last two, the process being to adopt a dropping tube which delivered minims of water, and which was found to deliver half minims of spirit. A grain of the soluble matter was dissolved in 1000 minims of water, and a drop of this liquor evaporated on the glass plate formed the first mark on the scale; then 10 minims of this liquor diluted with 90 of water, and a drop of this second dilution yielded the second mark on the scale. Then 10 minims of the second dilution made up to 50 minims with rectified spirit. A drop of this third dilution (equalling $\frac{1}{2}$ a minim) gives the third mark, and 10 minims of the third dilution made up to 100 minims with spirit makes the fourth dilution, a drop of which leaves $\frac{1}{1000000}$th part of a grain as the fourth and last mark in the scale.

The necessity for using spirit for the third and fourth liquors arises from the difficulty of meeting with distilled water so free from fixed matter as not to add materially to the visible size of the $\frac{1}{100000}$th and $\frac{1}{1000000}$th of a grain. Rectified spirit, on the other hand, usually contains so little impurity as not to interfere with these highly minute residues.

The PRESIDENT, in conveying the thanks of the Conference to Mr. Proctor for this paper, said it was homœopathy and practical chemistry combined.

The following paper was read by Dr. Thresh:—

STROPHANTHUS PLANTS.

BY T. CHRISTY, F.L.S., ETC.

Having my attention called in 1878 to the value of strophanthus, I obtained through a gentleman at Mozambique all the seeds that could be found, but very few germinated. I afterwards received a small quantity from the African Lakes Company and Mr. Buchanan. These seeds were at that time called "kombe," and I planted, without any selection, some of these seeds, the result being that from this handful of "kombe" seeds, *i.e.*, the green hairy seed, different kinds of plants were raised.

In the year 1886 Mr. Buchanan sent home some roots of strophanthus. One of these grew and produced a plant from which the leaves shown herewith were taken. No plant, excepting one other that I have raised from seed, has yielded so large a leaf as this; the seed producing this plant was known as "kombe," and it had no peculiarity about it. In the year 1888 some seed was brought to this country which was quite white, called by Blondel "Woolly seed from Zambesi." I have several times planted this seed, but have only obtained one plant, which has quite a small leaf. Early in 1888 the Niger Company at last being aroused to the advantage of obtaining strophanthus seeds, brought to this country seeds which I classified as *Strophanthus hispidus*, they being plentifully hispid, and of a red foxy colour; they were found to yield an excellent tincture, giving good results, equal, if not superior, to what was known as "kombe" tincture. These plants have all a large hairy leaf and promise to develope still larger foliage, very much resembling the strophanthus sent home by Buchanan.

Professor Husemann, of Gottingen, kindly made for me a comparative analysis between the "kombe," the "hispidus," and the "minor" or so-called "niger" seeds, and he reported to me as follows:—"Both seeds of *Strophanthus niger* received from you belong to the series of cardiac drugs. Both seeds in their action upon the heart are hardly to be distinguished from the African species of strophanthus commonly known as 'kombe.' I made experiments with the alcoholic extract after eliminating fatty matters with ether. The seeds first sent (the 'minor' variety) yielded 10 per cent., and the second (the 'hispidus') yielded about 12½ per cent. of extract. The latter, by reason of a larger percentage of chlorophyll, is greener than the former, which is of a dark brown colour. Of both extracts one centigram stopped the heart's action in a frog within a few minutes; no special direct action was noticeable upon the veins, showing in this respect that the two extracts above mentioned do not differ in any way from that obtained from the 'kombe,' and furthermore no narcotic action was found."

The variety of seed which Dr. Blondel named *Strophanthus minor* (B), owing to its being very small in size, is blunt at one end and has a tapering point at the other; a good name for this would have been "turtle" strophanthus.

In 1888 Dr. Blondel came to this country and worked up the sections of the plants growing in my greenhouses at Sydenham, and he visited the Natural History Museum, South Kensington, where Mr. Carruthers brought out the whole of the herbarium collection of strophanthus, flowers and foliage. He then went with me to Kew. Dr. Oliver kindly gave up considerable time to us and went through the whole series of his specimens. We then saw clearly that what we had called *Strophanthus* "*kombe*" was really only a variety of the "hispidus."

In 1889 a small supply of *Strophanthus glaber* seeds from the Gaboon, with some of the pods, arrived in Paris, but unfortunately it amounted to only a few pounds. This established the fact that the pod of the glabrous strophanthus of Gaboon was of large size, smooth externally and very red in appearance, thus agreeing with an unnamed specimen in my own collection. It was also proved that this glabrous strophanthus of Gaboon yielded a crystallizable alkaloid, and further that this same seed was that employed by Professors Hardy, Gallois and Polaillon, in their earliest researches, and who had found out and declared that the strophanthus yielded a "crystallizable alkaloid." Owing to the "kombe" only having reached Europe in commercial quantities during the past few years, no serious attempt could be made to isolate a crystallizable principle.

In 1889 I received a shipment of some 150 lbs. of the seed of the glabrous variety of Gaboon. I have got one plant from some thousands of the seeds planted; the leaf of this plant (now shown) is glabrous, shiny and pointed.

All the workers with strophanthus both in Paris and in Germany find that this glabrous strophanthus yields a crystalline compound with the greatest ease, and specimens were shown by me at a meeting of the Pharmaceutical Society early this year and exist in their Museum. This variety, it will be seen, has leaves somewhat similar to some of the specimens of "kombe."

At the Therapeutical Congress in Paris, in August this year, there was a bowl of strophanthus seeds shown which I thought very beautiful and bold; but upon expressing this opinion to Dr. Blondel, he picked out for me several seeds of a "turtle" shape, as before referred to, and asked me to bite them; I did so, and found they had hardly any bitterness. He said that it was very singular that this shape of seed, not only in this variety, but in others, such as the "minor," seemed to contain very little active principle. As far as the chemist is concerned, many are now working with medical men at the therapeutics of this interesting drug by mixing the strophanthus seed with other drugs, a combination of strophanthus and alstonia constricta having been found to be valuable against obesity. In the Paris Congress Dr. Dujardin-Beaumetz clearly put forward as the result of his experiments with the tincture of strophanthus that he obtained entirely a different action when he employed strophanthin, and he strongly advised medical men to keep to the tincture as giving the best results.

In conclusion I would remark that anyone looking at the seeds sent home originally as *Strophanthus "kombe"* cannot but be surprised at the different foliage of the plants raised from what appeared to be seed of one variety only, as shown in the first series exhibited.

(*To be continued.*)

Parliamentary and Law Proceedings.

THE SALE OF STRYCHNINE VERMIN KILLERS.

On Saturday, October 12, an inquest was held at Riddings, near Alfreton, respecting the death of a single woman named Platts, from the effects of poison. The following is the evidence given, that related to the obtaining of the poison by the deceased:—

Ernest Walter Greaves deposed that he lived at Golden Valley. He was 17 years of age, and was the son of William Samuel Greaves, chemist. On Thursday night last he was in his father's shop at Ironville, about half-past seven o'clock in the evening. William Joseph Smith, assistant, was also in the shop. A woman, dressed in a long ulster and straw hat, came into the shop and asked for a threepenny packet of Battle's Vermin Killer. He asked her what her name was, and she replied, "Elizabeth Salt." She wrote the name in the poison book, and she said that her address was "Riddings." Witness asked the deceased what the vermin killer was for, and she said it was to destroy mice with.

The Coroner: Did she bring anybody to vouch for her?—No.

Did you know her previously?—No.

Do not you see in the poison book a space left for the signature of the witness?—Yes. He added that Mr. Smith, the assistant, was with him in the shop.

The Coroner (to Smith): Why did not you insist on having a witness?

Smith: As it was a local case I did not think it necessary.

The Coroner: But you did not know this woman, and the law says you should see that she is accompanied by a witness. There is no precaution if you do not fulfil the terms of the Act.

Smith: We are very particular in regard to persons from outlying districts.

The Coroner: But you are not particular. You did not comply with the Act in this case. If proper inquiries had been made this poison would not have been supplied, and this poor woman might have been alive now.

The witness, Ernest Walter Greaves, then stated that after the deceased had signed the name "Elizabeth Salt" he supplied her with the packet of vermin killer, which contained about three-quarters of a grain of strychnine. He had seen the body of the deceased, and he was sure it was the person who purchased the vermin killer.

William Joseph Smith said he lived at Ironville, and was general assistant to Messrs. A. Greaves and Son, chemists. He corrobated the evidence of the last witness as to the sale of the poison to the deceased. Before she signed the poison book the deceased seemed a little depressed.

The Coroner: You noticed that?—Yes.

Why didn't you take it on yourself to ask her to bring somebody to vouch for her?—I didn't care to do it.

Why not?—My suspicions might have been wrong.

But you would have been perfectly justified in asking for it; in fact, the law requires you to do so. With the Swanwick case in front of you, and especially as she looked so distressed, I should have thought you would have done this. You would not have done much harm, and you might have done a great deal of good.

Dr. Warters, of Greenhill Lane, stated that he was called to see the deceased on Thursday night last. She was dead when he arrived. He found that she was pregnant, and about five or six months advanced. He suspected from her appearance that she had taken some poison. The evidence which had been given was clearly demonstrative of death by strychnine poisoning.

The jury then considered their verdict, and found that the deceased committed suicide while temporarily insane by taking Battle's vermin killer.

The Coroner briefly commented on the danger of chemists selling poison in a manner contrary to law If the chemist did not know the purchaser, he was bound to insist on having a witness to the signature.—*Sheffield Daily Telegraph.*

Obituary.

Notice has been received of the death, on the 1st of October, of Mr. William Leslie, Chemist and Druggist, High Street, Nairn, N.B. Mr. Leslie held the office of Provost of Nairn for fifteen years and in addition was an Honorary Sheriff Substitute of Nairnshire.

Review.

How to Analyse Simple Salts, Solids and Solutions. By H. Belcher Thornton, F.C.S.*

To any person commencing the study of analysis without the advantage of a tutor, this little pamphlet would be of great service; it is evidently written after experience and observation of the errors a beginner is liable to fall into if not looked after, and contains useful hints and advice on such points. The method pursued, too, is adapted for cultivating habits of observation, the student being recommended to perform certain experiments and note the results, without being told what to expect: after having made his own observations, but not till then, he is advised to compare with a text-book. The experiments are arranged so as to give at first an insight into the behaviour of the various bases and acids with certain group reagents, and afterwards confirmatory and distinctive tests are given, with advice as to methods of procedure. The value of the pamphlet is a good deal marred by a want of care in its compilation, and the use of an unscientific nomenclature, which form a strange contrast to the author's advice to his readers. In a small work of this kind, and intended, too, for beginners, such oversights as the inclusion of iodides among the salts precipitated by barium chloride, and the statement that with arseniates "ammonia silver nitrate gives a yellow precipitate," should not occur. In respect to the nomenclature employed, the terms "sulphate of potash," "hydrate of ammonia," etc., although not conforming to the commonly adopted modern system, have some excuse for their employment, but there is no excuse for the employment of "iodide of *potash*" and "cyanide of *potash*." The author seems to overlook the fact that by salts of potash were understood compounds of "acids" (anhydrides) with *oxide of potassium* or *potash*, a view impossible to apply to those containing no oxygen. A glance at the British Pharmacopœia of 1867 will show the distinction there preserved between salts of potash and potassium. If these points had received a little more attention, the utility of this little compilation as a substitute for oral teaching in the early stages of analytical study would have been materially increased.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Solubility of Sulphate of Barium in Alkaline Citrates, etc.

Sir,—Since my paper to the British Pharmaceutical Conference, printed in the *Pharmaceutical Journal* of September 8, my attention has been drawn to the fact that the influence of alkaline citrates in retarding the precipitation of barium sulphate is mentioned by Fresenius. I had looked to both volumes of Fresenius (a very old copy of 'Qualitative,' and sixth edition of 'Quantitative Analysis'), under the heads of detecting and estimating both sulphates and barium compounds, and not found any information on the point, and subsequently consulted several other works with like results.

Under these circumstances I think I was justified in using the somewhat cautious words that I had not met with any statement to the effect that citrates retard the precipitation of barium sulphate. I may now, however, add that those who may be interested in the subject will find in Fresenius's quantitative analysis, under the head of "Forms and combinations in which substances are separated from each other, or in which their weight is determined," bases of the second group, "Several salts more particularly interfere with the precipitation of baryta by sulphuric acid"——"alkaline citrates possess this property in a high degree."

Storer's 'Dictionary of Solubilities' also gives a considerable list of substances increasing the solubility of barium sulphate under the head of sulphate of baryta. The statement stands thus: "Nor is it precipitated from solutions containing normal soluble citrates, except on boiling, but citric acid alone exerts no such solvent influence (Spiller, J., *Chem. Soc.*, x., 110)."

The statement with which my paper concluded, that "tartrate of ammonium has a similar retarding effect to a rather smaller degree," remains, so far as I know, a new fact, though a fact which we might naturally have anticipated in the light of the knowledge of the influence of the citrate, and a fact which it would give no surprise to find had already been stated somewhere else. B. S. Proctor.

Ferri et Ammonii Citras.

Sir,—I have perused with much pleasure Mr. Proctor's practical and suggestive paper on the above subject, together with the discussion arising therefrom. In a note on "Ammonio-citrate of Iron," read before an evening meeting of the Pharmaceutical Society on March 7, 1885, I pointed out that the residue obtained on incinerating a portion of the salt invariably consisted of, or contained, magnetic oxide of iron.

But I do not agree with Mr. Proctor in attributing its presence to any reduction of ferric oxide; my experience of that oxide being that it is very difficultly reducible at a red heat in presence of organic matter. The more probable explanation, it seems to me, is afforded by the presence of ferrous salt in the ammonio-citrate.

I have examined a number of samples of this scale preparation, and have not met with a single one which did not contain a large proportion of ferrous salt.

A good method of testing I have found to be the following. A small quantity of the scale is dissolved in water, a little dilute sulphuric acid added, and the mixture gently warmed for a minute or two. This splits up the compound, and yields a straw-coloured solution, which is easily tested for ferrous salt by means of potassium-ferridcyanide.

With regard to residues containing magnetic oxide, I cannot say whether or not it is possible to convert the latter into ferric oxide, but certainly it is unaffected by exposure in a platinum dish to a red heat for four or five hours in the open air. My own impression is that it would be difficult to move a strong base like ferrous oxide when in combination.

I may say that when estimating various samples of ammonio-citrate I made solutions containing about 100 grains in 8 ounces distilled water, and although some kept good for several months, ultimately a kind of fermentation set up, with evolution of bad smelling gases; the iron deposited as oxide or sulphide, and the solution became colourless.

Perhaps I may be allowed to remark, in conclusion, that I do not think scientific pharmacy has yet said its last word upon the subject of scaly preparations. R. Wright.

Lex.—Proof of the addition of a foreign substance to an article of food or a drug, or of the wilful abstraction of any of its constituents, is not essential to conviction for an offence under the Act. It is an offence to "sell to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance and quality of the article demanded by the purchaser." You will find the Act printed *in extenso* in the Society's Calendar.

Midlands Counties Chemists' Association.—We regret that owing to some omission of the official who supplied the report of the meeting of this Association last week, Mr. Wyley's address was not received until too late for publication.

Naval Dispensers.—Inquirer.—The statement that an increase has been made in the rate of pay to dispensers in naval hospitals, which appeared recently in a contemporary, seems to have been made under a misapprehension. In the latest reprint of the regulations the opportunity was taken to rearrange the table in which the rate of pay is stated, but the effect is precisely as it was before.

Communications, Letters, etc., **have been received from** Messrs. Grierson, Welborn, Wyley, Maiden, Newsholme, Dyer, Septuagenarian.

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* London: H. Silverlock. 1889. 8vo. Pp. 1-45. 1*s*.

BOTANY BAY OR EUCALYPTUS KINO.

BY J. H. MAIDEN, F.L.S., F.C.S., ETC.,
Curator of the Technological Museum of New South Wales, Sydney.

(*Concluded from page* 222.)

4. Classification of Eucalyptus Kinos.

Eucalyptus kinos can be very simply classified according to their behaviour with alcohol or water. In all cases the writer made the tinctures of the strength of tinct. kino, B.P. The kinos experimented upon by the writer fall into three groups, which he has called, the Ruby group, the Gummy group, and the Turbid group respectively.

a. Ruby Group :—

E. amygdalina, Labill.
E. eugenioides, Sieb.
E. hæmastoma, Sm.
E. macrorrhyncha, F. v. M.
E. pilularis, Sm.
E. piperita, Sm.
E. Sieberiana, F. v. M. (syn. *E. virgata*, Sieb.).
E. stellulata, Sieb.
E. melliodora, A. Cunn.
E. obliqua, L'Her.

In the preparation of a tincture all the above kinos tend to dissolve entirely, forming clear ruby solutions of approximately the same tint. They also form clear ruby solutions to cold water, hardly differing in appearance from the tinctures. The aqueous solution of the alcoholic extract is similar in appearance. Members of this group are not very friable, breaking down into clean angular fragments, and never forming an impalpable powder. If acetate of lead or of copper be added to a moderately strong solution of these kinos, so strongly gelatinous a precipitate will be formed that the test-tube may be inverted without any liquid spilling. This distinguishes them, in one respect, from the Turbid Group.

At present I know of no constant characteristics to aid in further sub-dividing this group. The stringy barks (*E. obliqua, macrorrhyncha*, etc.), may often be distinguished (as a group) by means of fibrous bark either attaching to individual fragments of kino, or loose with a parcel of it, but it must be borne in mind that many other species (*e.g., piperita*) have more or less stringy bark.

b. Gummy Group :—

E. leucoxylon, F. v. M.
E. paniculata, Sm.
E. resinifera, Sm.
E. robusta, Sm.
E. saligna, Sm.
E. siderophloia, Benth.

In spirit, these kinos scarcely dissolve, leaving abundant granular residue of gum. Supernatant liquid perfectly clear. These kinos tend to be perfectly soluble in cold water, and age seems to have but little effect on them in this respect. They are like the Ruby kinos in not forming impalpable powders, being even tougher than the members of that group. They form gelatinous precipitates with some metallic acetates, like the Ruby group.

c. Turbid Group :—

E. goniocalyx, F. v. M.
E. hemiphloia, F. v. M.
E. rostrata, Schl.
E. punctata, DC.
E. odorata, Behr.
E. Gunnii, Hook.
E. Stuartiana, F. v. M.
E. viminalis, Labill.
E. terminalis, F. v. M.
Angophora lanceolata, Cav.
A. intermedia, DC.

The above yield orange-brown solutions.

E. corymbosa, Sm.

Yields solutions up to the brightest ruby.

E. microcorys, F. v. M.
E. maculata, Hook.

Yield solutions of various shades, from lemon-yellow to orange-brown.

All the members of this group yield turbid solutions to spirit, which require long standing or filtering to become clear. They behave in a similar manner to water, but become clear on boiling, indicating catechin. The aqueous solutions of the alcoholic extract are likewise turbid. They are all more or less friable, forming impalpable powders usually by pressure of the fingers. Addition of acetate of lead or copper produces only a very slight gelatinous precipitate, thus dividing them from the other two groups.

Sub-division of the Group.

E. corymbosa kino is usually so brilliant in colour, and yields such rich-coloured tinctures that it cannot well be mistaken for any other kino.

E. microcorys and *E. maculata* are often externally much alike, but they may be distinguished (1) by the facility with which the former dissolves in water, (2) by the yellow colour which the latter yields to ether.

E. maculata, E. punctata and *A. lanceolata* possess odours. The essential oils which cause them may be removed by ether.

5. Definition of the Terms "Botany Bay Kino" "or Australian Kino."

Not the product of *E. resinifera.*

I propose to investigate the claim of certain species to be yielders of the kino which for over one hundred years has passed under one or other of the above names. The first published allusion to this kino will be found at p. 233, *Journal of a Voyage to New South Wales*, by John White, Esq., Surgeon-General to the Settlement, London, 1790. A plant is figured (flower-buds and bark), described by Dr. (afterwards Sir) James Smith, who wrote the botanical portion of White's book, as a new species, *Eucalyptus resinifera*, and the kino is thus alluded to :—"On making incisions in the trunk of this tree, large quantities of red resinous juice are obtained, sometimes even more than 60 gallons from a single tree. When this juice is dried, it becomes a very powerfully astringent gum-resin, of a red colour, much resembling that known in the shops by the name of kino, and for all medical purposes fully as efficacious. Mr. White administered it to a great number of patients in the dysentery which prevailed much soon after the landing of the convicts, and in no single instance found it to fail. This gum resin dissolves almost entirely in spirit of wine, to which it gives a blood-red tincture. Water dissolves about one-sixth part only, and the watery solution is of a bright red. Both these solutions are powerfully astringent." What particular tree is indicated in the above passage will probably never be known. The sample of bark figured is smooth and scribbly, like that of *E. hæ-*

mastoma perhaps, and certainly as unlike that of the two trees named by Sir James Smith and Allan Cunningham, *E. resinifera** (*vide infra*), as it is possible for it to be. Only two trees in the Sydney district yield kino in anything like the abundance it was alleged to have been yielded by the *E. resinifera* of Smith. They are *E. corymbosa* and *Angophora intermedia*, but although I am well acquainted with these trees, and have made the matter of exudations of our native trees my special observation for over three years, the highest reliable estimate of the quantity yielded by either of them would not be more than one-third of the quantity mentioned by White. The red colour would, however, exclude the *Angophora*, while *E. corymbosa* yields a "blood-red tincture" to spirit of wine, and dissolves almost entirely in that liquid, but such a kino would be readily and almost entirely soluble in cold water. Smith's description also contains the statement: "The wood is extremely brittle, and from the large quantity of resinous gum it contains is of little use but for firewood." Not too much stress should be laid upon an expression of opinion of the value of a timber made only a few months after the settlement of this continent, but the description of the wood being full of gum-resins almost certainly applies to *E. corymbosa*, or to an *Angophora*. But the flower-buds figured are of a eucalypt (and that excludes *Angophora*), while they are as unlike those of *E. corymbosa* as possible. The bark figured is smooth, the flower-buds have something the shape of those of *E. punctata* (included by Bentham under Smith's *resinifera*), while the strongly-compressed peduncle, all taken in conjunction with the smooth bark (*E. resinifera* bark is never smooth, except occasionally on the branches), may show that Smith's figures refer to *E. punctata*. But the kino of *E. punctata* is liver-coloured or reddish-brown, and that description does not tally with that of White. All this tends to prove the truth of my original assertion, that the origin of the figures in White's book will probably never be known. As likely as not the bark and the flower-buds (no other parts being figured) were from different species.

It will be seen later on that the name *resinifera* was a singularly unfortunate one to apply to any species of eucalyptus, firstly, because they are nearly free from resin, and secondly, because scores of species yield this exudation (called "gum resin" by Smith) very freely. All kinos yielded by eucalypts, if they have been exuded sufficiently long, will be found, at a certain stage, to be only soluble in water to the extent of one-sixth, but a eucalyptus kino almost entirely soluble in spirit, and at the same time only one-sixth in water, is an impossibility.

White's description (for although penned by Smith, the substance of it must have been supplied by White) has partly been copied by many subsequent authors. A few extracts will suffice.

"*E. resinifera*, the brown gum tree of New Holland, furnishes Botany Bay kino. A single tree will yield 60 gallons." Balfour, 'Manual of Botany.' *E. robusta* is the only eucalypt ever known as "brown gum," but that species neither exudes kino freely, nor is the product readily soluble in spirit.

"*Botany Bay Kino.*—The substance called by this name is the produce of *Eucalyptus resinifera* (Myrtaceæ), and other species of eucalyptus, natives of Australia and Tasmania. It appears to be a kind of extract, and has properties similar to the official kino." (Pereira, 'Materia Medica.') The surmise as to its being an extract has already been dealt with.

"*E. resinifera*, the Ironbark tree, a native of Australia and Van Diemen's Land, and several other species, yield an astringent substance called eucalyptus, or Botany Bay kino. The kino resembles in its properties the official catechu and kino, and may be used for a similar purpose." (Bentley, 'Manual of Botany.') The Ironbark tree above alluded to is the *E. resinifera* of A. Cunn. (*E. siderophloia*, Benth.), but neither it nor the *E. resinifera* of Smith extends to Tasmania.

As has already been mentioned, there are two eucalypts called *E. resinifera*. They are:—

1. *E. resinifera*, Smith (White's 'Voyages,' p. 233; 'B. Fl.,' iii., 245; figured in Decade I. of Mueller's 'Eucalyptographia'). It is commonly called "Red or Forest Mahogany," and is the tree to which the species-name attaches by priority.

2. *E. resinifera*, A. Cunn. (Syn., *E. siderophloia*, Benth.); 'B. Fl.,' iii., 220. Figured in Dec. IV. of Mueller's 'Eucalyptographia.'

"*Ironbark*" *or* "*Red Ironbark.*"—At the latter place Baron Mueller states, "The Rev. Dr. Woolls observes that the Botany Bay kino is more extensively obtained from *E. siderophloia* than from *E. resinifera* (Smith, of course), which, as the specific name implies, is generally regarded as the main or even sole source of that drug." And Dr. Woolls, in his 'Plants of New South Wales,' (1885), states, "The Botany Bay kino was procured principally from this species, and hence Allan Cunningham and other botanists were accustomed to call it *E. resinifera*."

But what are the characteristics of kino? The official kino (*Pterocarpus Marsupium*) is, according to the British Pharmacopœia of 1885, "almost entirely soluble in rectified spirit." This is an important property, and on it the tinct. kino B.P. is based. Works on materia medica, while pointing out certain unimportant points of dissimilarity between the official and eucalyptus kino, never state that the latter does not dissolve in rectified spirit, while some make the specific statement that it is soluble in that liquid. But my experiments have shown that no kino is more insoluble in spirit than that of *E. siderophloia*. I obtained four samples from widely different localities in New South Wales and Queensland, and collected at different times. They all agree in their very partial solubility in alcohol, by reason of the very high percentage of gum they contain. The *E. resinifera* of Smith is also comparatively little soluble in spirit, for a similar reason. For this reason alone, I do not hesitate to say that "Botany Bay kino" is neither the produce of *E. resinifera*, Smith, nor *E. resinifera* A. Cunn. Both these kinos would be quite useless for the preparation of a tincture, and would never be thought of a second time by any person who had made the experiment on either; it is therefore quite certain that these species have not caused pharmacists to use eucalyptus kino more or less for a century, but rather, it has doubtless been the admixture of such kinos as these with such eucalyptus kinos as are freely soluble in spirit, which has helped to bring eucalyptus kino into disrepute.

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* *E. punctata* (included in *E. resinifera*) has a smoothish ark, but is not scribbly.

I now give a list of species which satisfy the requirements of the B.P., and it is hoped that systematic endeavours will be made to place kinos which do, or should come into that list on the market. Eucalyptus kino was official in the Edinburgh Dispensatory of 1811, but the different substances supplied under the same name doubtless led to its omission.

1. All members of the Ruby group.
2. The following members of the Turbid group:
    - *E. goniocalyx.*
    - *E. hemiphloia.*
    - *E. rostrata.*
    - *E. punctata.*
    - *E. odorata.*
    - *E. Gunnii.*
    - *E. Stuartiana.*
    - *E. viminalis.*
    - *E. terminalis.*
    - *E. corymbosa.*

The remaining members of the turbid group in my list must be for the present omitted, on account of their colour; perhaps *E. punctata* would have to be rejected only on that account.

All members of the gummy group must be rejected.

Important Note.—The above list only contains those species which I have proved by experiment to be suitable. I can therefore guarantee them, and will only add others to the list as opportunities occur for testing them by other chemists or myself.

I suppose it is too much to expect that the specific name of *resinifera* shall be abandoned for any eucalypt. I know it is against botanical rules; but if the specific name *virgata* could be suppressed on account of the stature of a eucalypt, I think, on the ground of expediency, Baron Mueller may well suppress Smith's *E. resinifera*,[*] for this name has impeded attempts to obtain a knowledge of our kinos for a century. I have already specifically referred to two objections to the use of *E. resinifera* for Smith's species, and would now emphasize that it is a poor yielder of a poor kino. Out of nearly one hundred and fifty species of eucalyptus, most of them (perhaps all) yield it more or less, and of those which yield it most abundantly it is difficult to say which produces it the most freely, and to which the term "resinifera" would by right belong. Probably to *E. corymbosa*. But the name should be suppressed.

6. Gelatinization of Tincture of Kino.

The gelatinization of tincture of kino, by which it forms a substance like red-currant jelly, and more or less devoid of astringency, remains an unsettled question, although it has often been alluded to in journals devoted to pharmacy[†] during the last half century. Pereira following Thomson, and most other writers on materia medica following Pereira, state that where gelatinization takes place, "Botany Bay Kino" has been used, by which is meant, as I have already shown, any of the kinos belonging to perhaps 40 or 50 species.

I have had over seventy eucalyptus and angophora kinos in spirit (to make tinctures of B.P. strength), for periods varying from a few days to twelve months, and have drawn the following conclusions:—(1) Tinctures do not gelatinize if made from new kinos. By the word "new" I mean under one or two years old. (2) No kinos gelatinize other than the clear ruby ones. Five very old ruby kinos on which I experimented gelatinized in a month or two. (3) All kinos entirely soluble in spirit are ruby ones.

Whatever the cause of gelatinization may be, or rather, whatever the substance may be which, when formed, causes gelatinization, my experiments show that no chemist need have gelatinized tincture of kino if he chooses to avoid it. Old ruby kinos should be rejected for the purpose of tincture making. In the case of a member of the Ruby group, if the kino is not completely and readily soluble in cold water, forming a clear ruby solution, with no gelatinous ruby coloured residue of phlobaphene, it should be rejected. My tinctures were made in March, 1888, and perhaps sufficient time has not elapsed to justify one in being dogmatic on the matter, but I will engage to report these samples in another year or two.

The writer has little doubt that this gelatinous looking mass consists wholly or mainly of softened phlobaphenes. By direct experiment he has shown that insoluble phlobaphenes break down after a longer or shorter period of digestion in alcohol, and form the substance already likened to red-currant jelly. The subject will bear further inquiry, but certainly he cannot detect gum, or the somewhat unsatisfactory pectin in the gelatinized mass.

THE PARIS UNIVERSAL EXHIBITION.

(Continued from page 302.)

Denmark.—One of the most interesting exhibits in this Court illustrates the enormous advance that has been made in recent years in the biological study of the organisms that play so important a part in beer brewing and other industries. Here may be seen growths of wild and cultivated yeast, the pure yeast occurring in round spots; "bottom" yeast; the "red yeast" of Pasteur, which worked such havoc among the barrack bread in Paris some years ago; *Aspergillus Oryzæ*; various moulds and cultivations of bacteria.

Dutch Colonies.—This collection contains a number of substances more or less interesting to the pharmacist. Among those from the eastern colonies may be mentioned cultivated and wild cubebs, false cubebs, long pepper, mace, nutmegs, cinnamon, patchouli, *Cassia Fistula* pods, *Sizygium Jambolanum*, *Orthosiphon stamineus* leaves, areca nut and coca leaves. Java also sends a good collection of cinchona barks, ranging from a *C. Schuhkraft* bark, containing only 0·22 per cent. of quinine, to a Ledger bark yielding 8·92 per cent. The barks are also accompanied by a number of mounted specimens of leaves and flowers of the plants from which they are derived.

Ecuador.—In this Court were noticed ipecacuanha, sarsaparilla, condurango, cinchona bark, ivory nuts, cocoa, mustard, sugar and caoutchouc.

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[*] Another eucalyptus product is usually called by a false name, the essential oils being generally labelled *E. Globulus.*

[†] Cf. *Pharm. Journ.*, i., 399; [3], x., 232.

Although there is no collection of native materia medica exhibited in this Court there is an herbarium containing specimens of the plants used in medicine in Ecuador, with the botanical names and medicinal properties given under each. A large number of these are probably not used beyond Central America, and others may be regarded as American substitutes for European drugs. The specimens of cinchona barks included *Cinchona lancifolia*, "*estoposa fina*," "chahuarguera" (*C. officinalis*), "Pata de Gallinazo" (*C. micrantha?*), "estoposa" (*Cinchona Palton*), hard carthagena bark and large flat pieces of *C. succirubra*. The list of medicinal plants is too lengthy for insertion in this notice.

GABOON.—The exhibit in the colonial palace includes many native drugs, some of them shown by the Catholic Mission and some by the Local Administration. Among these, besides the "physic nut" (*Curcas purgans*), there are several purgative barks, bearing the native names of "ozina-zina," "osombé," "osonguma" (very powerful), "osougon'goma," "osintjé" and "ongueka." A bark named "ogagouma" is described as yielding a decoction that acts powerfully as a sudorific, and the bark of *Haronga paniculata* is said to be astringent and antisyphilitic. Two ordeal poisons are shown, m'boundu seed, supposed to be from *Strychnos Icaja*, H. Baill, and "sassy" bark (*Erythrophlœum guineense*), which came into some prominence a year or two ago in consequence of the assertion that the active principle, "erythrophlœine," produced local anæsthesia; also "onaye" pods (*Strophanthus hispidus*). Then there are "melaguetta pepper" (*Amomum Melaguetta*), "Ethiopian pepper" (*Uvaria æthiopica*); "dika nuts" and "dika bread" (*Irvingia Barteri*); manioc root; café nègre (*Cassia occidentalis*); cocoa nibs and kola nuts and leaves; the fruit of *Chrysobalanus Icaco*, or cocoa plum, which is used for making preserves; and seeds of *Bambusa arundinacea*, used as a food by the natives. Under the name "resine d'Oucame" is shown a product from a species of *Bursera*; there is also an "incense from Cape Lopez," from *Amyris Plumieri*, and copal from *Guibourtia copallifera*, the last being exported from Cape Lopez. Among the oil and fat materials are the seeds of *Elæocarpus lanceolatus*, *Pentadesma butyracea* ("graines à stearin"), *Ricinus communis*, *Myristica gibbosa* ("muscadier à suif"), *Bassia noungou* and *Elæis Guineensis*. Some caoutchouc is shown as the product of *Carpodinus dulcis*, and there is also some black caoutchouc probably from *Landolphia Kirkii* and *L. Petersiana*, which is shown as representing the caoutchouc of the equatorial regions. Lastly, there is also some vanilla, but only a few small pods are shown. In the conservatories of the Colonial Exhibition a number of plants from the Gaboon are exhibited, including, besides several of those above named, among plants yielding vegetable fats, *Bassia noungou*, *B. Djave* and *B. Acole*, and the "ochoco" fat tree, referred to the genus *Dryobalanops*, although the species appears to be unknown. Of spices, there are the Gaboon nutmeg tree, *Monodora myristica*; of dye woods Cam wood or m'pano, *Baphia laurifolia*, Baill, and Bar wood or Ezigo (*Pterocarpus angolensis*); of indiarubber trees *Landolphia Kirkii* and *L. Petersiana*, Hook; and *Tacca involucrata*, from the roots of which an arrowroot is made.

GOLD COAST.—This exhibit, which is to be found in the Colonial palace, includes jequirity seed and "false jequirity" (*Adenanthera pavonnia*); chaulmoogra seeds; copalchi bark and "copalchin"; *Morinda citrifolia* bark and a fine yellow pigment extracted from it; kola nuts (*Sterculia acuminata*) and the two false kolas (*Garcinia kola* and *Heritiera littoralis*) investigated by Heckel and Schlagdenhauffen; *Guillandia Bonducella* seeds and oil; "galam butter" and "brown gutta" from *Bassia Parkii*; a "butter" from the *Pentadesma butyracea*, a tree which yields a yellow greasy juice when cut, to which it owes its name of "butter" or "candle tree"; and *Sarracenia purpurea* "for the gout." Other articles shown are coffee, caoutchouc, and palm oil.

HUNGARY exhibits sunflower seed oil.

INDIA (FRENCH).—There is nothing very striking in the collection from Pondicherry, but among the things noticed were the leaf buds of *Acacia oleracea*, esteemed a table delicacy, *Rottlera tinctoria* pods, indigo, coffee, cardamoms, *Pongamia glabra* seeds and the pale yellow variety of jequirity seeds (*Abrus precatorius*, var. *leucosperma*).

ITALY contributes products from the *salines* at Salsomaggiore, in Lombardy, boracic acid and borax and a very good display of vermicelli and similar pastes. There is also a case belonging to Piazzesi, of Florence, that is literally full of orris root.

MADAGASCAR contributes some good looking vanilla, cloves and coffee. There is also some india-rubber that promises well, labelled "caoutchouc du nord;" and probably derived from *Vahea madagascariensis*, Lamb., or *Tabernæmontana elastica*, Raoul, which are the two chief india-rubber plants of the island. Besides which some gutta percha, Madagascar beeswax, and orchella weed, consisting of *Roccella Montagnei*, a species that generally grows on trees or bushes, are exhibited. This last-mentioned plant has narrower and less rigid fronds than *R. fuciformis*, which it otherwise much resembles. In the conservatory containing Madagascar plants a new species of strophanthus, *S. Rigali*, Cornu, is exhibited, as well as the tacamahac tree, *Calophyllum Tacamahaca*. Notwithstanding the troubles France has had in Madagascar scientific men have evidently been busy, for in the upper story of this house may be seen upwards of a hundred well-executed plates of the flora of the island, and beasts, birds and insects have each about as many devoted to them.

MARTINIQUE.—The principle articles noticed in this Court were some small vanilla and tinned pineapples, essence of lemon and concentrated lemon juice.

MEXICO.—In this Court there is a large collection of native materia medica, but the labels were enclosed in the bottles, and the names could only be seen by permission of the officer in charge. The list is too long for insertion here, and will be given subsequently for reference in the form of an appendix. One feature noticeable in this Court is a collection of sponges from Yucatan, including fine specimens of the velvet grass and glove sponges.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, OCTOBER 26, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

ELEMENTARY SCIENCE TEACHING.

It is too much a characteristic of the people of this country to regard science generally as relating to matters outside the range of practical life. Hence it has been usual for those engaged in the conduct of industrial operations to profess a contempt for what they styled theoretical knowledge and to pride themselves upon being practical, the meaning of that designation being often little more than equivalent to the statement that they carried on their operations in a routine manner as their fathers and grandfathers had done. To some extent the abundant resources of the country in raw material may have been one of the reasons which made such a view of the matter possible, and to mention only one instance of the influence of that circumstance, it was not very many years ago when it was thought that the production of iron was an especially British industry that had no need to fear competitors. More recently the error of such an opinion has been proved, notwithstanding the great natural facilities offered by the occurrence of iron ores and coal in close proximity, which were considered to give this country an unapproachable pre-eminence in this branch of industry. Since that time many other branches of industry have experienced the influence of foreign competition, and it has become apparent that such competition has been very largely assisted by superior scientific knowledge on the part of foreign manufacturers. Germany, especially, has furnished evidence of the advantage arising from such knowledge, and the rapid growth of the productive industries of that country may be largely attributed to the fact that its manufacturers are now reaping the fruit of nearly a century of systematic cultivation of science, especially of chemistry. A recognition of this fact has to some extent led to a perception of the necessity of scientific education for everyone engaged in manufacturing occupations, but up to the present the facilities existing for the study of such an important science as chemistry are but slender. The mistaken idea as to the incompatibility of science with practical work has now, however, been to a great extent abandoned in favour of the view that the extended knowledge gained by scientific investigation is simply an extension of the field of possible industrial practice.

Under these conditions it has become a matter of importance to provide means of scientific education, and of late years it has been usual to include science teaching in school systems. But the method in which this has been done has seldom been efficient or satisfactory, and there is great need for improvement in this direction. The subject has now been taken up by the British Association, and one of the most important steps taken was the appointment of a committee to consider and report upon the present method of teaching chemistry. The first report was presented last year at the Bath meeting, and was founded upon statements made by teachers of chemistry as to the methods adopted by them. The conclusion arrived at was that much of the teaching of elementary chemistry is far from satisfactory, and that it needs to be considerably modified if it is to effect the benefit of which it is believed to be capable. In the second report, presented by the Committee at the late meeting of the British Association in Newcastle, it is pointed out that the high educational value of instruction in physical science has never been exhibited to its full advantage in our educational institutions. But experience proves that there is no more effective and attractive method of training the logical faculties than that afforded by a properly arranged course of instruction in physical science. Apart from the actually useful knowledge imparted, it has the still greater advantage of developing the faculties of observation and judgment, of accurately ascertaining facts and of drawing correct conclusions from them. The information gained by the Committee as to the existing state of scientific teaching, and as to the desire of teachers to be advised and assisted in the adoption of proved methods, has had the effect of inducing the Committee to discuss the lines which a course of elementary instruction in chemistry should follow, and to propose a scheme for that purpose. The leading principle adopted was that elementary physical science should be taught from the first as a means of mental training, and not merely as useful knowledge. Having arrived at an agreement as to the general principles on which a scheme of elementary instruction in chemistry should depend, the Committee accepted the offer of Professor ARMSTRONG to draw up an account of such a scheme in sufficient detail to serve as a guide to those who have to provide such teaching. This scheme constitutes a considerable portion of the report presented at Newcastle, and the Committee considers that it is in general accordance with the view entertained by it as to what should constitute a course of elementary instruction in physical science. With regard to the manner in which such a scheme should be carried out, particular stress is laid on the following points. In order that the plan may produce its full educational effect the instruction should commence at an early age and be extended to every child in a school. It is not desired to bring forward physical science as a substitute for any other principal subjects of study, but it is desired that it should be looked upon everywhere, like those subjects, as a necessary part of education, receiving a due share of the time given to school work.

The scheme suggested by Professor ARMSTRONG is drawn up with the idea that mere chemistry is not what is needed in schools, but that the study of certain general physical phenomena must form the introduction to it. On this principle the course is divided into six distinct stages, arranged so as to lead from one to another. Stage I. comprises lessons on familiar objects and their classification according to origin, use, etc. Stage II. Lessons in measurement and the relation of measures and of densities. Stage III. The effects of heat and the phenomena of combustion and the material changes thus produced. In this way the foundation would be laid for entering upon the more special study of material changes or chemical studies proper in Stage IV., which comprises lessons of the nature of problems, such as determining what happens when iron rusts, to demonstrate the general character and particular nature of gases, the changes taking place in combustion, the constitution of atmospheric air, the composition of chalk, etc. In Stage V. the quantitative composition of substances previously studied qualitatively should be dealt with, and thus combining proportions would be demonstrated. Stage VI., studies of the physical properties of gases, as compared with liquids and solids, so as to illustrate the molecular and atomic theories and their application. It is thought desirable that most, if not all, of the experiments in each stage should be made by the pupils; but much valuable instruction could be given if the lessons took the form of demonstrations, and if the pupils did not proceed beyond the fourth stage they would acquire an acquaintance with the everyday conditions of existence which very few possess at the present day. The foundation thus formed for more special studies and for technical training would also remove a deficiency that is too frequently experienced.

At a meeting of the Council of the British Medical Association, held on the 16th inst., it was decided to accept an invitation presented in the name of the Birmingham and Midland Counties Branch, asking that the Association should hold its next annual meeting in Birmingham, and Dr. Willoughby F. Wade was chosen as President-Elect.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Thursday, the 31st inst., when a paper will be read on "Photomicrography," with practical illustrations, by Mr. M. E. Swan.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

October 16, 17, 18, 23 *and* 24, 1889.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner, Taylor and Thresh.

Dr. Stevenson was present on the 16th and 18th on behalf of the Privy Council.

MAJOR EXAMINATION.

16*th*.—*Six* candidates were examined. *Three* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Davies, David Sidney	New Quay.
Flint, Charles	Stratford-on-Avon.
Foster, Murray Toogood	Collumpton.

17*th*.—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bygott, John William	Huddersfield.
Jeffcoat, Joseph George	London.
Jones, William Thomas	Wellington, Salop.
Lakeman, Nicholas Frank	Modbury.

23*rd*.—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Sayers, William Charles	London.
Seccombe, Charles William	Southampton.
Stonham, Herbert Lovett	Maidstone.
Stuart, William	Preston.

24*th*.—*Six* candidates were examined. *Four* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Peck, Ernest Saville	Cambridge.
Tabor, Thomas Slade	London.

MINOR EXAMINATION.

16*th*.—*Twenty-seven* candidates were examined. *Thirteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Andrew, John Herbert	Oldham.
Arnison, William Shoolbred	Sunderland
Bainton, Arthur	Manchester.
Baker, William Weaver	London.
Barclay, John	Birmingham.
Bate, Walter Humphries	London.
Beynon, Benjamin	Swansea.
Blanchford, Reginald Arthur	Sutton.
Brittain, Florence	Birmingham.
Broadbent, George Henry	Bradford.
Bush, James Edward	Dunmow.
Carpenter, Albert Hemsley	London.
Carter, Benjamin Robert	Hounslow.
Watson, David Sydney	London.

17*th*.—*Twenty-five* candidates were examined. *Sixteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cooling, Francis Charles	Bath.
Cullen, Frederick Spencer	Norwich.
Douthwaite, Hy. Lonsbrough	Pocklington.
Dowswell, Charles Wesley	Tewkesbury.
Fechtner, Arthur Louis Wm.	Hull.
French, John Edward	Sheerness.
Galloway, Philip Henry	London.
Geen, Charles Alfred	Exeter.
Gelling, John Alexander	Douglas.

18th.—*Thirty-one* candidates were examined. *Nineteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Corry, Edwd. Samuel Warren	Barnstaple.
Griffiths, William Robert	Clynderwen.
Hodgetts, Nathaniel	Birmingham.
Holmes, Charles Matthew	Bourne.
Honiatt, Albert Thomas	Hereford.
Hopley, John Henry	Northwich.
Houfton, Arthur Ellis	Chesterfield.
Kent, Thomas Oliver	Wye.
Laycock, James	Bradford.
Leadbeater, Sidney Herbert	London.
Lunn, Arthur	Cambridge.
Lyne, Walter Henry	Grantham.

23rd.—*Twenty-eight* candidates were examined. *Twenty-one* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Mitchell, Thomas Arthur	Truro.
Morrow, Charles	Hornsea.
Peters, George Henry	Wrexham.
Phillips, Joseph	Heath Town.
Smith, Richard Silcock	Norwich.
Taylor, James	Eccles.
Williams, William Henry	Bethesda.

24th.—*Twenty-four* candidates were examined. *Fifteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Pickering, James Skelton	York.
Poll, George James	Wells, Norfolk.
Robinson, William Albert	Carlisle.
Severs, Charles	Kingston-on-Thames.
Shacklock, Philip Joseph	Littleworth.
Tiffany, John William	Halifax.
Tingle, Joseph Grantley	Kettering.
Wallis, William	York.
Wrench, Frederick William	Silverdale.

PRELIMINARY EXAMINATION.

24th.—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Abraham, Edward	Caistor.
Allenby, Henry E.	St. Albans.
Barley, Alfred Henry	Broadstairs.
Bellamy, George William	Hoxton.
Budworth, James Phineas	Derby.
Dales, Edward	Louth.
Easton, David	Kilmarnock.
Flower, John Scott	Wakefield.
Gaziello, Charles Joseph	London.
Heap, John Henry	Bolton.
Morgan, Richard Bonner	Birmingham.
Robbins, Percy John	London.
Roberts, Walter John	Bath.
Smart, Harold William	Willesden Park.
Smith, Frank William	Bayswater.
Watson, Wilfred Lewis	Kettering.
Wharmby, Walter Frederick	Mansfield.
Whiffin, Leonard John	Sutton.

The Report of the College of Preceptors on the Examination held on October 8 was received.

Two hundred and forty-two candidates had presented themselves for examination, of whom *one hundred and thirty* had failed.

The following *one hundred and twelve* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Adams, John	Uxbridge.
Andrews, Thomas Newton	Plymouth.
Appleyard, Francis Henry	Bradford.
Appleyard, Percy	Keighley.
Bagnall, Percy	Ashton-under-Lyne.
Bentley, Lumley Scurr	Leeds.
Blackman, Leopold Gilbert	Oxford.
Botham, William	Whitby.
Bridger, Benjamin Charles	Barnstaple.
Broughton, Ernest	Manchester.
Burdon, Edward	Spennymoor.
Butterfield, James Foster	Driffield.
Campbell, John Henry	New Wortley.
Chapman, James	Bathgate.
Clark, Adam Burgess	Strichen.
Clarke, Thomas Cooper	Coventry.
Clode, Ernest	Cardiff.
Crook, Frederick Stanley	Mirfield.
Dalkin, Thomas	Sheffield.
Dawson, Arthur Cossons	Cheltenham.
Douglas, Hugh	Bournemouth.
Dudfield, Frank Floor	London.
Duncan, Henry Richard	Gloucester.
Dusart, George Charles	Twickenham.
Eaton, Henry	Lutterworth.
Eggleston, George	Alrewas.
Ellis, John	Glasgow.
England, Charles Frederick	Bristol.
Fawcett, Ernest John	Whitby.
Forbes, Charles	Aberdeen.
Foster, Fredk. Chas. Harvey	Birmingham.
Fraser, William	Maryburgh.
Freer, Cyril Charles	Malton.
Gibbs, William Yeend	Birmingham.
Glendinning, James Colman	Leeds.
Hack, Robert	Burton Lazars.
Hampson, Thomas	Leigh.
Hardman, Harry	Southport.
Harries, John Davies	Milford Haven.
Hart, Samuel Henry	Hull.
Hewitt, Charles Herbert	Sheffield.
Hodges, William John	Winchester.
Howorth, Frederick Arthur	Newcastle-under-Lyne.
Huband, George Thomas	Birmingham.
Hutchinson, Frederick Ernest	Sileby.
Ireland, Alfred Coltman	Leicester.
Ireland, Alfred James	Stroud.
James, George Christopher	Yardley.
Joesbury, Albert Edward	Ludlow.
Johnson, John William Baker	Nottingham.
Johnstone, James	Carlisle.
Joiner, Samuel	Banff.
Jones, Robert	Bethesda.
Kennedy, Alexander Anderson	Aberdeen.
Lane, John George O.	Milford Haven.
Langden, David Maxwell	Cheltenham.
Liddle, Thomas Martin	Middlesborough.
Lloyd, John Ambrose	Chester.
Logie, John Moffat	Arbroath.
Macfarlane, Malcolm	Aberfeldy.
McGregor, Geo. Alexander	Ellon.
McLaren, Robert	Edinburgh.
McLennan, Alexander	Nairn.
Main, Alexander	Keith.
Meats, William Edward	Leicester.
Milne, Hamilton	Dysart.
Mitchell, William Garden	Ellon.
Morgan, John Edward	Devonport.
Nicholls, Ralph	Devonport.
Ogden, Edward	Faversham.
Orme, John William	Heckington.
Owen, Thomas Pritchard	Blaenau Festiniog.
Padwick, John Graeme	Red Hill.
Page, William John	Newport, Mon.
Paine, Charles Standen	Bowdon.
Palmer, Frank Elijah	Ipswich.
Parkinson, Wilfred	Preston.
Pashley, E. F. Cuthbert	Harrogate.
Penman, Edward Wright	Jarrow.
Ramsay, William	Dundee.

Rattray, David Smith	Aberdeen.
Ray, George Wheatcroft	Clifton.
Rees, Elias	Llanelly.
Riley, Joseph Arthur	Seaforth.
Robinson, Albert	Manchester.
Rogers, Alford	Llanelly.
Rothwell, William Thomas	Radcliffe.
Russell, Edward John	London.
Russell, George Erskine	Paisley.
Senter, George	Mossat.
Skeeles, Arthur Edward	London.
Smith, Francis Joseph	Bradford.
Steeds, Frederick George	Dorking.
Stevenson, Robert	Kirkcaldy.
Sutherland, John Dunbar	Elgin.
Swanson, Alexander James	Edinburgh.
Thomson, William	Glasgow.
Tregaskes, Harry	Bude.
Waddell, John	Glasgow.
Warlow, George Henry	Addiscombe.
Webb, Stephen Archibald	Bristol.
Westland, Robert	Banchory.
Whittle, William Wilford	Melton Mowbray.
Widgery, Ernest	Burnham.
Wilkinson, George Henry	Dudley.
Williams, Gregory Thomas	Cardiff.
Williams, John	Llanelly.
Wilson, James	Doon of Urr.
Wilson, John Henry	Louth.
Winton, William Colin	Haddington.
Wright, Frederic	Knutsford.
Young, William Paterson	Aberdeen.

The questions set at this examination were published in the *Pharmaceutical Journal* for October 12, p. 285.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.		
	Examined.	Passed.	Failed.
Aberdeen	18	10	8
Birmingham	14	7	7
Brighton	4	0	4
Bristol	10	4	6
Cambridge	4	0	4
Canterbury	1	1	0
Cardiff	6	3	3
Carlisle	2	2	0
Carmarthen	10	5	5
Carnarvon	4	2	2
Cheltenham	3	3	0
Darlington	6	2	4
Douglas	1	0	1
Dundee	3	2	1
Edinburgh	13	7	6
Exeter	5	3	2
Glasgow	5	4	1
Hull	8	2	6
Inverness	5	4	1
Jersey	1	0	1
Lancaster	4	1	3
Leeds	10	9	1
Lincoln	3	2	1
Liverpool	8	4	4
London	33	9	24
Manchester	22	7	15
Newcastle-on-T.	4	1	3
Northampton	2	1	1
Norwich	2	1	1
Nottingham	11	5	6
Oxford	2	1	1
Peterborough	1	0	1
Sheffield	2	2	0
Shrewsbury	3	1	2
Southampton	6	3	3
Truro	4	2	2
York	2	2	0

Provincial Transactions.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The first meeting of the session was held on Friday, October 18, in the drawing room of the Young Men's Christian Association. There was a large attendance. Twelve new members were elected. Mr. H. Wyatt, Junr., M.P.S., and Mr. J. R. Johnson, M.P.S., were elected President and Vice-President in the place of Mr. H. B. Thornton and Mr. J. F. Fleetcroft, who have left Liverpool. Mr. B. C. Robinson and Mr. Frank Walker retain their posts as Treasurer and Secretary.

The President, in the course of his address, impressed upon the members the necessity of each doing something, however little, short communications being far better than a long paper, which occupied the whole evening, and was of no practical value to students when finished. The success of the Society depended upon each individual member, and he had no doubt but that if every one put his shoulder to the wheel the Society would be a success.

The Vice-President congratulated the Society upon its position, and hoped it would be maintained.

The remainder of the evening was taken up with pianoforte solos, songs and recitals.

The next meeting will be held on Thursday, October 31, in the Society's rooms, Colquitt Street, when a paper will be read by Mr. T. H. Wardleworth on "The Flora of the Wallasey Sand Hills."

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the session was held in the Association's rooms, Commercial Street, on Thursday evening, October 17, Mr. D. McD. Skinner, Vice-President, in the chair. There was a large attendance of members.

After the minutes of the previous meeting had been read and confirmed, the Chairman called upon Mr. J. B. Mason to read his paper on "Sodium and its Salts."

After a brief introduction, in which he referred to the former Association, Mr. Mason began with the metal sodium, describing how it was obtained, and from that proceeded to take up in turn nearly all the official preparations.

The paper (which was illustrated with equations and experiments) was very attentively listened to, and at the close Mr. Mason was awarded a hearty vote of thanks, after which some discussion took place, in which Messrs. Skinner, Mason, Main and Henderson joined.

The Secretary then stated that, in the unavoidable absence of Mr. James Anderson, he had much pleasure in handing over the microscope, which that gentleman had presented to the Association, and in doing so he hoped that full use would be made of it by the members and that it would prove a useful aid to them in their studies.

The Secretary was instructed to write and thank Mr. Anderson on behalf of the Association for his gift.

This was all the business, and the meeting closed.

British Pharmaceutical Conference.

MEETING AT NEWCASTLE-UPON-TYNE.

Wednesday, September 11.

(*Continued from page* 319.)

The following paper was read by Dr. Thresh:—

THE CHEMISTRY OF STROPHANTHUS HISPIDUS.

BY DR. THOMAS R. FRASER.

Seeds.—In order to ascertain the general composition of the seeds, a weighed quantity, after having been carefully triturated, was dried at 100° F. and extracted by percolation, first with petroleum ether, boiling below 50° C. (100° F.), and then with anhydrous ethyl ether. After the ether had been completely removed by exposure to the air and to a moderate heat, the residue was divided into two equal portions, one of which was extracted with rectified spirit, and the other with distilled water, and in the latter solution the mucilage and albumen were estimated. The water was estimated by heating a separate quantity of ground seeds to 212° F., and this also was used for the determination of the inorganic matter by combustion. Stated in percentages, the results were—

Analysis No. 1.

		Per cent.
Water		6·7
Petroleum ether extract (chiefly fat)		31·81
Ethyl ether extract (resin, chlorophyll, etc.)		0·845
Rectified spirit extract (20 of rectified spirit to 1 of seeds)		8·94
Water extract	Mucilage	7·35
	Albumen	1·95
Ash		3·514
		61·109
Undetermined constituents		38·891
		100·000

In many other analyses, no attempt was made to estimate the water, mucilage, albumen and inorganic matter, but the seeds were merely extracted with ethyl ether followed by rectified spirit, or by rectified spirit alone. It was early found that the fat and mucilage present in the seeds rendered water an inappropriate menstruum for removing the active principle; and for the same reason even dilute alcohol, in the form of proof spirit, could not conveniently be used, especially when extraction by percolation was attempted.

These and other analyses show that the ether extract, consisting mainly of fat with a small quantity of chlorophyll and of resin, amounts to about 34 per cent. and that the alcohol extract, containing the active principle, amounts to about 9·5 per cent. of the seeds.

Ether Extract.—The ether extract, whether obtained with ethyl or petroleum ether, consists mainly of a liquid fat or oil containing chlorophyll and other colouring matters, and when obtained with eythl ether, a small quantity also of resin. It gives a permanent translucent stain to paper. Its colour varies considerably, the lightest coloured specimens being very pale greenish-yellow, and the darkest brown with a faint tint of green, the chief intermediate shades being grass-green and pale and deep olive-green. The lighter coloured ether extracts were usually derived from the later percolates, and the dark-coloured from the earlier percolates of the same seeds. The extract is translucent and clear, but after standing for some time a nearly colourless sediment usually separates, which disappears when the extract is heated to 120° F. Ethyl alcohol, amyl alcohol, acetone, chloroform, ethyl and petroleum ether, and bisulphide of carbon dissolve it freely. It has an oleaginous odour, and when dissolved in ether and washed by shaking several times with water, it has an oleaginous taste without bitterness. The well-washed ether extract does not possess any toxic action, nor indeed any other action than that of a bland oil. Its viscosity, and in the paler specimens, its appearance and other characters, are very similar to those of olive oil. The specific gravity, determined in a pale yellow or greenish-yellow oil, was found to be 0·975, in a pale green oil 0·954, and in a dark greenish-brown oil 0·9267.

Alcohol Extract.—On evaporating, with the aid of a gentle heat, the concentrated tincture of the seeds freed from substances soluble in ether, or a watery solution of it, a sweetish mucilaginous and somewhat nutty odour is developed. The extract then assumes the appearance of a translucent brownish-yellow or yellowish-brown hard substance, having some tenacity. If it be further dried, by being placed *in vacuo* over sulphuric acid, it gradually loses its translucency and becomes opaque, lighter in colour, and brittle. The extract is intensely bitter. It is freely soluble in water and in rectified spirit, sparingly soluble in absolute ethyl alcohol and in amyl alcohol, and insoluble in chloroform and in ethyl and petroleum ether. The watery solution has usually a distinctly acid reaction. When ether or chloroform is added to a solution of the extract in ethyl or amyl alcohol, the solution immediately becomes opalescent, and an amorphous deposit is by and by formed. Occasionally, when ether is added to a very dilute solution in rectified spirit, the opalescence is succeeded by the formation at the sides and bottom of the vessel of groups of colourless glassy crystals. These crystals possess the chemical and pharmacological properties of the active principle, strophanthin.

However careful may have been the extraction with ether of the seeds or of the alcoholic extract, this extract does not consist of a crystalline substance alone. The crystals are mixed with, or imbedded in, other substances of non-crystalline structure, whose existence is rendered clear when the extract is further analysed. The further analysis also shows that the quantity of non-crystalline substances varies in different extracts, and that one important cause of this variation is the amount of spirit percolated through the seeds in the preparation of the extract.

Composition of the Alcoholic Extract.

On adding to the dried alcohol extract a small quantity of rectified spirit, the extract does not entirely dissolve, but a residue remains, which is insoluble in a moderate quantity of rectified spirit. When the clear alcohol solution thus obtained is mixed with ether, it becomes densely opalescent, but in a short time the opalescence clears away, and a translucent amorphous and intensely bitter deposit occurs. The decanted and usually clear alcohol-ether solution also yields a residue when distilled and evaporated.

The first of these products is freely soluble in water, forming a mucilaginous solution, which reduces Fehling's solution, after it has been digested for some hours with a little dilute sulphuric acid. The second product agrees with the active principle, for which I have proposed the name "strophanthin," in the chemical and pharmacological characters afterwards described. The third product is insoluble in water and in acids, soluble in rectified spirit and in dilute alkalis, and precipitated from the latter solution by acids, and it is, therefore, a resin.

The quantity of each of these products, in one out of several extracts that have been analysed, is stated below—

Analysis No. 2.

Alcohol Extract of Analysis No. 1.—Total alcohol extract, 8·94 per cent. of seeds.

	P. c. of alcohol ext.
Impure strophanthin	63·367
Mucilage	16·275
Resin	14·542
	94·184

The total extract (8·94 per cent. of seeds) was, however, the sum total of the extracts of three successive percolations of the same seeds; the first having been obtained by a percolation of 10 parts of rectified spirit to 1 part of seeds, the second by a subsequent percolation of 5 parts of rectified spirit to 1 of the same seeds, and the third by a subsequent percolation of 5 of spirit to 1 of seeds. It is interesting to note the total quantity of alcoholic extract obtained from each of these percolates, and the composition of each extract.

The first percolate of 10 : 1, therefore, yielded 7·9 per cent. of the 8·94 per cent. of total alcohol extract; and this 7·9 per cent. contained a much larger percentage of strophanthin than either of the subsequent percolates.

Analysis No. 3.

	1st percolate, 10:1. Total extract, 7·9 p. c. of seeds.	2nd percolate, 5:1. Total extract, 0·674 p. c. of seeds.	3rd percolate, 5.1. Total extract, 0·87 p. c. of seeds. P. c. of extract.
Impure strophanthin	68·16	27·44	25·67
Mucilage	12·27	42·28	52·7
Resin	13·79	23·36	14·18
	94·22	93·08	92·12

It appears from the above analysis, that by the process of percolation nearly all the active principle is extracted by the first small quantity of spirit, and that this percolate yields an extract consisting chiefly of active principle. Further percolates contain only small quantities of the active principle, even although they may be of decidedly bitter taste; but they contain much mucilage, resin, and other undetermined substances. It is also to be noted that the extract obtained from the first percolate of a moderate quantity of the rectified spirit differs from the extracts obtained from further percolates, not only in chemical composition, but also in physical characters. After having been dried by spontaneous evaporation and by exposure *in vacuo* over sulphuric acid, both extracts may be opaque, brittle, and only slightly coloured, although the extract from the first percolate is less coloured than those from subsequent percolates; but while the former retains for an indefinite time the appearance and physical characters it had acquired on becoming dry, the latter become much darker in colour, they lose their opacity and brittleness, and acquire a plastic amorphous character and a dark reddish-brown colour. These changes occur independently of exposure, as they have been observed with extracts protected from exposure by being placed as soon as dried in well-stoppered bottles.

The impure strophanthin, precipitated by ether from an alcoholic solution of extract, is also a much purer substance when it is derived from the first percolate than when it is derived from subsequent percolates. In the former case, it is pale, brittle, crystalline, and opaque, and it retains these characters for an indefinite period; while in the latter case it is, from the first, of a brownish-yellow colour and translucent, and if dried so as to admit of being reduced to a powder, it soon becomes an adherent homogeneous mass of dark colour.

Analyses of the separated Testa and Cotyledons and Embryos of the Seeds.

The next analyses were made in order to ascertain the quantity of each of the above ingredients present in the testa and in the combined cotyledons and embryos respectively, and especially to ascertain whether the former or the latter contains the largest quantity of active principle. When the testa was carefully separated from the rest of the seeds it was found, in 119·48 grains of seeds, that the testa weighed 52·6 grains, or 44 per cent. and the combined cotyledons and embryos, 66·88 grains, or 55·97 per cent., of the seeds.

Analysis No. 4.

52·6 grains of testa yielded—

Anhydrous ether extract (28 : 1) 9·58 grains = 18·212 per cent. of testa, or 8·016 per cent. of seeds.

Rectified spirit extract (20 : 1) 4·58 grains = 8·707 per cent. of testa, or 4·873 per cent. of seeds.

66·75 grains of *cotyledons* and *embryos* yielded—

Anhydrous ether extract (26 : 1) 31·15 grains = 46·666 per cent. of cotyledons and embryos, or 26·118 per cent. of seeds.

Rectified spirit extract (20 : 1) 4·865 grains = 7·288 per cent. of cotyledons and embryos, or 4·07 per cent. of seeds.

The testa therefore yielded a much smaller quantity of ether extract, but a somewhat larger quantity of spirit extract, than the combined cotyledons and embryos. Differences in composition between the alcoholic extract of the testa and that of the cotyledons and embryos are stated below.

Analysis No. 5.

Alcoholic extract of *testa*, 4·58 grains, yielded—

Impure strophanthin, 2·7 grains = 58·95 per cent. of extract, or 5·13 per cent. of testa.

Mucilage, 0·875 grain = 19·104 per cent. of extract, or 1·663 per cent. of testa.

Resin, 0·94 grain = 20·545 per cent. of extract, or 1·663 per cent. of testa.

Alcoholic extract of *cotyledons* and *embryos*, 4·865 grains, yielded—

Impure strophanthin, 3·765 grains = 77·4 per cent. of extract, or 5·65 per cent. of cotyledons and embryos.

Mucilage, 0·48 grain = 9·866 per cent. of extract, or 0·719 per cent. of cotyledons and embryos.

Resin, 0·44 grain = 9·044 per cent. of extract, or 0·67 per cent. of cotyledons and embryos.

The alcoholic extract of the seeds, therefore, obtains most of its colouring matter, mucilage, and resin from the testa, and most of its strophanthin and oil from the cotyledons and embryos.

Reactions of the Alcoholic Extract.

The action of a considerable number of reagents has been tested upon both the dry extract and a watery solution of it.

Dry Extract.

1. Moistened with strong sulphuric acid, it first became pale yellow, then brown, and in a few seconds emerald green. In about a minute, the green was almost completely displaced by a brownish-black, and in about an hour dark green became the predominating colour, but it passed in another hour into a greyish-green. When, after the addition of strong sulphuric acid, it was placed in a chamber heated to 105° F., and the temperature was gradually raised to 120° F., the green colour soon became much intensified, and in about an hour and a half it passed into a dirty green, and ultimately into a nondescript grey, through which numerous black particles were diffused.

2. With dilute sulphuric acid (10 per cent.), no material colour change was produced within several hours, provided the extract were originally only a slightly coloured one. When the solution was then heated to 120° F., it gradually became light green, dark green, bluish green, deep blue, violet-blue, deep violet, and ultimately violet-black and brownish-grey.

The final coloured products of 1 and 2 are insoluble in water.

3. Strong nitric acid (B.P.) produced a pale brown solution.

4. Strong hydrochloric acid (B.P.) produced a yellowish solution.

5. Acetic acid (B.P.) produced a pale brownish solution.

6. Iodic acid produced a pale brownish solution, in which, however, no blue colour was developed by starch.

7. Strong sulphuric acid and bichromate of potassium produced a greenish-brown colour.

8. No distinct effect was caused by strong sulphuric acid, rectified spirit, and neutral solution of ferric chloride, nor by sulphuric acid and bromine water.

9. Solution of potash, soda, or ammonia produced a bright yellow solution, but the yellow colour immediately disappeared on the addition of dilute sulphuric, hydrochloric, or acetic acid. When the alkaline yellow

solution was boiled for a short time, it became reddish-brown in colour.

10. Phosphomolybdic acid produced a green colour, which immediately changed to blue on the addition of an alkali.

Solution of Extract in Water (2 *per cent.*).

1. Acetate of lead produced a faintly yellow flocculent precipitate.

2. Subacetate of lead produced an abundant yellowish flocculent precipitate.

After the lead precipitates in 1 and 2 had subsided, the supernatant fluid was nearly colourless and intensely bitter.

3. Solution of ferric chloride (B.P.) caused a greenish-yellow colour, and afterward a slight precipitate.

4. Nitrate of silver produced a faint opalescence, which afterwards became a dark precipitate.

5. Mercurous nitrate produced a white cloudiness, which afterwards subsided as a slight grey sediment.

6. Cupric sulphate produced a slight haziness, which, on subsidence, left a pale green fluid.

7. Platinic chloride failed to produce any change within several hours, but on the following day a slight brownish opalescence had occurred.

8. Phosphomolybdic acid produced a very pale greenish-yellow precipitate, permanent only with a considerable quantity of reagent. When the precipitate had subsided the supernatant fluid was seen to be emerald green, and the precipitate dissolved on boiling, and reappeared in cooling.

9. Molybdate of ammonium produced a faint yellow tint, and, after several hours, a considerable yellowish-white precipitate, the supernatant fluid continuing to be yellow. The precipitate dissolved on boiling and appeared again on cooling.

10. Tannic acid produced a copious white precipitate.

11. Solution of potash, soda, ammonia, lime and baryta, and of carbonate of potash and carbonate of soda, each produced a bright orange-yellow colour. Carbonate of ammonium, carbonate of baryta, and bicarbonate of potash produced a less marked yellow. In each case, the yellow colour was immediately discharged by dilute acetic acid. The alkaline yellow fluids did not reduce Fehling's solution when boiled with it.

12. Sulphuric acid (10 per cent.), dilute hydrochloric acid (BP.), and dilute nitric acid (B.P.), and dilute phosphoric acid (B.P.) each rendered the solution paler, and slowly produced a slight flocculence, which disappeared in great part on boiling. When afterwards neutralized and tested with Fehling's solution, a well-marked reduction occurred.

13. Dilute acetic acid (B.P.) produced no obvious change, and after boiling for a few seconds, and neutralizing with sodium carbonate, only a slight reduction was obtained with Fehling's solution.

14. No obvious change was produced by picric acid, carbonate of baryta, phosphate of sodium, chloride of gold, mercuric chloride, potassio-mercuric iodide, metatungstate of sodium, tri-iodide of potassium, potassio-bismuthic iodide, nor potassio-cadmic iodide.

Absence of any Alkaloid from the Extract.

The failure, already described, of many reagents for alkaloids to produce change in the watery solution of the extract, although it is naturally acid in reaction, affords sufficient evidence of the absence from the seeds of any alkaloidal principle.

In addition to this negative evidence, ten grains of the extract were treated according to Stas's method for separating alkaloids,—ether and chloroform being used as the separating solvents; but the result was also entirely negative.

At the same time, the extract contains nitrogen in small quantities, but this is by no means remarkable when its composition is borne in recollection.

Further, when the extract is made alkaline by solution of potash and then heated, alkaline vapours, having a distinctly ammoniacal or, rather, trimethylamine odour, are evolved.

Presence of a Glucoside in the Extract.

The reduction of Fehling's reagent by solutions of the extract in dilute acids having indicated the presence of glucose in these solutions, it became of importance to determine if this glucose exists in the unchanged extract, or is produced in it by the decomposition of one or more of its constituents.

Some alcoholic extract, prepared by percolating the seeds with ethyl ether and then with rectified spirit, was dissolved in distilled water so as to constitute a 2 per cent. solution. When treated with Fehling's reagent it failed to give any evidence of reduction. A portion of the same solution of extract was then acidified with sulphuric acid, and left at the ordinary temperature. After three days, the now slightly turbid solution was filtered, and after having been neutralised with carbonate of sodium it also was tested with Fehling's solution, when it immediately produced a copious reduction.

Evidence was thus obtained in an extract originally free from glucose, of a decomposition having been caused by dilute acid, of which one of the products is glucose, and the presence of a glucoside in the extract was accordingly indicated.

The production of this decomposition in the cold by the action of dilute acids was further examined. It was found that when a 3 or 4 per cent. solution of alcoholic extract in water is acidified with sulphuric acid, so that the acid is present as a 0·3 to 2 per cent. solution, the mixture in a short time becomes turbid, an apparently amorphous deposit forms in it, and in from two to four days the solution becomes clear and less coloured, and small crystalline tufts appear at the bottom and sides of the vessel, which increase in size until a considerable crystallization has been produced. To this crystalline substance I have given the name strophanthidin. On examining the solution in which the crystals have appeared, it is now found to contain much glucose.

When a minute quantity of the extract dissolved in a drop of water is placed on a microscope slide provided with a shallow cup, and a drop of 2 per cent. sulphuric acid added before the cover glass has been applied, in one or two days a large number of small and translucent globular bodies make their appearance, and in three or four days a beautiful crystallization of strophanthidin may be detected in the solution.

A well-defined crystallization produced in such circumstances in a solution of a pharmacologically active substance, is of so rare occurrence that it may usefully be applied as a test for strophanthus extract. It would probably also be an easy matter to devise a quantitative test for all strophanthus preparations, depending on the quantity of crystalline strophanthidin produced in this reaction.

If a watery solution of the extract be acidified, and after a short time shaken with chloroform or amyl alcohol, the decanted chloroform, or amyl alcohol, yields on evaporation a crystalline substance. It is, accordingly, an easy matter to obtain a well-defined crystalline product from the extract; but it will, at the same time, be found that the original solution now contains glucose, and the crystalline substance thus obtained is not therefore strophanthin, but strophanthidin, one of the products of its decomposition.

In fact the glucoside in the extract is quickly and completely decomposed by the addition of many acids; and weak solutions of several acids may, even at the ordinary temperature, produce this decomposition sufficiently to cause crystalline strophanthidin to appear in the solution.

The following experiment illustrates the action in the cold of the weak solution of sulphuric acid:—

A 5 per cent. solution of extract in water was acidulated with sulphuric acid so as to produce a 0·4 per cent. solution of acid. The solution very soon became slightly turbid; in two days the turbidity had greatly increased; in four days, a few small crystalline rosettes had appeared at the bottom of the solution, which was now less turbid; and in five days there was a considerable pale brownish-yellow incrustation at the bottom and sides of the vessel, consisting chiefly of round groups of lancet-shaped crystals, while the fluid was now only faintly turbid, and much less coloured. The crystals, which could not be removed from the vessel without some loss, when washed and dried, weighed 18·3 per cent. of the extract used. The filtered solution, after having been neutralized, was found, on estimation with Fehling's reagent, to contain 23·4 per cent. of glucose.

In another experiment with the same strength of solution of extract and of sulphuric acid, but in which the acidulated solution was at once boiled for half an hour, an abundant formation of large and only slightly coloured crystals occurred while the solution was being raised to the boiling point, and before the temperature of 180° F. had been attained; and, at the same time, a peculiar odour, like that of cooked raisins, was developed. The crystals became broken and more deeply coloured by the boiling; but still, when dried, they weighed 27·4 per cent. of the extract. The glucose produced amounted to 27·9 per cent.

By these and other experiments, it was shown (*a*) that the extract contains a glucoside, which is readily decomposed by weak solutions of acids so as to produce glucose, and the crystalline body, strophanthidin; (*b*) that glucose is produced in the extract by sulphuric, hydrochloric, nitric, phosphoric, acetic, and oxalic acids, both in the cold and at an elevated temperature, but by 2 per cent. hydrocyanic acid only at an elevated temperature; (*c*) that crystalline strophanthidin was produced in the cold by sulphuric, nitric, and phosphoric acids; and (*d*) that crystalline strophanthidin is produced at an elevated temperature by sulphuric, hydrochloric, nitric, phosphoric, acetic and oxalic acids.

Strophanthin.

The well-defined crystals produced during the evaporation of non-acidulated watery solutions of the extract are no doubt the active principle, strophanthin.

It is, however, extremely difficult to separate the crystals from adhering impurities by the use of any solvents; and even when that is accomplished, the great solubility of strophanthin in water and in rectified spirit, entails much loss, if separation by repeated crystallization be attempted. The crystalline product obtained when ether is added to a dilute alcoholic solution of the extract, or when ether is added to a strong solution of the alcoholic extract in water, also both represent nearly pure forms of strophanthin; but, on several times repeating each process, it was found that sometimes only did it succeed in yielding a crystalline product, while frequently it failed to do so. Nice adjustments, extremely difficult to determine, are obviously required of the proportional quantities of active principles, water, alcohol, and ether, and of active principle, water and ether, respectively, in order to ensure the separation of the active principle in the form of colourless crystals.

It was therefore found necessary to devise some other process. In the first place, at an early stage in the research, the removal of impurities and the isolation of the active principle by subacetate of lead was attempted; as it had been found that after the removal of the copious precipitate formed in solutions of the extract by subacetate of lead an intensely bitter, clear, and only slightly coloured filtrate, of great pharmacological activity was obtained. When, however, sulphuretted hydrogen was passed through this filtrate, in order to precipitate lead, the active principle was necessarily subjected to the action both of sulphuretted hydrogen and of free acetic acid; and accordingly it was decomposed, glucose appeared in the solution, and strophanthidin crystallized out in great abundance.

As the extract obtained by small quantities of rectified spirit from the seeds previously percolated with ether, appeared to consist chiefly of active principle, the removal of the inconsiderable quantity of impurity present in it was attempted by treatment with pure animal charcoal; but this process also proved unsatisfactory both in the quantity and quality of the product obtained.

After several other attempts, the following was adopted as a tolerably satisfactory, though, no doubt at the same time laborious, process for separating the active principle in a pure form.

The active principle was precipitated by a solution of tannin from a strong solution of the extract in water; the well-washed tannate was thoroughly mixed with recently precipitated, carefully washed, and moist oxide of lead, which was added in the quantity calculated to be necessary for the conversion of the tannin into tannate of lead; the mixture was digested for several days at a low temperature; and, after it had been dried, it was thoroughly exhausted with rectified spirit, and occasionally with proof spirit. If the alcoholic solution still contained any tannin, as it usually did, it was evaporated to a syrupy consistence, and again treated as above with a smaller quantity of oxide of lead. It was frequently necessary to adopt a third such treatment before every trace of tannin had been removed. The product was now dissolved in weak alcohol, and, if necessary, decanted and filtered from sediment; and through the clear and usually almost colourless solution, a gentle stream of well-washed carbonic acid was passed for two or three days, in order to remove traces of lead. The solution was then evaporated to dryness, and the residue dissolved in rectified spirit, and, after filtration, ether was added to the solution to precipitate the active principle. The precipitate was dissolved in absolute alcohol, which usually left a further slight sediment, and the clear alcoholic solution was finally dried by spontaneous evaporation, and by being placed in a partial vacuum over sulphuric acid.

By this process about 65 per cent. of the active principle, strophanthin, was usually obtained from the extract. This quantity, undoubtedly, does not represent the whole of the active principle present in the extract; but the result otherwise is satisfactory, in so far as the quality of the product is concerned.

Strophanthin thus obtained is a colourless, opaque, and brittle substance, having an appearance suggestive of a crystalline body, but exhibiting no crystals to the naked eye. Under the microscope, however, it is found to consist of minute irregular crystalline plates.

When ether is added to very dilute alcoholic solutions of it, and the faintly turbid mixture is put aside in a stoppered bottle for a few days, beautifully stellar groups of colourless and transparent crystals frequently form on the sides and at the bottom of the bottle.

Strophanthin is very freely soluble in water and in rectified spirit, losing its opacity when a very small quantity of either solvent is added to it, and becoming a viscous, clear, and faintly yellow solution on further minute additions. It is soluble in 55 parts of absolute alcohol (sp. gr. ·796), in 300 parts of acetone, and in 1000 parts of amyl alcohol (sp. gr. ·820). It is almost insoluble in chloroform (sp. gr. 1·497), in absolute (sp. gr. ·723) and common (sp. gr. ·730) ethyl ether, in petroleum ether boiling below 120° F., and in bisulphide of carbon.* Glycerine (sp. gr. 1·26) dissolves it freely: but when small quantities are placed in strophanthus oil and in olive oil, respectively, they remain unchanged for several months, although afterwards the particles appear to dissolve very slowly.

Solutions in rectified spirit and in amyl alcohol are precipitated by the addition of chloroform, absolute or common ethyl ether, petroleum ether, and bisulphide of carbon. A solution in absolute alcohol is precipitated by ethyl and by petroleum ether, and is rendered slightly turbid by bisulphide of carbon; but neither chloroform nor acetone produces any change in the appearance of the solution. A solution in acetone is precipitated by ethyl ether, petroleum ether, chloroform and bisulphide of carbon, but not by absolute alcohol nor by amyl alcohol.

Strophanthin is intensely bitter. Its solution in water or spirit is acid in reaction. When a dilute solution in water is shaken, a persistent froth is produced.

It melts at a temperature of 343° F. Below this temperature, at about 295° F., it acquires a faintly yellow colour, which becomes yellowish-brown at the melting point. When the temperature is further raised, it evolves fumes having at first a caramel and then a disagreeable empyreumatic odour, becomes charred, and finally disappears without almost any residue.

When heated in a test-tube with soda lime, and when tested by Lassaigne's cyanogen process, it was found to contain no nitrogen.

Ultimate Analysis.—In order to determine its percentage composition, several combustions were made, of which the three following agree closely in their results:—

Analysis No. 6.

0·3 gram, yielded CO_2, 0·610 = 55·45 p.c. C.
" " H_2O, 0·204 = 7·55 p.c. H.

Analysis No. 7.

0·1789 gram, yielded CO_2, 0·3635 = 55·41 p.c. C.
" " H_2O, 0·1222 = 7·58 p.c. H.

Analysis No. 8.

0·1893 gram, yielded CO_2, 0·3849 = 55·45 p.c. C.
" " H_2O, 0·1288 = 7·56 p.c. H.

These percentages correspond with the formula $C_{16}H_{26}O_8$.

	Found (average of above three analyses).	Calculated for $C_{16}H_{26}O_8$. Per cent.
Carbon	55·43	55·49
Hydrogen	7·56	7·51
Oxygen (by subtraction)	37·01	37·0

$C_{16}H_{26}O_8$ may, therefore, provisionally be adopted as the formula of strophanthin, until, at any rate, more complete knowledge has been obtained of its constitution.

Reactions.—When various reagents were applied to strophanthin in the dry state, and also in 2 per cent. solution, the results were as follows:—

Dry Strophanthin.

1. When a minute quantity, in the form of powder, was moistened with a drop of strong sulphuric acid, a bright green colour was immediately produced, which in a few seconds became greenish-yellow, and then brown at the centre with green at the edges. In twenty minutes the whole was brownish green; in a few minutes afterwards it was grey, with a greenish tint; and in the course of an hour or two dirty brown, without any green.

When strophanthin moistened with strong sulphuric acid was heated to between 110° and 120° F., the green colour first produced soon became dark olive, changing to very dark brown, with green at the parts which had dried, then to violet and dark violet-blue, and finally to black with a violet tint.

2. With 10 per cent. sulphuric acid, a nearly colourless solution was produced, which remained unchanged in appearance for several hours.

When heated between 110° and 120° F. with 10 per cent. sulphuric acid, it soon became light green, grass green, dark green, deep bluish-green, deep greenish-violet, very dark violet, and in about two hours, black with a violet tint. When allowed to cool the last colour remained for more than twelve hours.

These colour changes were quite distinctly obtained with even the $\frac{1}{15000}$ of a grain of strophanthin.

3. Strong nitric acid in the cold produced a pale brown solution.

4. Dilute nitric acid (10 per cent.) merely dissolved strophanthin, without obvious change of colour.

When heated between 115° and 130° F. with 10 per cent nitric acid, a violet colour was first developed, in which blue streaks appeared; the whole then became violet for a few minutes, then yellow appeared at the margins, the violet gave place to yellowish-brown, and, finally, in about forty minutes, the whole became gamboge-yellow, and remained this colour for several hours.

5. Strong hydrochloric acid dissolved strophanthin, forming a pale yellow solution, which afterwards became brownish-yellow.

6. Dilute hydrochloric acid (10 per cent.) dissolved it, and produced a colourless solution.

When heated between 115° and 130° F., changes were very slowly produced; in about twenty minutes, a yellow colour appeared, which, however, soon passed into green, and then into blue (Turnbull's), and the last colour remained for several hours.

7. Strong sulphuric acid and bichromate of potassium, in the cold, produced successively green, orange-brown, dark brown with green at the edges, and emerald-green. When now heated to between 115° and 120°, the green slowly became bluish-violet.

8. When to a minute particle of strophanthin there was added a small drop of distilled water, and also of dilute solution of ferric chloride, and then a drop of strong sulphuric acid, a deep yellow colour appeared, which changed to pink. On mixing the whole with a glass rod the pink disappeared.

9. Solution of phosphomolybdic acid developed rather slowly a green tint, which on prolonged exposure became a pure blue of considerable intensity. If an alkali was added along with or after the phosphomolybdic acid, the blue colour was immediately developed.

10. Solution of potash, soda, and ammonia, and of other alkalies and their carbonates, produced a faint yellow colour, which disappeared on the addition of acids.

11. Negative results were obtained on the addition of iodic acid and starch, nitrate of silver, sulphate of zinc, sulphate of copper and Nessler's reagent.

Solution of Strophanthin in Water (1 or 2 per cent.).

1. Concentrated, or 10 per cent. solutions of, sulphuric, nitric, hydrochloric, phosphoric, and chromic acid, and concentrated acetic acid, each produced a slight haze even in a 1 per cent. solution of strophanthin. When the solution was afterwards neutralized and tested with Fehling's reagent the reagent was in each case reduced.

2. Sulphuric acid and bichromate of potassium also produced a slight opalescence, and the solution, on being neutralized, reduced Fehling's reagent.

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* In the experiments that were made, chloroform dissolved 1 part in 10,000, and absolute and common ethyl ether, petroleum ether, and bisulphide of carbon about 1 part in 20,000.

3. Solutions of potash, soda, ammonia, lime, and baryta, of carbonate, of ammonium, and phosphate of sodium, each caused the solution of strophanthin to become of a light yellow colour; but even after prolonged contact, the yellow solutions did not reduce Fehling's reagent. The alkaline yellow fluids became deep reddish-brown when heated to 212° F., and, at the same time, they lost much of their original bitterness, and apparently also of their pharmacological activity.

4. Solution of ferric chloride produced no change until sulphuric acid had been added, when a faint opalescence occurred. When a drop of 1 per cent. strophanthin in water was placed on a white porcelain slab, and a minute drop of solution of ferric chloride, followed by a small drop of strong sulphuric acid, was added to it, a yellow colour was first produced, and then streaks or patches of pink and blue were quickly developed. In a short time, the whole assumed a dirty pale greenish-blue colour.

5. Solution of nitrate of silver very slowly produced a reddish-brown colour and a slight dark deposit.

6. Phosphomolybdic acid slowly produced a bright green colour, which gradually passed into greenish-blue.

7. Tannic acid solution threw down a copious yellowish-white precipitate, which redissolved until an excess of the acid had been added.

8. Molybdate of ammonium in sulphuric acid produced a slight opalescence, and Fehling's reagent afterwards revealed the presence of glucose in the neutralized solution.

9. Negative results were obtained by an addition of chloride of gold, platinic chloride, cobaltic chloride, acetate and subacetate of lead, mercuric chloride, mercurous nitrate, ferro- and ferri-cyanide of potassium, chloride barium, acid carbonate of potassium, iodide of potassium, tri-iodide of potassium, tribromide of potassium, potassio-mercuric iodide, metatungstate of sodium, potassio-bismuthic iodide, and potassio-cadmic iodide.

Decomposition by Acids, etc.

Glucose having been produced by the application to strophanthin of such of the above reagents as were acid in reaction, it was indicated that this substance is a glucoside. This indication has been rendered clear and unambiguous by the results of other experiments, of which the following are given by way of illustration.

To a colourless and clear 3·3 per cent. of strophanthin in distilled water, sulphuric acid was added so as to make the solution a 0·3 per cent. one of acid, and the solution was then left to itself at the ordinary temperature. On the following day, it had become slightly turbid, and two days afterwards several colourless rosettes of lancet-shaped crystals had formed at the bottom of the flask. On the fourth day, the rosettes had increased in size, and now also a general crystalline incrustation had occurred over the bottom and sides of the flask, while the solution had lost its turbidity, and had again become quite clear. The crystals increased in quantity during the next twenty-four hours, and, on the sixth day, when they were collected as carefully as possible, they weighed 33·7 per cent. of the strophanthin used. The filtered solution, after having been neutralised, was found to contain 22 per cent. of glucose.

In an experiment with the same quantity of strophanthin and of sulphuric acid in solution, as soon as the solution had been made it was placed in the water-bath and gradually heated. While the temperature rose from 150° to 165° F., a beautiful crystallization appeared in the solution, consisting of slender colourless crystals, many of them being ¾ of an inch in length, and the solution at the same time became slightly turbid. The temperature was raised to 212°, and maintained at this point for half an hour; during the boiling, an odour like cooked raisins was given off, and the solution became slightly yellow in colour. When the solution had cooled, it was found that, in addition to now partially broken, long and slender crystals, a further crystallization had formed, consisting of colourless nodules or tufts attached to the bottom of the flask. The washed and dried crystals weighed 36·2 per cent. of the strophanthin used, and there was found in the filtered solution 27·5 per cent. of glucose.

Sulphuric acid was the only acid employed to decompose strophanthin; as it seemed unnecessary for the present purpose to multiply the experiments, in view of the evidence already described regarding the action of other acids on the extract of strophanthus, there being no reason to doubt that the decomposition of strophanthin into glucose and strophanthidin will occur under the influence of those other acids which have been shown to decompose it in the extract.

It was found that large quantities of crystalline strophanthidin, and considerable quantities of glucose, were produced by the prolonged contact in the cold of strophanthin with from 0·3 to 1·5 per cent. sulphuric acid. Crystalline strophanthidin was also abundantly produced when strophanthin was boiled for a short time with 0·3 per cent. sulphuric acid; and much crystalline strophanthidin, but proportionally less glucose, when strophanthin was heated between 160° and 170° F. with 0·5 per cent. sulphuric acid. When, however, strophanthin was boiled with stronger than 0·5 per cent. sulphuric acid, although much glucose was generally produced, no crystalline strophanthidin, but only a brown amorphous substance, appeared as a result of its decomposition.

The crystals of strophanthidin produced in the cold by H_2SO_4 were usually in the form of colourless nodules or rosettes, consisting of moderately thick, lancet-shaped crystals. The finest crystals, of long and slender form, were obtained when strophanthin was heated to 160° or 170° F. with 0·3 and 0·5 per cent. sulphuric acid.

In addition to the influence of acids on strophanthin, that of ptyaline was also examined. 0·1 gram of strophanthin was dissolved in 5 c.c. of distilled water, and to the clear solution 2 c.c. of filtered saliva* was added. The now decidedly alkaline mixture was digested for an hour at a temperature ranging between 99° and 100° F. The digestion did not produce any obvious change, nor could any strophanthidin be detected in the fluid after it had cooled. When, however, it was tested with Fehling's reagent, reduction immediately occurred, and an estimation showed that rather less than one per cent. of glucose had been produced. Prolonged contact with saliva is therefore able to cause only a slight decomposition. As a large quantity of saliva of great protylytic activity had been used in this experiment, it is reasonable to infer that in the ordinary administration of strophanthus, decomposition will not be produced to any appreciable extent by admixture with the mouth secretions.

As only slight decomposition occurs when extract of strophanthus is digested for half an hour with 0·1 per cent. hydrochloric acid at a temperature ranging between 98° and 100° F., the inference also appears to be justified that when strophanthus is introduced into the stomach it will probably be absorbed into the blood before any important part of the dose has undergone decomposition.

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* The saliva was obtained, with the usual precautions to exclude impurity, from an adult to whom pilocarpine had been administered. It was alkaline in reaction, and neither before nor after prolonged heating did it affect Fehling's solution. A small quantity rapidly and abundantly produced glucose in starch solution.

Still, these experiments, and indeed all the experiments in which strophanthin was shown to be decomposed by acids, render it not only of interest but probably of practical importance to determine, as I propose on some early occasion to do, the pharmacological action of strophanthidin itself.

Strophanthidin.—In the meantime, in addition to those physical and chemical characters of crystalline strophanthidin that have incidentally been mentioned, it may be added that it has an intensely bitter taste and a neutral reaction; that it is very slightly soluble in cold water, moderately soluble in cold rectified spirit, chloroform, and amyl alcohol, and pretty freely soluble in warm rectified spirit; that it does not give a glucose reaction with Fehling's solution, either before or after prolonged digestion with 2 per cent. sulphuric acid at 200° and 212° F.; and that it is extremely active as a pharmacological agent, 0·0025 and 0·00125 grain producing death in frogs weighing 350 grains and 340 grains, respectively, with symptoms closely resembling those produced by strophanthin. It can readily be obtained in colourless crystals by the spontaneous evaporation of a solution in rectified spirit.

As a solution of recrystallized strophanthidin, produced by the decomposition of strophanthin by sulphuric acid, remained unchanged when solution of chloride of barium was added to it, strophanthidin cannot be regarded as a combination of some substance present in strophanthin with the acid employed in decomposing it.

The amorphous brown substance obtained by boiling strophanthin with moderately strong acids has not been examined further than to determine that it is much less bitter than either strophanthin or strophanthidin, and that it is insoluble or nearly so in water and acids, and soluble in alkalies and rectified spirit.

Kombic Acid.—Basic and neutral acetate of lead have been enumerated among the reagents which produce precipitates in solutions of the extract in water. The precipitate obtained by the former reagent has not been examined. That produced by neutral acetate of lead, after having been carefully washed with distilled water, was decomposed by sulphuretted hydrogen, and the filtrate from lead sulphide was concentrated by evaporation at a low temperature, and then dried *in vacuo* over H_2SO_4. There was thus obtained a scaly brownish-yellow substance, representing 1·6 per cent. of the extract, of strongly acid reaction, and freely soluble in water. For this acid, the name "kombic acid" is suggested.

Comose Appendages.—On being subjected to analysis, the comose appendages of the seeds yielded a relatively small quantity of strophanthin and a large quantity of a resin-like substance. Even when one pound weight of appendages was examined, no alkaloid could be isolated by Stas's process.

Follicles, leaves, roots, etc.—Chemical examination of the pericarp of the follicles, of the leaves, branches, stem and root of strophanthus resulted in showing that each of these parts of the plant contains strophanthin, but only in small, and in some of the parts, in minute, quantity.

Specimens of the leaves of strophanthus grown by Mr. Christy at Sydenham were placed on the table.

The **President** said all would appreciate very highly the paper by Dr. Fraser, who had done an immense amount of work on strophanthus. In reference to the leaves exhibited he said the various kinds of plants produced from the strophanthus seeds of the trade were remarkable; he had lately seen them growing, and one could scarcely recognize the plants from some of the seeds as being strophanthus at all; they were so wholly dissimilar. He was very sorry that Mr. Christy was not present to make some remarks on the subject.

Mr. **Wellcome** said Mr. Christy had dealt so thoroughly with the subject that hardly anything he could say in the direction of his treatise would add to the information of the members. It was very well known to all who had occasion to employ strophanthus seed that very great care was necessary in purchasing those which came to the London market to avoid false seeds. Many of them were absolutely inert, and others were either so damaged in transit or being gathered before they were ripe that they were entirely useless. The great value of Dr. Fraser's paper was obvious to them all, and they had been looking forward for a long time to the results of his work on the active principles of strophanthus.

Mr. **Dott** said he had nothing to add to the chemistry of the subject which had been so well dealt with by Professor Fraser. With regard to the seeds, certainly the appearance of some of them showed that they were not genuine, but in other cases it was not so easy to determine. Some had come into his hands about which he had a little doubt, and on submitting them to Dr. Fraser he at once said they were immature, and on comparing their weight with the genuine sample he found they weighed about half what they should, which confirmed Dr. Fraser's opinion that they were immature.

The **President** asked if Dr. Fraser had any of the varieties of seeds met with in trade under cultivation?

Mr. **Dott** said there were some in the Botanical Gardens in Edinburgh.

The Conference then adjourned for luncheon.

Upon resuming the first paper read was on—

NARCEINE AND ITS SALTS.

BY D. B. DOTT.

Narceine is one of the opium alkaloids which exist in larger quantity, it being present in sufficient amount to admit of its employment in medicine to a considerable extent. So far, however, it has not come into very general use, although favourably regarded by some of the German physicians. The purity of commercial narceine does not seem to have been suspected until the appearance of a paper by Laborde in the *Archives de Pharmacie* (April 5, 1887),* wherein it was stated that narceine, specially purified so as to be free from morphine and codeine, was found to be more active than any he had used before. Now, considering the great facility with which narceine may be separated from morphine and codeine, it is highly improbable that any manufacturer would send out narceine so contaminated; and even supposing such a curious result had occurred, it is difficult to comprehend how the action of the alkaloid could be weakened by the presence of morphine or codeine. The statement is probably one of the many inaccurate conclusions which have been arrived at from therapeutical experiments. Subsequently there was published a communication† from Claus and Ritzefeld, who at first imagined they had prepared a new base by the action of potassic permanganate on narceine, but soon found that the product was nothing other than pure narceine. These chemists therefore recommend that method of limited oxidation for the purification of narceine, stating that while the commercial base melts at 145°, the alkaloid so purified melts at 162°. Quite recently a paper on "chemically pure narceine" was contributed by E. Merck, who describes some interesting experiments and corrects certain misconceptions of previous writers on the subject. It is to the paper of Merck that I would specially refer.

In the first place it seems advisable to remark that Merck, like many other German chemists, ignores the work done by English and French chemists. The whole subject of the hydrochlorides of narceine was some years ago very fully investigated by Dr. C. R. Alder Wright, who mentions[*] most of the facts which are referred to by Merck as if they were new discoveries. It is a matter of old observation that narceine which has been precipitated from hydrochloride by ammonia tends to retain chloride very energetically. Wright showed that this was due to the formation of basic hydrochlorides, the compound becoming with each crystallisation more basic, until ultimately a salt was apparently obtained which contained a great number of narceine molecules to one molecule of hydrochloric acid. I am rather inclined to think, however, that by a sufficient number of recrystallizations chlorine-free narceine would be obtained, just as by a sufficient treatment with water, oxychloride of bismuth is converted into pure oxide. Wright's method of obtaining pure narceine from the basic hydrochloride is to convert into sulphate, which after recrystallization and precipitation yields the pure alkaloid. Merck is not very clear as to the method followed by him, but he mentions the fact that if caustic soda is used to precipitate, the narceine may be obtained free from chlorine. The same chemist seems inclined to regard these basic hydrochlorides as mixtures or compounds of the normal hydrochloride with the alkaloid. I do not think that is a tenable hypothesis, but is rather one which arises from a mistaken view of such salts. Whether it be true that all alkaloidal salts are simply molecular compounds, it is certainly true of some of them. The so-called acid hydrochlorides, for instance, are evidently of this nature, being analogous to the so-called potassium quadroxalate. That is to say, the second molecule of hydrochloric acid is not atomically combined to the alkaloid, but is simply related to it as the "water of crystallization" to the salt molecule. The basic hydrochlorides of narceine are doubtless of the same nature, so many molecules of alkaloid being feebly combined with so many molecules of acid. The view formerly referred to, that these salts are compounds of the normal salt with alkaloid, does not appear to be tenable; because when one molecule of the normal salt is decomposed by water, there is no obvious reason why all the molecules present should not be similarly decomposed. Merck thinks that the behaviour of narceine towards acids contradicts the current assumption that narceine is a very weak base. Yet surely the tendency to form basic salts is no proof of strength. Bismuth and antimony salts tend to form basic compounds, not because their oxides are strong bases, but rather the contrary. It is impossible to say whether the normal salts of narceine are acid in reaction or not, as they no doubt all suffer more or less decomposition when dissolved. When narceine is suspended in hot water, and sulphuric acid gradually added, complete solution does not take place until sufficient acid has been added to form the acid sulphate, which fact is another proof of the feeble character of the alkaloid. Indeed narceine follows the general rule, that the higher the position of a compound in a series, the less developed is its distinctive character; and if the morphine series of alkaloids were truly homologous the rule would doubtless be strictly correct. Codeine is a stronger base than morphine, but although it differs by CH_2, it is not a true homologue of morphine. It is in reality what has been called a "compound ether" of morphine, for want of a better name. The most interesting portion of Herr Merck's paper has reference to the melting-point of narceine. It is shown that the melting-point is greatly lowered by the presence of a small proportion of hydrochloric acid, from which it would appear that much of the impurity formerly spoken of was nothing but a little acid, which is pharmacologically speaking no impurity at all. It further appears that decomposition takes place at, or probably under, the observed melting point of 170°. The question arises, can a substance be said to have a melting-point, which is above its temperature of decomposition? The discrepant statements as to the melting-point of morphine, led me to try one or two experiments, but I soon found that the morphine showed signs of extensive decomposition before there was any appearance of fusion, and therefore abandoned the experiments as useless. In short, the melting-point as a means of determining purity, must be regarded as of very limited application in the case of the complex alkaloids. From all we have been able to learn, the general practical conclusion would seem to be, that no proof has been adduced to show that commercial narceine ever contains any impurity which can affect its value as an article of the materia medica.

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* *Pharm. Journ.*, [3], xvii., 882.

† *Ber.*, xviii., 1575, and *Pharm. Journ.*, [3], xviii., 621.

The PRESIDENT said this was a very difficult subject, but Mr. Dott had made it a special study for some years past, and no one connected with the Conference was better able to speak upon it. Mr. Dott's former papers had been looked upon as standard works on the various alkaloids of opium, which he had from time to time investigated.

Mr. MACLAREN also added his testimony to the value of Mr. Dott's work upon these alkaloids.

The next paper read was on—

NOTE ON LEMON JUICE.

BY T. HOWELL WILLIAMS, F.C.S.

In the British Pharmacopœia of 1867 lemon juice is described as having sp. gr. 1·039 and containing 32·5 grains of citric acid in 1 fluid ounce. In the Pharmacopœia of 1885 the sp. gr. is given as from 1·035 to 1·045 and the quantity of citric acid as from 36 to 46 grains per fluid ounce. The variability of the juice is here very properly allowed for, but as far as my experience goes the standard for citric acid is much too high. From 30 to 36 grains per ounce citric acid would more correctly represent the amount present in lemon juice as commonly obtained from the finest imported fruit during the winter months, and from 20 to 30 grains per ounce when the juice is pressed in summer.

On looking up the literature of the subject I find very conflicting statements. For example, Bentley and Redwood, in their 'Materia Medica,' give the citricity of lemon juice as 32 grains per fluid ounce, while Mr. W. W. Stoddart, in a paper which he read at the Norwich Pharmaceutical Conference in 1868, gives as the result of the examination of eight lemons from 39 to 46 grains of citric acid, and he concludes that should there be less than this the lemons must have been kept too long or gathered too late in the season. Flückiger and Hanbury, in the 'Pharmacographia,' consider 40 to 46 grains per ounce the normal quantity of citric acid, while Warington, whose experience on this subject is very extensive, states that English pressed juice contains from 11 to 13 ounces to the gallon, that is, from 30 to 35·5 grains per ounce.

Under these circumstances, being asked to contribute to the Conference, I have thought that the results of analyses performed in the laboratory of my firm upon juice obtained by us from fruit of our own importing might perhaps be acceptable. There was no idea of publishing these results until a few days ago. Lemon juice is, with us, only a bye-product, and it is only occasionally that the results of analyses have been recorded, and still less often that the yield of juice has been noted. The lemons are not pressed to the full extent of the hydraulic press, as time is considered of more value than a small additional yield of juice. In one instance I find that 15,000 lemons yielded 104 gallons of juice. A case of

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[*] *Chem. Soc. Journ.*, xxvii., 109.

400 lemons pressed a few days ago yielded 4¼ gallons of juice, a very much larger proportion, but the juice was of very inferior quality. Each carboy of juice was tested immediately after pressing, and the results are given below.

The amount of acid present is ascertained by titrating 1 fluid ounce, measured with a pipette of known accuracy, with normal caustic soda, using phenolphthalein as an indicator. The number of cubic centimetres of normal soda solution used multiplied by 1·078 gives the weight of crystallized citric acid in grains. But it must be remembered that phenolphthalein indicates an alkaline state of the solution, and in working with these quantities the neutral point should be reckoned as 0·1 c.c. less than that shown by the burette. With juice of known origin, where sophistication is out of the question, this method leaves nothing to be desired. Very careful experiments have shown that results obtained by titration are quite as accurate as those obtained by previous precipitation as calcium salt; in neither case is the absolute amount of citric acid ascertained, but simply titration tells truly the total acidity, and for our purpose we may consider this as due entirely to citric acid.

The following table shows the results obtained in those instances in which notes were kept during the past season:—

Month.	Lemons.		Citricity.
	No. of cases.	Average no. of lemons, per case.	
November . . .	38	416	31·3
			33·0
			33·5
			34·5
			30·2
			30·8
			34·6
			35·6
			32·9
December	25	425	29·2
	3	480	33·5
	2	486	32·9
	1	410	33·5
	1	415	32·5
	1	420	30·3
	1	415	34·0
May	2	350	29·2
August	1	405	22·6

The **President** said lemon juice was an article they frequently came into contact with, but they evidently had something to learn with regard to it. It was evident lemons should be selected for pressing principally in the winter months, and it was quite clear that the percentage of acid was 30 per cent. less in the summer than in the winter. The superiority of the lemons, not only in acidity, but also in the essential oil of the peel, was also very marked in the winter months.

Mr. **Linford** asked whether the lemons dealt with in the experiments were Messina or Naples lemons. According to his experience the latter had the larger amount of juice, but the smaller amount of citric acid, and the peel contained less essential oil than the Messina lemons. Some years ago he remembered some lemon juice being ordered, and he sent out true lemon juice, but the doctor came back to know why he had sent artificial juice, which would not effervesce with the mixture. He then sent some more, with the same result, and on examining the lemons he found they were perfectly sweet, and contained no acid whatever, and twice since then he had met with perfectly sweet lemons.

Mr. **Naylor** asked how far the percentage of acid was influenced by the maturity of the lemon?

Mr. **Schacht** said he remembered a paper being read some years ago by Mr. Stoddart on this question, and the discussion which arose upon it, from which it appeared that it was the unfortunate habit of medical men to order so much fresh lemon juice to be taken with a definite amount of carbonate of soda or potash, inasmuch as at certain times of the year very much more of the alkaline carbonate would be required to produce the desired effect, which was probably something like neutrality. At that time Mr. Stoddart went through some elaborate experiments, the result of which was that lemons gathered at certain times were found to be much more acid than at others. In those days the importation of lemon juice had not reached the immense volume it now had, and consequently very little lemon juice was then used except that recently expressed. It was settled then that it was a little unfortunate that there was not supposed to be any standard acid strength of lemon juice. He should like to know whether fruits imported at certain times were supposed to represent the fruits gathered at that time.

Mr. **Conroy** said he gathered from the author of the paper that he obtained on an average about 32 grains of acid to the fluid ounce. He had had considerable experience in testing lemon juice, and he must say he had found it to contain much more than that. Thirty-two grains only worked out about 7 per cent., whereas he generally found that fresh lemon juice prepared in the months of December, January and February, those being the months in which lemon juice was pressed, the lemon juice of commerce being a bye-product obtained in the manufacture of lemon peel, yielded on an average about 8·7 per cent of free citric acid. His mode of testing was similar to that adopted by the author, but as he had many hundreds of samples to test representing puncheons of juice, he made a standardized soda solution, 1000 fluid grains of which represented 100 grains of citric acid. By standardizing the solution in that way the percentage could be read straight off immediately after titration. It might be that he was under a misconception in reference to the percentage given by the author of the paper, but his experience was that 8·7 per cent. was a very fair average, and he had frequently found lemon juice which tested over 10 per cent. of citric acid, equal to 1 lb. of citric acid per gallon.

The **President** asked if Mr. Conroy referred to imported lemon juice, or that pressed in England.

Mr. **Conroy** said he referred to that pressed in this country by manufacturers of candied lemon peel. The imported lemon juice was much weaker.

Mr. W. H. **Symons** said the percentage mentioned by Mr. Conroy represented about 39 grains to the fluid ounce, while Mr. Williams recommended from 30 to 36 grains as the standard. It was well known that lemons varied very much, especially during the summer months, those which had been stored from the early crops being less acid than those more recently gathered, and perhaps those most suitable for Mr. Williams's purpose for manufacturing tincture would not be suitable for the manufacture of citric acid.

The **President** asked if Mr. Conroy knew whether the makers of candied peel used Messina or Palermo lemons? It was possible that in one case the peel might be superior, but there might be a difference in the amount of acid in the juice.

Mr. **Conroy** said that was a question he could not answer. He had heard, but he had confused the two names, and did not know which it was.

The **President** said good judges of essence of lemon could tell the difference between the essential oils obtained from different varieties, and it was possible there might be some slight difference in the juice of the two fruits.

Mr. **Clark** (Leicester) said it was the Messina lemons that were pressed in such large quantities abroad, and the peel came over in puncheons packed in salt.

The **President** remarked that Mr. Stoddart's paper referred to freshly expressed lemon juice, and his proportions were 31·09 to 31·5 grains of citric acid to the ounce. Those figures rather agreed with the average given by Mr. Williams.

Mr. **Conroy** said if he remembered Mr. Stoddart's paper rightly, he pressed the lemons himself; but the lemon juice from a presser, obtaining many puncheons at a time, was more likely to give an average sample than Mr. Stoddart could have obtained by buying a few lemons himself. Mr. Williams had mentioned that the lemons were pressed by hydraulic power, but he knew a very large manufacturer, Mr. Hartley, of Bootle, whose lemon peel went all over the country, who used a lemon squeezer invented by himself. He simply got the lemon juice as a bye product, as he wished to preserve the peel intact for preserving purposes. He forgot to mention before with reference to the titration that he found as soon as he got the lemon juice slightly alkaline it was a sufficient indicator of itself; it turned immediately a bright yellow with the least excess of alkali, so that there was scarcely any necessity to use an indicator.

Mr. **Maclaren** asked if in both cases referred to peeled lemons had been dealt with.

Mr. **Williams** said in all cases they peeled the lemons.

Mr. **Schacht** said Mr. Stoddart found that the same lemons when kept a certain number of months lost their acidity. On May 28 he bought a lot of lemons from six different shops, and after mixing them, pressed eight, which gave 7 ounces of juice having specific gravity 1·040 to 1·046 and yielded 40 to 46 grains per ounce of citric acid. The remainder was put aside again to the end of May and again examined, when the result was an average of 41 grains of citric acid. The lemons kept on decreasing in acidity, at first slightly and then rapidly, but the specific gravity only suffered a slight diminution, and in July it was 1·027, but had lost all the citric acid.

Mr. **Conroy** said that rather bore out his statement.

The **President** said the Conference was much obliged to Mr. Williams for this paper. Of course they were concerned in seeing that the standard in the British Pharmacopœia was not too high, and when a statement was made that lemon juice should contain 40 to 46 grains to the fluid ounce, and when they found in the summer months freshly-pressed juice only contained 26 grains to the ounce, it was rather an important difference, and they should know what they were about, or some day something would take place which would be a great annoyance to somebody. He himself should read this paper with great interest, and should turn back to that of their lamented friend, Mr. Stoddart, and read the two together, and he had no doubt on comparing them they would get pretty nearly accurate results.

Mr. **Williams** in answer to Mr. Linford said the juice referred to was obtained from Messina lemons imported by his firm in lots of about 200 cases, especially ordered to be packed so as to arrive in England as quickly as possible, and before they had quite lost their green colour. The lemons then showed the greatest amount of acidity, for the longer they were kept the more the acidity diminished. He had also tried Palermo lemons occasionally, and although he found some difference it was not very great, probably on the whole the acidity was rather less. He had adopted all sorts of presses, sometimes having to press small quantities, and in preparations made for the manufacture of beverages they always had to make it up to a standard strength of acidity, and therefore were obliged to ascertain whether there was a deficiency of acidity in the juice or not, even in very small quantities. There was no doubt that as the lemons matured and got ripe they became much sweeter; there was more juice but much less acid. He never came across any imported lemon juice except concentrated, and was not aware that fresh lemon juice was ever brought to this country. His experience with lemon juice obtained from pressers who made candied peel, such as was referred to by Mr. Conroy, was somewhat different, for he generally found it only contain about 27 grains per ounce. That was from pressers in London, but of course it was quite impossible to say that it was not sophisticated; the volume might be increased by dilution, so that he did not place much reliance on results obtained from such purchases. In all cases the lemons were peeled because the peel was the most important product in their estimation. The small correction was not a matter of great importance, but he thought it necessary to use phenolphthalein as an indicator, and to check the results in other ways. The singular part of it was this, that he had never yet found lemon juice to contain more than 36 grains per ounce in any case, and the results had been checked by many other people. He had discussed the matter with people who said they had obtained lemon juice from wholesale houses containing more than 36 grains, but he found on inquiry at well known houses that they never could obtain lemon juice of that strength themselves, but were careful to meet the requirements of the Pharmacopœia by adding citric acid.

The British Association for the Advancement of Science.

ADDRESS TO THE CHEMICAL SECTION.

BY SIR LOWTHIAN BELL, BART., F.R.S., F.C.S., D.C.L.

(*Concluded from page* 259.)

After the invention of the blast furnace pig-iron was placed in a similar hearth, and while in a melted state a blast of air was directed upon the molten metal, until just as much carbon remained with the iron as constituted steel. This mode of procedure continued to be practised long within my own recollection, and may, for what I know, still be followed in some districts. The subject of steel-making occupied the attention of Hassenfratz, of Réaumur, and others, but practically the only process followed until 1865 was the well-known one of cementation.

Since the days of Fourcroy it was ascertained that in addition to the iron carbon was an essential ingredient in cast metal, but invariably accompanied by more or less silicon, and whenever the minerals contained sulphur or phosphorus these metalloids were also present. The nature of the actions employed for ridding the product of the blast furnace of these substances so as to render it malleable had also been carefully examined and explained by the light of scientific investigation. The manufacturer had, it is true, learnt by experience and observation how to produce an article of excellence without much knowledge of the science of his art. Among other things he ascertained that to obtain a ton of wrought iron he required the heat of an equal weight of coal in the puddling furnace; but he did not know, nor did even men of science, I think, ever dream, that the oxidation of the metalloids in the pig-iron, and that of a small portion of the metal itself, would afford heat enough to enable the workman to dispense with the use of all coal in the process of conversion. When, therefore, the iron trade was informed in a paper read before the British Association in 1856, entitled "A mode of making iron without the use of fuel," its author, Henry Bessemer, was set down by the iron trade as a deluded enthusiast. At that period I doubt whether 10 lbs. of wrought iron had ever been seen in a state of fusion at one time. Bessemer in his description, however, spoke of melting tons of it with no more heat than that afforded by the rapid oxidation of about five or six per cent. of the weight of the pig-iron used. Not only therefore was the subject one of economic but also of high scientific interest. Nevertheless, a mere statement of the title of the paper was all the notice bestowed by our predecessors in their "Transactions" on a discovery which has revolutionized the art of making iron. It is quite true that for some time it appeared as if the scientific aspect of the question were to constitute its only recommendation, for the malleable iron made in a Bessemer converter proved unmanageable when hot, and destitute of strength when cold. Finally it was ascertained that phosphorus was the source of the evil, and, further, that while carbon and silicon could be almost entirely removed from the molten metal, this third metalloid remained unaffected by the treatment. The extent to which the hurtful influence of phosphorus makes itself felt in the wrought iron obtained by the Bessemer process is somewhat remarkable, because while two to three-tenths per cent. is often present in puddled bars of fair quality, probably no consumer would accept Bessemer steel when it contains half of this amount. The first success was obtained in Sweden, where by using pig-iron containing a mere trace of the objectionable substance a product was obtained which was satisfactory. For many years the beneficial effect produced by manganese on steel had been well known, and it occurred to R. F. Mushet, son of David Mushet, one of, if not the earliest scientific metallurgist in the United Kingdom, to try its influence in the converter on iron made from the hematite iron of the West of England, which contained from ·05 to ·1 per cent of phosphorus. This addition, apparently by its removing occluded or combined oxygen in the molted iron, afforded the necessary relief, and the operation being one of extreme simplicity enables steel or wrought iron to be produced at a greatly reduced cost. To such an extent has this been carried, that ore is brought by sea over a distance of 1000 miles to Middlesborough, and from it steel rails are made more cheaply than a greatly inferior article of iron can be produced from the abundant and economically wrought bed of ironstone found within a couple of miles of that town. As an example of the facility of conversion may be adduced the fact that the molten metal is brought direct from the blast furnace, turned into steel or ingot iron as the case may be, and the heat evolved by the operation is sufficient to enable the product in many cases, without further use of fuel, to be taken direct to the mill, and rolled into a finished bar.

We have just seen that ·1 per cent., or thereabouts, in phosphorus renders steel or ingot iron valueless; in like manner very insignificant variations in the quantities of carbon or silicon materially affect their quality. Now the blow, as it is termed, in a Bessemer converter may be accomplished in from twelve to fifteen minutes. It is clear, therefore, the opportunity of ascertaining the precise quality of the steel is one of very short duration. It is, I think, not disputed that a product can be obtained by this process possessed of very high, if indeed not of the highest, excellence, but it is also pretended that the quality is not sufficiently uniform for certain purposes. The ordinary reverberatory furnace is incapable of affording the necessary temperature for melting steel or wrought iron, but by employing the fuel in a gaseous state, and by heating the air and gas before they are brought together, as is done in the valuable furnace suggested by the Messrs. Siemens, the heat is so intensified that wrought iron in it is rapidly fused. Steel is now largely made in such furnaces, either by mixing wrought and cast iron, as proposed by M. Pierre Martin, or by means of cast iron alone, when the carbon is removed by the addition of iron ore and some limestone, in which case, by the agency of the ore, the metalloids are oxidized and removed from the bath of iron. Some hours being required for this, sufficient opportunity is afforded for ascertaining the progress of the operation.

The cause of the iron in the Siemens furnace, as well as in the Bessemer converter, retaining its associated phosphorus in time began to attract the attention of chemists. In each case the expulsion of the metalloids is effected by oxidation. The carbon is gasified, and the silicium, on being acidified is absorbed and forms a slag containing usually 40 to 50 per cent. of silicic acid. In the presence of such an excess of this substance, any phosphoric acid, if formed, could not be absorbed by the slag. It was the late M. Grüner, of Paris, who, in 1867, first pointed out this fact, and he it was who first recommended the use of lime in order to render the slag basic instead of acid. Further, in order to avoid the presence of silica, he recommended at the same time that the converter should be lined with lime instead of with fireclay.

The same subject engaged my own attention, when guided by the fact that, as oxide of iron in the puddling furnace was capable of acidifying and removing a large quantity of the phosphorus as iron phosphate, it might be possible by keeping the temperature of the metal below that required for the process of puddling to make this removal more complete. The result of these experiments was communicated to the Iron and Steel Institute in March, 1877, when it was shown that pig-iron containing 1·75 per cent. of phosphorus could in a few minutes have this reduced to ·2 per cent. This process is now being used in the United States for freeing cast iron from its associated phosphorus.

The rapid destruction of the ordinary Bessemer converter led Mr. G. I. Snelus to consider the practicability of using a lime lining, and on experimenting with this on a working scale he confirmed the opinions previously enunciated by Grüner by observing that the presence of lime had removed a considerable quantity of the phosphorus. These discoveries constitute the foundation of the very important basic process of Messrs. Thomas and Gilchrist, which consists in adding lime to the molten steel in a converter constructed on the principle described by Mr. Snelus. Considerable difficulty had, however, been experienced by this metallurgist in the attachment of the lime lining to the walls of the converter. This important question was solved by Mr. Edw. Riley by exposing dolomite to a very high temperature in order to prevent further shrinking, and then grinding and mixing the powder with coal tar. This formed a species of cement which is applied to the sides and bottom of the converter in the form of bricks or as cement. Doubtless, simple as the idea is, it has greatly contributed to the success of the basic process.

The acidification and subsequent transference to the slag of the phosphorus by the basic treatment has led to its application to agriculture. For this purpose the slag is ground to a fine powder and sprinkled over the land without any further preparation. By this operation an indispensable element of animal life is derived from the remains of living creatures which ages ago found a grave in the ferruginous mud destined to become the great Cleveland bed of ironstone.

Before closing this portion of my official duty, I cannot refrain from tendering to chemists an assurance of the great advantage the manufacturers of iron feel they have derived from the lessons taught them by chemical science. I am the more anxious to do this because we, among others, have been reminded that we are losing the supremacy among industrial nations we once enjoyed for want of that knowledge of chemistry which is more assiduously cultivated abroad than it is in our own country. I am not prepared to deny that the opportunities for acquiring a scientific education are less generally spread here than is the case in France, Germany, or Belgium, but for this the nation, and not the iron trade in particular, is responsible. It must also be admitted that as manufacturers we no longer stand so far above other lands as we formerly did. In this result any differences of education are in no way concerned, for if I were to classify the nationalities of the various inventions enumerated in the course of my remarks the fears of those who are alarmed at the appearance of a Belgian girder or a German steam-engine on our shores would, I think, be allayed. Perhaps I might be allowed to offer a very few words on the technical side of this important question of education. Much I shall not be able to say, because I have not yet been able to learn the precise position the subject occupies in the minds of its most earnest advocates. If it means, as is sometimes alleged, a system by which, along with scientific instruction, manual dexterity in the use of tools or a practical knowledge of various manufacturing processes has to be acquired, I confess I am not sanguine as to the results. Certain I am that if foreign workmen are more skilful in their trades, which, as a rule, I doubt, and which in the iron trade I deny, this superiority is not due to scientific training in the manner proposed, for in this they possess, as far as I have seen, no advantage over our own workmen. My objection to the whole system is the impossibility of anything approaching a general application being practicable. I have not a word to say against the rudiments of science being taught wherever this is possible. The knowledge so obtained may often give the future workman a more intelligent interest in his employment than he at present possesses, but I think they who expect much good to attend such a thin veneer of chemistry or physics do not take sufficient account of the extent of the knowledge already possessed by more highly educated men who are now directing the great workshops of the world. It is by extending and enlarging this that substantial aid has to be afforded to industry and science, and not by teaching a mere smattering in our primary or any other schools. In the case of young people who from necessity must leave the schoolroom at an early age, my own leaning is towards the present system, with the addition of drawing and some natural science. By it certain important lessons are taught, which, if not followed under the discipline of the schoolmaster, run some risk of being entirely neglected. After this, probably, the playground will be found more useful and much more popular with schoolboys than trying to learn a trade by means of tools which, before he has to use them in earnest, may be thrown into the scrap heap.

As a national question the attention of the Government, Imperial or municipal, ought to be directed to the importance of establishing in all great manufacturing centres institutions resembling that of the Physical College of this city. These should consist of appropriate and even handsome buildings, properly furnished with all the instruments and appliances required for teaching the sciences in their practical bearings on industrial pursuits. In Newcastle, as well as in other places, this has been done on a fairly ample scale, and the advantages the College of Science in this city are capable of affording are offered on such terms that no one can plead expense being a barrier to mental improvement.

Bearing in mind the importance of the subject, and remembering, as my colleagues and myself do, the difficulties we have had to encounter and those we have still before us, I am strongly of opinion that the erection and maintenance of colleges of science should not be left to the accidental liberality of the few, but should be taken in hand by the nation at large.

Obituary.

HAROLD WOOLLEY.

We regret to have to record the death, as the result of a sad accident on the 15th instant, of Mr. Harold Woolley of the firm of James Woolley and Sons, Market Street, Manchester. It would appear that a two-gallon bottle containing nitric acid having burst in the cellar of the establishment of the firm, water was thrown on the acid which had escaped on to the floor and subsequently whiting was used to neutralize the remaining acid. Mr. Harold Woolley, hearing of the accident, went to superintend the operations, and whilst doing so must have inhaled a quantity of nitrous fumes that caused his death. So far as observation went there is nothing known that would account sufficiently for the fatal result from such an apparently trivial accident. It can only be surmised that Mr. Woolley was either more exposed to the vapour than the others present, or that he was more susceptible to its effects. However this may be, Mr. Woolley does not seem to have complained of any particular inconvenience at the time of leaving business on the day of the accident; but the same evening he obtained medical advice, and although the symptoms were not then considered to be urgent, he was unable to go to business on the following morning and died in the course of the afternoon. Mr. Harold was the youngest son of the late Mr. James Woolley, one of the earlier members of the Council of the Pharmaceutical Society, and was in his thirty-ninth year at the time of his death. After studying at Owen's College and at the School of Pharmacy, Bloomsbury Square, where he was a prizeman in 1871, he entered the business of Messrs. Woolley and Sons in 1872, where he took charge of the scientific apparatus and surgical instrument department. Mr. Woolley became a member of the Pharmaceutical Society in 1872.

Notice has also been received of the death of the following:—

On the 18th of October, Mr. James Slipper, Chemist and Druggist, of Brunswick House, Hampstead. Aged 73 years. Mr. Slipper was a member of the Pharmaceutical Society for forty-six years, and in 1879 was elected a member of the Council, but retired at the end of the year.

On the 2nd of October, Mr. Thomas Styan Pearson, Chemist and Druggist, Bank Street, Maidstone. Aged 33 years.

On the 15th of October, Mr. William Willan, Chemist and Druggist, Friargate, Preston. Aged 38 years. Mr. Willan was an Associate in Business of the Pharmaceutical Society.

On the 17th of October, Mr. James Brogden Marsden, Chemist and Druggist, Blankett Row, Hull. Aged 48.

On the 19th of October, Mr. Andrew Ross, Chemist and Druggist, Castle Street, Aberdeen. Aged 55 years.

On the 19th of October, Mr. George Coverdale Jones, Chemist and Druggist, York Town, Surrey. Aged 40 years. Mr. Jones was an Associate of the Pharmaceutical Society.

ANSWERS TO CORRESPONDENTS.

Student will find full information respecting all the compounds named by consulting the indexes of the Journal.

A. H. Samuel.—See the paper on 'Frankincense,' by Dr. Birdwood, in *Pharm. Journ.*, [3], vol. i., p. 163, and on 'Perfumes,' vol. iii., pp. 808, 825.

T. J.—*Hypericum calycinum* and *Nepeta Cataria*.

Aq. Flor. Aurantii.—*A. J. Dyer* asks for information as to what is usually dispensed when aq. flor. aurantii is ordered. As the language of the B. P. remains still very indefinite upon this point, the opinions of correspondents as to the practice is invited.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Welborn, Clower, Atkins, Jankowski, Wright and Co., Richardson, Associate in Business, M. P. S.

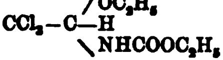
"THE MONTH."

Chloralamide.

The results following the administration of the new hypnotic, chloralamide (*ante*, Aug. 31, p. 161), to a number of hospital patients have been communicated by Dr. D. R. Paterson, of Cardiff (*Lancet*, Oct. 26, p. 849). It was given in fourteen cases of insomnia, including simple sleeplessness and that consequent upon phthisis, heart disease and enteric fever. Upon the whole the results obtained were encouraging, for although the action of the amide is not quite so rapid as that of chloral hydrate, sleep coming on from half an hour to an hour after its administration, this is considered to be more than compensated for by the almost entire absence of action upon the circulation. The new hypnotic, however, appears to be not quite free from some of the disadvantages attending the use of others, since in some instances doses of 30 grains and 45 grains were followed by giddiness, feeling of sickness, dryness of mouth and even slight delirium. As a rule sleep lasting about eight hours followed its administration, and in cases of phthisis its influence in restraining sweating was very marked; but the insomnia and restlessness due to pain were little, if at all, affected by it. Dr. Paterson thinks some of the published doses to be much too large, at least to begin with, especially if the patient has been ill some time. He has found that usually from 30 to 45 grains is sufficient for a man, while 20 to 30 grains will give satisfactory results in a woman.

Somnal.

"Somnal" is the suggestive name applied to what is described as "ethylirtes chloralurethan," and represented by the formula $C_7H_{12}Cl_3O_3N$ (*Pharm. Zeit.*, Oct. 5, p. 611). It was at first described as being prepared from chloral, alcohol and urethan, and as differing from the compound recently introduced as "chloralurethan," by containing 2C and 4H more in the molecule; also as melting at 42° C., boiling in a vacuum at 145° C., and as not being altered by the addition of silver nitrate or by acids. As the crystals are very deliquescent the preparation appears to be sent out dissolved in alcohol, in which it is soluble to the extent of three parts in one. The advantage claimed for "somnal" is that when administered in two gram doses it induces within half an hour a quiet sleep that lasts from six to eight hours without any inconvenient bye effects. It is not unimportant to add, however, that Herr Lutze, writing to the *Pharmaceutische Zeitung* (Oct. 26, p. 652), has claimed that somnal is none other than chloralurethan under a new name and that the addition of the word "*ethylirtes*" is simply a blind. This statement has, however, evoked a denial from Herr Radlauer, who now affirms that it is a product of the direct combination of chloral alcoholate and urethan in a vacuum apparatus and that its composition is correctly represented by the formula—



$$CCl_3-C\begin{cases}OC_2H_5\\H\\NHCOOC_2H_5\end{cases}$$

Formyl-amido-phenol ether.

Formyl-p-amidophenol ether, which would be a compound corresponding to phenacetin, but with a formyl group in the place of an acetyl group, is the subject of a recent patent (*Pharm. Zeit.*, Oct. 12, p. 625). It is described as being made by heating together definite quantities of the hydrochloric acid compound of p-amidophenolethyl ether, sodium formate and formic acid in a vessel connected with a reflux condenser, and separating the formyl compound that is formed by boiling the fused mass with water. On cooling the water deposits it in handsome white brilliant tasteless scales, melting at 69° C., slightly soluble in cold water and readily soluble in hot water, ether and alcohol. The new compound differs from phenacetin, or acetphenetidin, in possessing scarcely any antipyretic property; but on the other hand it is said to act to an extraordinary degree upon the spinal cord, abolishing the action of strychnine, and to be available therefore as an antidote or in the treatment of the tetanic condition.

Double Salts of Mercury and Thymol.

According to the terms of a patent taken out by E. Merck for the preparation of compounds of mercury with certain phenols (D. R. P., 48539) the process adopted is as follows (*Pharm. Zeit.*, Oct. 12, p. 625): A warm solution of mercuric nitrate, moderately acidulated with nitric acid, is poured in small quantities at a time, during stirring, into a warm alkaline solution of thymol, as long as the yellow precipitate that forms is redissolved. The liquor is then allowed to stand and upon cooling forms a crystalline paste, consisting of felted needles of the double compound of mercuric thymolate and nitrate. This is purified by recrystallization from dilute soda solution, in which, when warm, it is freely soluble. Another way is to pour the warm weakly acidulated solution of mercuric nitrate into an alcoholic solution of thymol, this mixture also upon cooling forming a paste of soft felted needles. The former plan has so far the disadvantage that the alkaline solution of thymol becomes slightly coloured, so that the product is not purely white, in addition to affording an opportunity for the formation of sodium nitrite, which requires considerable washing for its removal. The pure mercury-thymol double salt is said to be perfectly colourless and odourless, but it gradually becomes reddish, especially if exposed to daylight, and acquires a faint thymol odour. When mercuric nitrate and thymol are used the salt formed is represented by the formula $(C_{10}H_{13}O)Hg-Hg(NO_3)$; but when mercuric acetate is used the formula is given as $(C_{10}H_{13}O)Hg-Hg(C_2H_3O_2)$.

Strychnine and Brucine in Strychnos Preparations.

The results of some experiments reported upon at Heidelberg, by Professor Beckurts, as to the relative proportions in which strychnine and brucine occur in preparations of nux vomica, appear to have an important bearing upon the present mode of standardizing these preparations at present official in this country. Five different samples of extract of nux vomica were taken, the total alkaloids separated, and the relative proportions of strychnine and brucine present in them determined by taking advantage of the difference in solubility of the acid ferrocyanides (*Pharm. Centralh.*, Oct. 3, p. 574). The relative percentage proportions of the two alkaloids in these extracts were as follows:—

	I.	II.	III.	IV.	V.
Strychnine .	48	53·6	42·7	53·1	45·6
Brucine . .	52	46·4	57·3	46·6	54·4

It therefore appears that in the total alkaloids from these samples the relation of the strychnine to the brucine varied between 42 : 58 and 54 : 46. Assuming then that these extracts were all standardized to contain 15 per cent. of total alkaloids, the one richest in strychnine would contain 8·1 per cent. of that alkaloid, while the poorest would contain only 6·3 per cent., or a difference of 1·8 per cent. According to Talk the physiological activity of strychnine is 38½ times greater than that of brucine, a difference so great that Professor Beckurts suggests that instead of standardizing upon the total alkaloids, it would be better to take into account the strychnine only, and ignore the brucine.

Ipecacuanha Alkaloids.

[*Apropos* of a communication from Herr Geyger, as to amounts of alkaloid separated from different preparations from the same parcel of ipecacuanha, in which the largest quantity of emetine was attributed to the alcoholic and acid tinctures of the German Pharmacopœia, Herr Arndt calls attention (*Pharm. Zeit.*, Sept. 25, p. 585) to the disturbing influence that may be exerted upon emetine determinations by the volatile alkaloid that he has before described as occurring in the root (*Pharm. Journ.*, [3], xix., 505). This base is spoken of as forming at an ordinary temperature a yellow oil, solidifying when cooled to a low temperature to fine pearly crystals. The salts are represented as being crystalline and readily soluble, with the exception of the tannate and nitrate. The volatile base is supposed to exist in the root as a tannate, but when the conditions of the exhaustion of the root are favourable to the breaking up of this insoluble compound, and bringing the alkaloid into solution, the whole quantity, which is stated to be about 0·3 per cent., might get added to the total of emetine. According to Herr Arndt actual emetine varies between 0·6 and 1·1 per cent. of the cortical substance, and never exceeds 1·12 per cent.

Atropine, Hyoscyamine and Hyoscine.

Some experiments made by Professor Schmidt (*Pharm. Zeit.*, Sept. 25, p. 583) seem to establish the fact that the length of time belladonna roots are kept after collection has little influence on the alkaloid they contain, as practically only hyoscyamine, and no atropine, is found in full grown roots that have been kept for years. On the other hand there appears to be some relation between the alkaloidal contents and the stage of growth, for whilst in roots of one year's growth free atropine occurs together with hyoscyamine, only hyoscyamine is present in fresh old roots. Professor Schmidt also reports that he has now found that *Scopolia atropoides*, like *S. japonica*, contains both hyoscyamine and hyoscine, and that hyoscine, hitherto known only as a syrup, has been obtained in a crystalline form by Herr Bender. Traces of an alkaloid having a mydriatic action have also been found in *Solanum tuberosum*, *S. nigrum* and *Lycium barbarum*. From the residues of the conversion of hyoscyamine into atropine by Will's process (*Pharm. Journ.*, [3], xix., 245), a crystalline compound has been separated presenting some analogies to isatropine, the decomposition product (tropine) of hyoscine, but differing from it in crystalline form. Its occurrence suggests the possibility of the formation of another base, besides atropine, during the conversion, and it has been named "metatropine." In reference to the commercial preparations sold under the names "atropine" and "hyoscyamine," Professor Schmidt remarked that they are usually mixtures, and physiological experiments have hardly yet been made with the pure compounds. He mentioned that the more hyoscyamine sulphate a sample of atropine sulphate contains the finer would be its crystalline appearance, whilst the samples occurring as white granular masses would contain more atropine sulphate. Further if a solution of hyoscyamine sulphate containing atropine sulphate be allowed to evaporate spontaneously the hyoscyamine would gradually all be converted into atropine, as shown by a solution of the residue being inactive towards polarized light.

Eschscholtzia Californica.

Early in the present year (*Pharm. Journ.*, March 7, p. 703) a statement was made by Messrs. Adrian and Bardet to the effect that in the Papaveraceous *Eschscholtzia californica* there is present an alkaloid possessing all the characters of morphine, together with a second unidentified base and indications of a glucoside. At the recent meeting of German Naturalists and Physicians in Heidelberg, Herr Reuter stated that he had made a careful examination of a small quantity of the plant cultivated in Germany, but had failed to find any alkaloid that did not differ in its reactions from morphine (*Pharm. Zeit.*, Oct. 19, 635), though he confirms the presence of two alkaloids and a glucoside. One of these alkaloids was obtained as a crystalline hydrochlorate by treating a petroleum ether extract with dilute hydrochloric acid, and the other by similar treatment of an ethereal extract. They differed from morphine and from one another in their behaviour to sulphuric acid, the former giving with it only a faint yellow colour instead of orange-red and the latter an intense violet blue. Both differed from morphine also in not giving a blue colour with perchloride of iron. There was a further precipitation by potassium iodiodide, which was too small to be examined. It is proposed to continue the investigation upon wild-grown Californian plants.

Chelidonium Alkaloids.

Another Papaveraceous plant, the greater celandine (*Chelidonium majus*), was reported upon at the same meeting by Professor Schmidt, who stated that instead of the alkaloids in the root being limited to the two hitherto isolated, chelidonine and chelerythrine, he has recognized the presence of no less than twelve different bases in larger or smaller quantities. Only four of these have yet been studied, namely, chelidonine, to which the author attributes the formula $C_{20}H_{19}NO_5 + H_2O$; methylchelidonine, and α- and β-methylchelidonine, represented by the formula $C_{21}H_{21}NO_5$ (*Pharm. Zeit.*, Sept. 25, p. 582). A base having this latter composition, discovered by Hesse in opium and named by him "protopine," has also been recognized by Eykman in other Papaveraceæ and by Professor Schmidt himself in *Sanguinaria canadensis* and *Stylophorum stiphyllum*, and he also believes that the base supposed to be morphine discovered in *Eschscholtzia californica*, as referred to in the previous paragraph, will prove to be identical with methylchelidonine. It was further stated that these chelidonium bases have been ascertained to possess a weak morphine action physiologically.

Lobelia inflata and Lobeline.

The literature relating to the active principle of *Lobelia inflata* was already somewhat contradictory, and the latest contribution to it, by Dr. H. Dreser (*Arch. exp. Path. u. Pharmakol.*, xxvi., 237), does not lessen the diversity. According to this author the only active constituent of the drug is lobeline, which he describes as a non-volatile, non-glucosidal alkaloid that by careful manipulation can be obtained partly as a beautifully crystalline platinum salt, but forming for the greater part a non-crystalline platinum compound. In their pharmacological action the two forms of lobeline are identical, warm-blooded animals being killed by them, when given in toxic doses, through paralysis of the respiratory organs. It will be remembered that about three ago (*Pharm. Journ.*, [3], xvi., 838), the occurrence of liquid and crystalline basic substances in lobelia leaves was reported, but these were then said to be distinct alkaloids. Subsequently (*Pharm. Journ.*, [3], xvii., 1038; xviii., 135) Messrs. Lloyd reported that they had failed to obtain from the plant any other than an amorphous alkaloid, which had not yielded to them crystalline salts. A crystalline substance that was at first thought to be a salt was found to have no alkaloidal relation, but to be something of the nature of a stearoptene or wax, to which the name "inflatin" was given.

Urtica Glucosides.

The common nettle has long had a popular reputation as a remedy in various disorders, but recently a decoction of the leaves has been strongly recommended as a hæmostatic in metrorrhagia. This has induced Herr Reuter to examine the *Urtica urens* and *U. dioica*, with a view to discover the active principle. He reports (*Pharm. Centralh.*, Oct. 17, p. 609) that his efforts to isolate an alkaloid were attended with negative results, but that from mixtures of the powdered dried herbs with milk of lime he has separated in each case a non-nitrogenous glucoside that is precipitated by potassium iodiodide, and reduces Fehling's solution only slowly when simply heated with it, but immediately and very strongly after being boiled with acids. The *Urtica pilulifera*, which has a reputation in the East as a powerful galactagogue, has also been examined by Herr Reuter, and has yielded a glucoside, but it does not appear whether it is identical with that from the other species.

Cascara Sagrada.

In a paper read before the American Pharmaceutical Association (*West. Drugg.*, Sept., p. 325), by Mr. Zeig, a slight increase to our knowledge of the constituents of the bark has been made. He has found, like previous investigators, three resins in an extract made with strong alcohol, but has ascertained that two of them are physiologically inactive, whilst the third possesses the purgative properties of the drug, five grains of it having a marked laxative effect upon an adult. The author also finds that if dilute alcohol be used very little of the inert resin is dissolved, and recommends treating the cascara bark, in number 40 powder, with a mixture of equal parts of dilute alcohol (presumably of U. S. P. strength) and water. The process of maceration in a percolator with subsequent percolation is adopted, the percolate being evaporated to a syrupy consistence and poured slowly into water containing hydrochloric acid in the proportion of 2 drachms to 8 ounces of the bark. The precipitate is washed and dried at a gentle heat. The resin thus prepared is contaminated by the bitter decomposition product of the tasteless glucoside observed by Meier and Webber, to which they attributed tonic properties (*Pharm. Journ.*, xviii., 804). It can, however, be obtained devoid of bitterness by dissolving it in solution of caustic potash and reprecipitating it by means of hydrochloric acid.

Cinchona officinalis.

In a note in the *Kew Bulletin* (Oct., p. 247), relating to cultivated Jamaica cinchona bark, some correspondence on the subject of cinchona is published which discloses the curious fact that fine old silvery Loxa bark of the H. O. brand is about twelve times as valuable as Jamaica bark, not on account of its larger percentage of alkaloid, but because it is used to give a peculiar bouquet to the tonic wine of cinchona that is sold largely in France. It would be interesting to know how far the aroma is due to the lichens on the bark, and how much may be due to the flavour of the bark itself, which in some varieties, as in *C. micrantha*, is strongly marked.

Wattle Bark.

In consequence of the reckless stripping of the wattle trees in Victoria for the "mimosa" bark of commerce, the Government of that colony has appointed a committee of inquiry as to the regulations that should be adopted to stay the evil. It appears that in Victoria as much as 12,000 to 15,000 tons of bark per annum are used, whilst the exports have in one year amounted to 9724 tons. It has been suggested that much of the waste bark could be worked up into "cutch," or terra japonica, which is now imported into Victoria at about £20 per ton.

Japanese Senega.

A senega from Japan, supplied by Professor Shimoyama of Japan to Professor Flückiger, has been examined by Herr Reuter, who finds that it yields to ether 9·6 per cent. of a yellow mass, consisting of 0·8 per cent. resin and 8·8 per cent. oil, which has an odour of patchouli rather than of wintergreen. The senega in question is referred to *Polygala tenuifolia* (*Pharm. Centralhalle*, Oct. 17, p. 609). The root is mentioned in the Catalogue of Japanese and Chinese drugs, by S. Tsudioka and J. Murai; it is not, however, referred there to this species, but to *P. japonica*, Houtt.

Echujin.

Herr Boehm reports upon the examination of two arrow poisons obtained in a journey by Dr. Schinz through South-west Africa (*Arch. exp. Path. u. Ph.*, xxvi., 164). One of them was the juice of an apocynaceous shrub, *Adenium Boehmianum*, called by the natives "echuja," and contains as its active constituent a glucoside having the same percentage composition as digitalin, which it also resembles in its physiological action, and which has been named "echujin." It differs, however, so widely from digitalin in some of its characters as to leave no doubt as to its being a distinct body. The other poison could not be identified as to its botanical origin, but was probably derived from the same or a closely allied source.

Crystalline Ethers of Albumose.

Although numerous communications have appeared at different times upon the decomposition products and reactions of albumenoid bodies, well-defined crystallized compounds or derivatives have not hitherto been described, and it is probable that as a rule operators have worked upon heterogeneous mixtures. This gives interest therefore to the announcement of Herr Schrötter that he has succeeded in preparing relatively well-characterized benzoic ethers of albumose, which are soluble in alcohol, yield no ash, and are quite free from sulphur (*Berichte*, xxii., 1950). It may be convenient to recall here that the term "albumose" has been applied by Kühne and Chittenden to a group of compounds occurring as intermediate products in the conversion of albumen into peptone. The starting material was a mixture of albumoses obtained by precipitating a weak acetic acid solution of Witte's peptone with a concentrated solution of ammonium sulphate, redissolving the precipitate in dilute acetic acid and reprecipitating with strong alcohol. The moist precipitate of albumose was dissolved in 10 per cent. soda solution and shaken with benzoyl chloride, and this process was repeated several times. The white powder eventually obtained was extracted with boiling alcohol, which on cooling deposited white microscopic crystals of a body giving the biuret reaction, but containing no sulphur, from which 51·6 per cent. of benzoyl was separated by saponification. Upon distilling off some of the alcoholic mother liquor a yellow precipitate formed, which after purification by dissolving it in 95 per cent. alcohol and reprecipitating it by ether was obtained in white flocks, also free from sulphur, showing the biuret reaction and yielding on saponification 45·5 per cent. of benzoyl. Upon concentrating the alcohol-ether mother liquor to a syrup a crystalline paste formed, consisting of a third body, that also gave the biuret reaction, but very faintly; it contained no sulphur and yielded 61 per cent. of benzoyl on saponification.

Ricin.

The poisonous principle present in castor oil seeds has been variously represented as an alkaloid, a glucoside and an organic acid. But as the result of an exhaustive chemical and pharmacological investigation, recorded in a lengthy treatise (*Arbeit. d. pharmakol. Inst. Dorpat*, part iii., p. 59), Herr Stillmark has come to the conclusion that it is an albumenoid body, identical with the "β-phytalbumose" separated from the dried juice of *Carica Papaya* by Sidney Martin and belonging to the class of unformed ferments. This substance, which has been named "ricin," may be prepared by exhausting well-pressed peeled ricinus seeds, reduced to powder, with a 10 per cent. solution of sodium chloride, saturating the clear percolate at the ordinary temperature with magnesium sulphate and sodium sulphate and keeping it in a cool place, when besides large crystals of the two sulphates, a white precipitate easily separable from these is formed. This is placed in a dialyser, with frequent changes of water, for six days, after which the residue is removed and dried over sulphuric acid and can then be reduced to a snow-white powder, which still contains 10 to 20 per cent. of sulphate. This substance is a most powerful poison, exercising a remarkable power of coagulation, so that the blood coming into contact with a minute quantity that has been absorbed is coagulated, blocks the lumina of the intestinal capillaries, and causes thrombosis and echymosis. Even when introduced subcutaneously the principal action of the poison appears to occur in the intestinal canal, and not at the place of injection. The lethal dose for a man weighing sixty kilograms is estimated as 0·18 gram, and it is stated that this quantity is contained in the press cake from 3 grams of peeled seeds. In view of this fact, that the residue from the pressing of castor oil contains such large quantities of a tasteless poison exceeding arsenic in toxic power, and at present not to be detected in the body by any known method, Herr Stillmark raises the question whether it should not be made compulsory upon manufacturers to burn the cake or render it harmless by a process of boiling that would destroy the ferment. Experiments were also made upon the seeds of nine other species of ricinus, as well as those of *Croton Tiglium* and *Jatropha Curcas*, and in each case a poisonous albumenoid substance was separated, similar to if not identical with ricin, and belonging to the class of ferments. It is pointed out by the author that the coagulating power of ricin explains the external application in some countries of crushed ricinus seeds as a hæmostatic.

Anthrax Albumose.

In a communication to the *British Medical Journal* (Oct. 12, p. 811), Mr. E. H. Hankin claims to have isolated from anthrax cultures an albumose that is capable of exercising a marked influence upon the development of the anthrax disease. He states that when this albumose is injected into an animal in too large a quantity it appears to cause death more quickly than an injection of the most virulent anthrax spores; but that when only a very small dose is injected the system appears quickly to establish a tolerance of the poison sufficient to protect it against the subsequent action of the anthrax bacillus. If his conclusion proves to be correct it would seem to point to an improvement in the method of vaccinating animals against anthrax and possibly against other diseases. Mr. Hankin states that he isolated the albumose from anthrax cultures by the ordinary chemical method of precipitating it from solution by the addition of a large bulk of absolute alcohol, washing the precipitate thoroughly with absolute alcohol to remove ptomaines, drying, redissolving and then filtering through a Cumberland filter. A rough colorimetric determination of the quantity of the albumose in solution was made by comparing the biuret reaction with that of a peptone solution of known strength.

Solubility of Glass.

In a communication upon the influence of the composition of glass upon its chemical and physical properties, which was brought before the chemical section at the late meeting of German naturalists and physicians, some points were mentioned having a bearing upon the solubility of glass which has also recently been the subject of discussion in this country. Professor Weber stated that he had been in the habit of submitting glass intended for laboratory purposes to a preliminary test, which consists in exposing it under a cover, after being carefully washed, to the action of the vapour of concentrated hydrochloric acid for twenty-four hours. Under these conditions the glass undergoes as much change as would be produced by carbonic acid and moisture in a year (*Chem. Zeit.*, Oct. 2, p. 1304). As might be expected some sorts of glass are affected more than others by this treatment, and the kind which Professor Weber has found to be attacked least is that which approximates to the composition represented by the formula $6SiO_2,CaO,Na_2O$ (or K_2O), whilst a glass having the composition of $13SiO_2,CaO,3Na_2O$ proved very alterable.

Some interesting experiments made with the view of obtaining information as to the variations of temperature of trees as compared with that of

Temperature of Trees.

the atmosphere are recorded in the *Botanical Gazette* (Oct., p. 217). It was found as a general rule that the temperature of the interior of the tree was somewhat higher than that of the air, except during the warmer portions of the day, the maximum temperature of the air being generally between 1 and 2 p.m., and the minimum between 6 to 7 a.m. The comparative tables show that the heat is absorbed and radiated more rapidly in the outer layers than in the centre. Experiments made at a time when the buds were starting, to determine whether the chemical action carried on in the tissues gives rise to heat, led to the conclusion that it is extremely doubtful if the metabolic processes involved generate sufficient heat to influence the ordinary thermometer. A curious difference was, however, found in the wood of the oak and pine in winter. Contrary to the statements of Professor Prentiss, the author of the paper, Mr. H. L. Russell, found that the temperature of the pine was lower than that of the oak at all times, except during the latter part of the night and early morning. This is attributed to the thick coating of the leaves on the pine preventing absorption of heat by the trunk, since the larch, which has similar wood, resembles in the matter of temperature the oak rather than the pine. The further conclusion was arrived at that the direct absorption of heat is the main cause of the high temperature of trees, and that it is largely dependent on the character of the bark, smooth-barked trees being as a rule warmer than those with a thick bark.

Heat evolved in the Respiration of Fungi.

Professor G. Arcangeli has communicated to the Botanical Society of Italy some interesting observations on the elevation of temperature in the receptacle of hymenomycetous and other fungi caused by respiration. The species experimented on were *Armillaria mellea*, *Phallus impudicus*, *Lepiota excoriata*, *Clavaria flaccida*, *Polyporus fraxineus*, *Clitocybe spinulosa* and *Scleroderma Geaster*. In all cases the excess of temperature of the receptacle over the surrounding air appears to rise regularly in the earlier, and fall in the later part of the day, attaining its maximum between noon and 2 p.m. The greatest excess recorded was in the case of *Lepiota excoriata*, 1·25°, about 1.30 p.m.

Pulpy Fruits.

In the last number of the *Annals of Botany* (p. 393) Mr. J. Bretland Farmer contributes an article on the morphology and physiology of pulpy fruits. After pointing out the very different sources of the pulp in different fruits, he gives detailed descriptions of its mode of formation in the elder, dulcamara, blackberry and ivy. The term berry is usually applied to fruits in which the pulp or succulent tissue is derived from the pericarp, but in *Daphne mezereon* it is formed not only from the pericarp but from the outer integument of the seed also. In *Citrus* it is due to hairs which spring into the ovarian cavities and become distended with fluid. In *Vitis* and *Solanum Dulcamara* the pulp is formed partly from the placenta and partly from the pericarp. In the latter, after fertilization of the ovary, the cells of the placenta grow out between the seeds so as to give them the appearance of being sunk in it, and this growth is continued until met by a similar growth from the pericarp, so that the cavity of the ovary is then filled up with pulpy tissue. The outermost layer of cells of the ovules also undergo a change, their inner and side walls becoming lignified and the outer wall becoming mucilaginous and forming part of the mucilage of the pulp, just as it does in linseed. The red colour of dulcamara berries is due to the appearance of a large number of chromo-plastids derived from the chlorophyll granules. At the same time that this formation takes place the starch in the fruit becomes changed to sugar.

Gluten in the Grain of Corn.

According to Herr W. Johannsen, gluten forms the main portion of the protoplasm in the amylaceous endosperm-cells of wheat, and is not the result of the action of any ferment. The so-called "gluten-layer" beneath the pericarp contains neither gluten nor any ferment, but small grains of a nitrogenous substance imbedded in fatty protoplasm, as well as diastase.

Relation of Plants to Soil.

In a paper read before the Paris Academy of Sciences (*Compt. Rend.*, cix., 628), M. Georges Ville shows that the composition of the soil influences plants in five principal characters, viz., the stature, the colour, the amount of carotine and chlorophyll, and the quantity of vegetation. A table is given showing the difference in stature and colour of plants of the common hemp according to the manure used, from which it is evident that this plant flourishes least in soil without manure, next in manure without potash, and in manure without nitrogen. The absence of lime and phosphate in the manure in the case of hemp did not interfere so largely with the colour and stature of the plants. It would appear, therefore, that rich manure is essential, at least, to the development of foliage.

Arenaria gothica.

The latest addition to the British phanerogamic flora is *Arenaria gothica*, which was discovered in West Yorkshire, near Ribblehead, by a Skipton botanist, Mr. R. Rothesay, and identified by Mr. A. Bennett (*Journ. Bot.*, p. 314). A careful search in the north of Britain by anyone familiar with Scandinavian botany would probably add several more new plants to the number already detected during the last few years.

Indian snuff.

According to Mr. F. W. Anderson (*Bot. Gaz.*, p. 229), the leaves of *Anemone cylindrica* and *Anemone multifida* are used by the Indians of the Rocky Mountains for nasal and pharyngeal catarrh. The leaves are gathered before the seeds are quite ripe, dried, and reduced to a fine powder. The powder so prepared, when used as snuff, produces a stinging sensation, makes the eyes water, and taken in sufficient quantity produces violent fits of sneezing. When these symptoms have subsided the throat and nostrils become free and have a comfortable feeling. The leaves are also broken small and smoked, the smoke being expelled through the nostrils for the same purpose. The juice of the fresh leaves is hot to the taste, and is sometimes rubbed into the nostrils instead of the snuff being taken. From the symptoms mentioned it seems likely that these species contain anemonin, and that it is not all dissipated by the drying to which the leaves are subjected. Possibly some of the British plants of the same order, *e.g.*, *Ranunculus acris* or *Anemone Pulsatilla* might answer the same purpose.

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THE RELATION OF PHARMACY TO HYGIENE AND BACTERIOLOGY.

THIS is a time when pharmacists require to be on the alert to avail themselves of any suitable opportunity to extend the field of their business operations without falling into the common mistake of trying to do the business of everyone else as well as their own, and it may be acceptable to some of our readers at least to be made acquainted with a suggestion that was offered with that object by the reader of a paper in the Pharmacy Section of the German Association of Naturalists and Physicians. The subjects dealt with in that paper were Hygiene and Bacteriology, and though it was admitted that the discussion of these subjects was specially provided for in another section of the body it was thought that attention might also be directed to them in a general way from the point of view of their interest for pharmacists. In that sense the author of the paper, Mr. EDUARD RITSERT, pointed out that regarding hygiene as the science of maintaining and promoting health, it comprises a very wide field of observation and inquiry concerning the various conditions by which health is influenced. In the first place the general conditions of existence, the soil, atmosphere, water and food materials have to be considered, together with the micro-organisms that occur under various conditions in our immediate surroundings. In addition to these attention has to be directed especially to the dwellings and occupations of the people, as well as to the diseases to which they are locally subject, and the effects produced by the overcrowding of particular localities. In short all the conditions under which human beings live have to be taken into account, with the object of ascertaining all influences prejudicial to health and of devising means for counteracting their evil effects. Though hygiene was regarded as a matter of practical importance by many ancient nations, and especially by the Jews, Greeks and Romans, it was little regarded in the Middle Ages, when the medical art was in a low condition, and every disease was considered to be a visitation of Providence, which could only be remedied by prayer. Among modern civilized peoples, however, hygiene has been recognized as a matter of paramount importance, and the reader of the paper referred to gave credit to England for having shown the necessity for a rational attention to its requirements, and for having furnished an example of the measures to be carried out with that object. The development of hygiene in Germany was of later date, but having once gained a firm footing it has progressed in such a manner that the principles there established have also been recognized in other countries. In the same way that German pharmacy may be proud of having given to the world the great chemist LIEBIG, it may also be proud that from its ranks came Dr. MAX v. PETTENKOFER, the man who opened the way for the practical exercise of hygiene in Germany, and who first pointed out the needful methods of investigation based on scientific principles. At his suggestion a chair of hygiene was founded at Munich in 1865, and soon afterwards that example was followed at the universities of Leipsig and Göttingen.

The establishment in Berlin of an Imperial Health Department in 1876 gave a fresh impetus to the study of hygiene, as well as to the work of preventing adulteration of food and the investigation of infectious diseases. The labours of Dr. ROBERT KOCH in relation to splenic fever and other subjects of this kind led somewhat later to his appointment as a director of this department, and from that time important researches have been carried out upon disinfection and the etiology of tuberculosis that are of world-wide interest. These researches serve to show the uncanny enemies man has to deal with, and they have created a general desire to find, by the cultivation of Hygiene and its offspring Bacteriology, means of counteracting the insidious attacks of those enemies. In Germany no cost has been spared in pursuing that object, and in rapid succession chairs of hygiene were established at the Universities of Berlin, Greisswald, Giessen, Breslau, Freiburg, Halle, Jena, Kiel, Rostock, etc. It will probably not be long before hygiene is made a special branch of study at all German universities. Naturally, as hygiene is most intimately connected with medicine, the greater number of hygienists and bacteriologists are medical men. But there is ample scope for men in other occupations to contribute to the promotion of hygiene, which requires not only special medical knowledge, but also theoretical and practical acquaintance with other branches of science, such as chemistry, botany, physics, and meteorology. In this connection the mention of the names of PASTEUR and PETTENKOFER alone will serve to illustrate what may be done.

With this general sketch of the development and scope of hygiene, we may now proceed to consider with Mr. Ritsert the relation it bears to the present state of pharmacy. The sciences that were once embraced by that art and medicine have been developed to a condition of independence that leaves pharmacy in the background. A still further limitation of the field of pharmacy has been brought about and is still progressing in consequence of the production of chemicals and other products on a large scale at such low prices that the pharmacist can no longer offer the products of his laboratory in competition with them. And, moreover, the free sale of drugs by general dealers has even in Germany begun to encroach upon what was regarded as the most indisputable right of the pharmacist to the exclusive sale of medicinal articles. Every year also prescriptions are becoming more simple, and all things considered it is probable that even under the more favourable conditions that obtain in Germany the field of pharmacy will be still more restricted if no effort be made for conservation, and by advancing with the spirit of the time, to acquire new ground for profitable activity. The increased demand now made upon those seeking admission to the pharmaceutical body in Germany is a sign of the desire to keep abreast of modern scientific progress. But as pharmacists must always keep in view the practical as well as the scientific aspects of their calling, it is suggested by Mr. Ritsert that both purposes might be served by turning attention to the study of hygiene and its methods of investigation. By qualifying himself for the examination of water, air, soils and articles of food or drink, as well as for conducting inquiries connected with bacteriology, the pharmacist would not only have extended the range of his scientific knowledge, but also opened up a new field for advantageous occupation.

The first meeting of the Chemical Society for the new session will be held on Thursday, November 7, at 8 p.m., when the following papers will be read: "The Isolation of a New Hydrate of Sulphuric Acid existing in Solution," by S. U. Pickering; "Further Observations on the Magnetic Rotation of Nitric Acid, and of Hydrogen Chloride, Bromide and Iodide in Solution," by Dr. W. H. Perkin; "On Phosphoryl Trifluoride," by T. E. Thorpe and F. T. Hambly; "On the Acetylation of Cellulose," by C. F. Cross and E. Bevan; "On the Action of Light on Moist Oxygen," by A. Richardson; "Anhydracetophenonebenzil," by Drs. Japp and Klingeman.

* * *

The London Section of the Society of Chemical Industry will commence its sessional meetings on Monday, the 4th of November, when a paper will be read by Mr. C. Napier Hake giving an account of a Borax Lake in California. At the next meeting, on the 2nd of December, Mr. Watson Smith will read a paper on "Variations in the Products of the Destructive Distillation of different Gas Coals heated separately in the same Retort under similar Conditions," and Mr. I. Hauff will read a paper on "Cresotinic Acid and its Applications."

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

October 16, 17, 24 *and* 25, 1889.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Nesbit, Maben and Stephenson.

Professor Sir Douglas Maclagan was present on the 16th, 17th, and 24th, on behalf of the Privy Council.

MAJOR EXAMINATION.

16th.—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Cargill, David Allan	Arbroath.

MINOR EXAMINATION.

16th.—*Ten* candidates were examined. *Five* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Barrass, Arthur	Hingham.
Brislee, William Henry	Liverpool.
Burn, James Robert	Newcastle-on-Tyne.
Carruthers, Edward Sanderson	Manchester.
Curtis, George	Aberdeen.

17th.—*Fourteen* candidates were examined. *Eight* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Falding, Harry Bennett	Sheffield.
Grant, James	Elgin.
Grey, John Elston	Edinburgh.
Innes, John	Douglas.
Jamieson, William Bannatyne	Rothesay.
Jones, Alfred Benj. Geo. Ernest	London.

24th.—*Fourteen* candidates were examined. *Three* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Lord, William Butler	Lancaster.
Lyle, William	Rothesay.
Maries, Charles Alexander	Liverpool.
Muir, George McCartney	Cumnock.
Parker, Herbert George	Scunthorpe.
Patrick, James	Dunfermline.
Richardson, Harold	Bradford.
Robertson, John Wright	Dundee.
Robinson, Bernard Christopher	Wolverhampton.
Scott, William Henry	Sandy.
Wheeldon, Edwin	Warrington.

25th.—*Fourteen* candidates were examined. *Five* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Smith, Francis Joseph	Edinburgh.
Smith, Robert	Forres.
Spark, William	Maryport.
Taylor, Joseph	Manchester.
Welch, Geo. Richard Julians	Bradford-on-Avon.
Weston, John Henry	Holyhead.
Wilkie, Adam Laidlaw	Galashiels.
Wilson, William Potter	Haddington.
Young, George Herbert	Brigg.

MODIFIED EXAMINATION.

16th.—The undermentioned was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Lupton, Edward	Lower Place.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at the Rooms, Great Russell Street, on Thursday, October 24. The President, Mr. Ellwood, took the chair. In the absence of the author, Mr. W. L. Williams, Honorary Secretary, read a paper on—

BACTERIA.

BY F. DAVIS, B.SC.

The author commenced with a general description of bacteria, giving as an illustration the hay bacillus (*Bacillus subtilis*), multitudes of which are developed in an infusion of hay when exposed to the air, as rod-like bodies about one twenty-thousandth of an inch in diameter. Although the bacteria mostly resemble one another in being rod-like there is a vast difference in their manner of motion, and this has led to their classification as "vibriones," having a wave-like motion; "oscillariæ," having an oscillating motion, and so on. Just previous to the period of multiplying the bacterium becomes quiescent and shortly afterwards encysted, forming upon itself an external gelatinous wall which entirely encloses the original bacterium or protoplasm. The protoplasmic mass then divides into numberless granules, which increase in size, and eventually burst the gelatinous wall and become free; these in their turn immediately commence to go through the phenomena of multiplication. After giving reasons for not accepting the theory of a spontaneous generation of these organisms, the author referred to the micrococci, which are mostly round or elliptical. These multiply by simple division and not by germination; that is a diplococcus or streptococcus is formed and multiplication is thus effected. Without attempting to draw a line of demarcation between microbes of the vegetable and those of the animal kingdom the author said it would be sufficient for the purposes of the paper to understand that every ferment has its specific microbe. The micrococci have two principal divisions, the *Micrococcus zymogens* and the *Micrococcus pathogens*, besides which there are two less important divisions of the chromogenic, or colour makers, and the septic micrococci. Some micrococci require free oxygen, others do not. The former, which are called aerobies, are illustrated by the top yeast used in the fermentation of English beer; the latter known as anaerobies, by the bottom yeast used in the fermentation of German beer. The author stated that nearly all fungi may be destroyed by the application of a solution of copper sulphate, this explaining why farmers dress their seed wheat before sowing. Bacteria exist in all departments of life. Sulphurous springs are due to the presence of a microbe, really an alga, capable of reducing sulphates. Saltpetre is formed in India and Peru by the action of bacteria in soil containing organic matter and carbonate of potash or soda. These nitrate bacteria are aerobic and hence the saltpetre is found on the surface of the soil only. The greenish matter developed sometimes in a suppurating wound is the product of a chromogenic microbe. Many bacteria appear to be altogether harmless, such as *Leptothrix buccalis*, which is always present in the saliva. Many others are harmless in the saliva and digestive canal, but are immediately productive of disease if they gain access to the blood through ruptured mucous membrane. This the author considers to be proof that bacteria in different phases of existence are capable of producing different results. Human saliva containing the *Micrococcus Pasteuri*, injected into rabbits, has proved fatal, whilst saliva from the same individuals, taken at another time when it was free from those organisms, was inert. Recent researches have shown that many apparently inert bacteria assist materially in the digestive process. In all cases of contagious disease bacilli may be found in the body after death. Anthrax, or splenic fever, swine plague, typhoid fever, and small pox all have bacilli characteristic of themselves. In some cases, according to the disease, these are found in the blood; in others they may occur in the mucous membrane, the malphigian capsules of the kidneys or the globules of the liver. The presence of bacteria in the blood is no doubt characteristic of various diseases, but whether the bacteria themselves or their secretions are the immediate cause of the disease is open to discussion. The cholera bacillus, which confines itself to the mucous membrane of the intestines, and does not appear to enter the blood, developes in an alkaline liquor, but is killed by one that is acid, whilst in dental caries the bacteria carry on their work best in an acid liquor. The author then referred to the preventive treatment for some diseases, such as small pox, hydrophobia and anthrax, and to the theories that have been advanced as to the effect of the introduction of an attenuated virus into the blood. In respect to antiseptics the author said that mercuric chloride occupies the premier position, but cannot always be employed with safety. From experiments conducted by himself he has found sulphurous acid to be the most effectual, and after this the following substances in the order named:—Chlorine, permanganate of potash, salicylic acid, carbolic acid and boracic acid. Iodine and bromine are also active germicides. The author concluded by giving a few instructions as to bacteria cultivation.

The President (Mr. Ellwood) was sorry Mr. Davis had not suggested a system of classification. For himself he recommended the one adopted by McNab. In that system the Bacteriaceæ are divided into four tribes, and two of these are again divided. A question which occurred to him in connection with the subject was this—Was it possible for one bacterial form to pass into another, and if so, would it be right to include the new form in the same species as the parent. He had hoped to obtain some fuller information respecting the cultivation, collection and preservation of bacteria, and referred to Koch's researches in that connection. He was anxious to know if specific forms were associated with particular chemical products, and if those products were the direct result of bacterial activity or a secondary consequence of that activity. He spoke of the intimate relationship that exists between the studies of bacteriology, chemistry and physiology, reference being made to the work of Klein and Pasteur, and after dwelling upon the necessity for the full discussion of the question of vaccination (which was related to the subject of the paper), amongst the educated portion of the community, he concluded by arguing that Pasteur's statements as to the persistence of germs for years in the decaying bodies of animals was an overwhelming argument in favour of cremation.

Mr. Strother gave a humorous instance of the popular idea upon the subject of microbes, and referred to the necessity for a system of classification as facilitating the study of the subject. He had anticipated that Mr. Davis in presenting a subject of this character would have dwelt a little more fully upon the sanitary and germicidal side of the question, as these were matters of practical importance to pharmacists.

Mr. F. C. J. Bird discussed the numerous terms that were commonly used in speaking of these micro-organisms, and suggested that "bacterial" was a good general term to employ. He also alluded to the difficulty that was encountered in freeing solutions from bacteria by simply boiling. He would have liked some information respecting the lenses that were suitable for bacteriological work and yet were within the means of students.

Mr. Ince then asked if he might be allowed to read the following note, which was especially interesting from a historical point of view.

Marcus Terentius Varro on Bacteria.

Some few months ago (in March) I was requested by Mr. Stanley J. Smith, of Colchester, to search for and verify a passage from a Latin author bearing on bacteria. It had been stated in a public lecture that these minute organisms had not only been alluded to but described so early as before the birth of Christ.

The statement needed confirmation, and I found the passage in a treatise by Marcus Terentius Varro, 'De Re Rusticâ,' on country life. Varro lived about B.C. 114, which was the age of Cicero.

In one of his chapters he gives directions for the choice and building of a villa; for the opening sentences I borrow Owen's translation, date, 1800.

"You must endeavour to place your villa at the bottom of a mountain that is woody, where there may be extensive pastures, with the front towards the winds which are most salubrious.

"That, which is placed towards the rising of the sun at the equinox, is very convenient, for it has some shade in the summer, and it has some benefit from the sun in winter.

"If you should be compelled to build near a river you must take care that you do not place your villa in such a situation as may be immoderately cold in winter, and unhealthy in the summer."

Now comes the sentence to which I would draw attention. The text as reprinted in 1472 reads thus:—

Quo sit loco potissimum villa statuenda.

Advertendum etiam si quum erunt loca palustria et propter easdem causas et quum arescunt, crescuntque animalia quædam minuta, quæ non possunt oculi consequi, et per aera intus in corpus per os ac nares perveniunt atque efficiunt difficiles morbos.

Here I must leave Owen, for his translation does not follow the original with sufficient closeness.

The passage may be thus rendered:—"Attention must be also paid as to whether there are marshy places, both for the same reasons, and because when they become dry, certain minute animals breed, which the eye cannot discern, and which borne through the air, penetrate into and within the body, by the mouth and nostrils, and propagate obstinate diseases."

Turning once more to Owen, the author, as was his habit, further explains the matter in a conversation. Fundanius, is the man of property; Agrius, the farmer; Scrofa, an imaginary character who comes in upon occasions.

Fundanius says, "What shall I do, if a farm of this kind falls to me by inheritance, that contagion may not affect me?"

"I can give an answer to that question," says Agrius: "Sell it for as much money as you can; or if you cannot, leave it."

But Scrofa says, "You must take care that your villa may not front those parts from which unwholesome winds usually blow, and do not build it in a hollow valley, but in an elevated situation, that if any unhealthy air is blown there it may be the more easily dispelled. Besides a situation on which the sun shines all day is more salubrious, for if any animalcules breed and are brought there, they are either blown away or they soon perish from drought."

Often in the laborious treatises of mediæval writers we trace foreshadowings of great truths which are accepted in our own day; but Varro, before the Christian era, speaks of what we term a modern discovery in no uncertain manner.

Our age is distinct as it exhibits the march of exactness as against speculation and poetic fancy. Whether the time may come, as we hope it will, when our knowledge may attain a precision by the aid of which we may combat disease face to face, I know not; but this I know, for it is certain, that investigations similar to those brought before us to-night tend in that direction.

Mr. Fawssett referred to the mention made in the paper of the practice adopted by agriculturists in using copper sulphate as a "pickle" for wheat, and inquired if its germicidal properties were based upon a satisfactory foundation.

Mr. Blackham said he had paid some attention to the subject, and had always considered that the liberal use of water was inimical to the growth and increase of microbes, an opinion that was confirmed upon hygienic grounds; he was therefore unable to see how water could act as a preservative of bacteria. He was in favour of cremation. He thought that the relatively high position of corrosive sublimate amongst antiseptics was not altogether in accordance with facts, nor did permanganate of potassium possess disinfectant properties to anything like the degree that was commonly claimed for it.

Mr. A. C. Stark thought the Association was indebted to Mr. Davis for the interesting manner in which he had treated a most important subject. It was an interesting subject, as showing the rapid progress that science made now. When they considered that within the life of the youngest man present, little or nothing was definitely known of these organisms, and the relative amount known of them now, it seemed to promise most valuable discoveries in the future. It was gratifying to note that some of the best work upon the subject had been done by a man who was then but an amateur in science and who had moreover so ably refuted Bastian's theory of spontaneous generation. He referred of course to Dallinger. The spontaneous generation of life was to a scientific man an absurdity. It would be quite as reasonable to talk of the spontaneous generation of matter or of force. With regard to the action of bacteria in the origin of diseases, he believed that the foremost investigators were inclined to think that it was the ptomaines the bacteria produced which really were the immediate cause of many diseases; the recent investigations of Dr. Luff and others seemed to confirm this view. He was sorry Mr. Davis had not said more about antiseptics, which was certainly the side of the question most valuable to pharmacists. The ideal antiseptic was yet, he thought, to be discovered. Perchloride of mercury, although still the most powerful known, was by no means entirely satisfactory. It ruined the instruments, and was, owing to its poisonous nature, rather unsafe in many cases. He thought that pharmacists might do good work in the direction of finding an efficient and non-poisonous antiseptic. In this connection it was interesting to note that one of the most successful and skilful operators of the present day entirely repudiated the use of antiseptics in surgery, and declares them to be not only useless, but positively injurious. Evidently, then, Listesium was not the last word upon the subject. Turning now to the question of the value of inoculation, there was one thing that vaccination had effected which the most rigorous opponent of it cauld hardly deny. It had mitigated the character of the disease. The percentage of death in the cases of smallpox had fallen enormously since the introduction of vaccination, and it was difficult to explain this by the improvement in sanitation.

Mr. E. Richards testified as to the value of boric acid as an antiseptic agent.

Mr. W. L. Williams said he much feared his rendering of the paper had not done its author justice; he had only that morning been made aware that it might fall to him to read the paper, and he had not been able to peruse it before delivery; they would probably appreciate the difficulty under which he laboured. He confessed that he had experienced a slight feeling of disappointment, for he had expected that the author would have treated the subject, which was one of very great interest, in a broader manner. No allusion had been made to the odours and colours which accompanied and were evidence of the presence of bacteria, nor to the useful economic products which were associated with their development. The question of classification had occupied much attention, and the names of Cohn and Lankester were inseparably associated with the subject. Lankester's proposal was to include them all in one class, on account of the identity in colouring pigment which ran through the entire series. Here, as elsewhere, much depended upon the limitation that was assigned to the term "species." There was undisputed evidence of the existence of intermediate forms of bacteria, as might be seen in the case of acetic fermentation. Here one organism was required to convert sugar into alcohol, before the *Bacillus aceti* could commence operations. The difficulty of freeing water from bacteria by boiling was not due so much to the tenacity of life in the organisms themselves, though that was often considerable; it was rather due to the failure to destroy the spores which embedded themselves in a gelatinous mass, known as zooglea, for their destruction by boiling whilst in that stage was well known to be a highly difficult matter. Sterilization might be effected by heating in a hot-air chamber to a temperature above the boiling point of water, for a period of one hour upon three successive days. Milk had been reported to be a fruitful carrier of disease, and it was always advisable to use only boiled milk for dietetic purposes. The last word had still to be said upon the subject of antiseptics, and investigations were still being carried on. He thought there was no question as to the germicidal property of copper sulphate. It was a very old-fashioned remedy in certain surgical cases. He could not say much with regard to an efficient and cheap lens, but he knew of an ⅛th with a good eye-piece, sufficing to detect the bacillus of tuberculosis.

The proceedings terminated with a vote of thanks to Mr. Davis for his paper, and to Mr. Williams for replying.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The twenty-first annual meeting of the above Association was held October 4, the President, Mr. William Smeeton, in the chair.

The annual report and financial statement, showing an increase in the number of members and a slight excess of receipts over expenses on the year, were approved and adopted.

A statement of accounts for the five years during which lectures for associates have been maintained was read, and it was resolved to meet the small deficit by means of donations. It was also decided that a meeting of a social nature be arranged during the present session.

A resolution constituting the members of the Association a committee to make the necessary local arrangements on the occasion of the visit of the British Pharmaceutical Conference was, on the proposal of the Hon. Secretary, seconded by George Ward, adopted.

The following were unanimously elected, on the proposal of G. W. Worfolk, seconded by J. W. Shepherd:—President, W. Smeeton; Vice-President, Geo. Ward; Hon. Treasurer, Jas. Hirst; Hon. Secretary, F. W. Branson; Council, J. H. Beacock, P. Jefferson, W. D. Pollitt, R. Reynolds, S. Taylor, E. Yewdall.

At the next meeting of the Association the following will be communicated:—"Physical Operations of a Chemical Laboratory," by Dr. Lewkowitch, Ph.D.; and "Various Methods of Estimation of Urea," by F. W. Branson.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the Session was held on Thursday evening, October 24, in the Association's rooms, 74, Commercial Street. Mr. John Forsyth, President, occupied the chair, and there was a good attendance, including several local chemists.

The minutes of the previous meeting having been read and confirmed, the Chairman called on Mr. T. C. Henderson (the secretary) to read his paper entitled, "Notes on a few Medicinal Syrups."

Mr. Henderson at the outset said it was simply his intention to give a short sketch of his experience in the manufacture and preservation of a few of the more important of these syrups. Beginning with syr. ferri iod. and quoting the B.P. 1867 formula, he said that shortly after this syrup was made it assumed a brownish coloration, due it was said by many to the oxidation of the ferrous salt into the ferric, with liberation of free iodine, although this opinion was by no means universal. Various methods were suggested to prevent this coloration, including the alteration proposed in the B.P. 1885. After enumerating these methods the writer said that as the result of his experience he would advocate the use of 0·1 per cent. hypophosphorous acid or 5 per cent. of glycerine, preferably the latter.

Here he showed several samples, all made at the same time, and with the same sugar, and preserved by various methods. Of these it was seen that syrups preserved according to either of those methods mentioned possessed a far more elegant appearance than the others.

Coming next to syr. ferri bromidi he found that Martindale's formula, with the addition of either acid. hypophosph. or glycerine, made a very satisfactory syrup.

Coming to Easton's syrup the essayist said that the preservation of this had been a source of trouble to many. He himself had followed the formula published in the 'Extra Pharmacopœia,' 1st edition, for some years. Soon after this was made it turned opalescent, and eventually a white precipitate settled at the bottom of the bottle. As a remedy for this he reduced the quantity of quinine by one-fourth, and this answered very well. After standing for some time this syrup assumes a dark coloration, but by adding 5 p. c. of glycerine this coloration is retarded, and samples were shown which were made four months ago, one with and the other without glycerine, and the results were very different; the glycerine sample being quite bright and clear, while the other was dark in appearance.

Following on this was a few remarks on syr. phosph. co., and then syr. hypophosph. co. Speaking of this syrup Mr. Henderson said that during his residence in the Royal Infirmary he had had occasion to make large quantities of this syrup, and as the result of his experience he laid before them the following formulæ, which he said gave the utmost satisfaction to all the staff of that Institution.

Take of—

Strychnine	1 grain.
Quinine (pure)	40 grains.
Manganese hypophosphite	40 grains.
Hypophosphorous acid	ʒii.
Water	℥i.

Dissolve and filter.

Sodium hypophosphite	160 grains.
Calcium hypophosphite	160 grains.
Liq. ferri hypophosph. B.P.C.	℥iii.

Dissolve and filter.

Mix these two solutions and add—

Glycerine . . . . ℥iv.
Syrup (cold) suffict. to produce . ℥xx.

Each drachm will thus contain about 1/160 grain of strychnine, ¼ grain quinine, ¼ grain manganese, ¾ grain iron, 1 grain calcium, 1 grain sodium hypophosphite.

After referring briefly to syr. tolu, syr. scillæ, etc., Mr. Henderson concluded by recommending his hearers to be careful as to what kind of sugar was used, as many of the changes which occurred in these syrups, also the unsatisfactory results which were often obtained, were not always due to faulty manipulation but to the impurities contained in the sugar of commerce, and he recommended the more frequent use of glycerine in these preparations.

On the conclusion of the paper, which all through was most attentively listened to, the essayist was awarded a very hearty vote of thanks, after which some discussion took place in which Messrs. Campbell, Doig, Forsyth, Lamont, Lindsay, and others joined.

A vote of thanks to the Chairman concluded the meeting.

The next meeting of the Association will take place on Thursday, November 7, when the question "Ought the Curriculum Bill to become Law?" will be discussed, the openers being:—Aff., Wm. G. Lamont; Neg., D. McD. Skinner.

British Pharmaceutical Conference.

MEETING OF THE EXECUTIVE COMMITTEE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, September 23, 1889, at 4.30 p.m. Present: Mr. Umney (President) in the chair, Professor Attfield, Messrs. Carteighe, Davies, Ransom, and Mr. Martindale (Hon. Treasurer), Mr. Naylor (Hon. Gen. Sec.) and Mr. J. C. Nightingale (Ass. Sec.).

The minutes of the previous meeting were read and confirmed.

Intimations of inability to attend were announced as having been received from Professor Bentley, Messrs. Atkins, Dott, Groves, Kinninmont, Kirkby and Reynolds.

Mr. Naylor (Hon. Gen. Sec.) read a letter which he had received from Dr. Thresh, tendering his resignation as Senior Honorary General Secretary of the British Pharmaceutical Conference.

The following resolution was proposed by Professor Attfield: "That the Executive Committee regrets that Dr. Thresh has, in consequence of his appointment as Medical Officer of Health to Mid and East Essex, found it necessary to resign his office as the Honorary General Secretary of the British Pharmaceutical Conference. The Committee on behalf of the Conference desires to place on record its sense of the valuable services rendered to the Conference by Dr. Thresh during the past five years." This was seconded by Mr. Carteighe and carried unanimously.

It was agreed to defer to the next meeting of the Committee the election of successor to the vacant office of Honorary Secretary.

A letter addressed to Mr. Naylor from Mr. J. Maltby Clague of Newcastle was then read, pointing out that the Library of the North of England Pharmaceutical Association required the 1886 'Year-Book of Pharmacy' to complete its set, and intimating that the Association would be grateful to the Executive of the Conference if it would supply the needed volume. The request was cordially granted.

The Committee of the Unofficial Formulary through its chairman asked leave and obtained the necessary sanction to publish a short list of formulæ at an early date.

By unanimous vote the remuneration of the Assistant Secretary was increased by £10 per annum.

Ten gentlemen were elected to membership.

The thanks of the Committee were accorded for the Twenty-fifth Annual Report of the Alumni Association, 1888-9.

MEETING AT NEWCASTLE-UPON-TYNE.

Wednesday, September 11.

(*Continued from page* 338.)

The next paper read was entitled—

TANNIN: ITS SOLUBILITIES, ETC.

BY B. S. PROCTOR, F.I.C.

While compiling a table of solubilities of pharmaceutical materials for the second edition of 'Practical Pharmacy,' I found that the statements with regard to tannin were very contradictory, old writers saying that in the manufacture of tannin by treating powdered galls with moist ether, a heavy aqueous solution of tannin was obtained, and a lighter ethereal liquor containing but little tannin, tannin being only sparingly soluble in ether. More recent and careful observers state that the heavy liquor is a dense solution of tannin in ether, tannin being very soluble in ether. I accepted this latter testimony, and obtained what I considered confirmatory evidence. This was in 1882. On the appearance of the B.P., 1885, I noted its statement that tannin is sparingly soluble in ether.

When the lecture session of the present Newcastle Pharmaceutical Association collapsed for want of students I felt my hand liberated, and took up the criticism of the pharmacopœial tests, and I now propose to lay before you notes of my observations on tannin, observations made in a somewhat fragmentary way during the last two or three years, and made with the appliances and methods most handy to a pharmaceutical operator. I do not give them in exact chronological order, but arranged according to the nature of the experiments.

I first worked, as most pharmacists would, with commercial tannin and methylated ether. Then I went to commercial tannin and commercial absolute ether. Becoming more critical I estimated the water in my tannin, and worked with dry tannin and commercial absolute ether, and as a last step I adopted ether, which I had rectified by maceration with, and distillation from, sodium.

Note A. To 6 fluid drachms of ether (=about 235 grains) tannin was added 20 grains at a time up to 180 grains. The first addition soon dissolved excepting a very small light residue. The second did the same; the third dissolved, but the solution separated into two strata, one heavy and turbid, the other light, clear and pale. Further additions continued to dissolve, the lower stratum increasing and the upper diminishing in bulk till the sixth addition (total 120 grains) caused the total disappearance of the light stratum, but did not exhaust the solvent power. Three further additions were made without showing saturation. This was 180 grains of tannin in 235 grains of ether.

The insoluble was evidently very small and light; it was filtered out, washed with ether, then with spirit, and finally with water, and when dry weighed 0·3 grain.

B. The filtered solution "A" was found to dissolve in all proportions in methylated ether, though the same proportions of ether and tannin had previously given immiscible strata. This observation is not confirmed, nor yet exactly contradicted by subsequent results, as the experiments have not been precisely parallel.

C. Further additions of tannin in powder to the solution "B" at first dissolved clear, but 20 per cent. addition caused the re-establishment of immiscible strata, one volume of light solution rising and two volumes of heavy subsiding.

D. The light solution containing about 8 per cent. of tannin, the heavy about 25 per cent. of tannin.

F. The ethereal solution of tannin "B," containing about 43 per cent. of tannin when shaken with an equal volume of water, separated into three strata. The bottom one, "Fb," thick and brown; the middle, "Fc," almost colourless, and the top one, "Fd," small, yellow and mobile. The heaviest solution was ethereal, and contained about 33 per cent. of tannin. The lightest solution was also ethereal, and contained about 2·2 per cent. of tannin. The middle stratum was aqueous, and contained about 3 per cent. of tannin. We may no doubt regard all these three solutions as consisting of ether, water and tannin, the proportions being determined by some law not as yet ascertained.

We should naturally conclude that both of the ethereal solutions would contain as much water as they could take up, and that the aqueous solution would be saturated with ether; but it would not be safe to assume that the same law of intersolubility which holds good between ether and water in their pure state would be maintained in the presence of tannin.

The solutions "Fb" and "Fc" (heavy ethereal and aqueous) left in an uncorked vial at rest for twenty-four hours remained as separate strata, but on shaking became a clear uniform solution. The addition of a little ether caused separation into *two* strata, a syrupy heavy ethereal solution with a weak aqueous solution above, and a further addition of ether caused separation into *three* strata, the heavy and light liquors as before being ethereal, and the medium aqueous.

G. A fluid drachm of commercial absolute ether (sp. gr. 0·7194) with additions of tannin, 5 grains at a time. The first addition turned pasty and then dissolved, forming heavy and light solutions. Further additions were made 5 grains at a time up to 40 grains, the light stratum disappeared, a dense solution nearly clear resulting (38·8 grains of ether to 40 grains tannin); that is to say, this syrupy solution contained more than 50 per cent. of tannin.

H. 1 drachm of tannin pressed into a half ounce vial and f℥j. commercial absolute ether poured upon it, the tannin speedily contracted and dissolved into a syrupy liquid. That is tannin 60, ether 38·8 or nearly 60 per cent. of tannin in the solution.

I. Pharmaceutical tannin, as dry as dust, was found to lose about 10 per cent. on drying at water-bath temperature. I am not in a position to say whether or not a few hours' exposure to this temperature effects any decomposition, but for the present paper I speak of this simply as dry tannin.

J. 6·4 grains of dried tannin with 20 grains of commercial absolute ether speedily became pasty, and in twelve hours formed a syrupy liquid with a supernatant mobile stratum. Four grains of dry tannin added dissolved speedily, solution being nearly complete in five minutes. Further additions of tannin up to a total of 18·4 grains dissolved to a thick syrupy liquid.

Having named these results to Prof. Bedson, he suggested repeating the experiments with ether further rectified, considering that the sp.gr. 0·7194 was not a sufficient guarantee of purity. I consequently rectified a small quantity of ether for myself, taking commercial ether from pure alcohol, macerating it with fused potash for several days, decanting the ether from the heavy alkaline liquor, and adding to it eight or ten little strips of sodium, moderating the action by immersing the bottle in cold water. When the action had apparently ceased the ether was again decanted clear and brown. Clean sodium was added and the maceration continued for ten days, during which there was no visible evolution of gas, though some further action on he sodium took place. At the end of this time the tle was connected by a bent glass tube and perted corks with another clean dry bottle The bottle containing the sodium and ether was then immersed in warm water and the other bottle in ice and water. Distillation was continued till nine-tenths of the ether had passed over. A sample of this ether, after keeping in a corked vial for a week, was tested again with a strip of sodium. A very small evolution of gas took place, but no discoloration of the ether. This I expect indicates that all the alcohol had been removed by the first treatment, and probably that the ether had absorbed a trace of water by the bottle having been opened from time to time for use. The ether rectified from sodium was taken for the next experiment, for which I also prepared some dry tannin by heating to about 200° F. till its weight was constant.

K. Two fluid drachms of dry ether with 10 grains of dry tannin. The tannin took the appearance of a damp powder in the course of an hour. In two hours it was pasty. In twenty-four hours it was a syrupy liquid at the bottom of the bottle with a stratum of thin ethereal solution above. Further additions of dry tannin, 10 grains at a time, were made, each one undergoing solution more speedily than its predecessor up to the fifth addition. Two more additions, making a total of 70 grains of tannin to 77·6 of ether, made a thick turbid liquid which became more fluid at about the temperature of boiling ether, but turning thick again on cooling, almost approaching a gelatinous condition, too thick to pass through filter paper, and on the addition of a little dry ether it was thinned but not sufficiently to filter, and part of the solution separated again as a light mobile stratum. Thirty grains of dry tannin crushed into a small bottle, and f℥j of dry ether poured upon it caused it to contract speedily, become pasty in the course of an hour, and fluid in the course of a day, some small particles remaining undissolved in the thick liquid, while a clear stratum remained above. The latter (the clear stratum) decanted weighed 11·7, and on evaporation left 0·3 of tannin, or about 2·56 per cent. The syrupy portion weighed 56·5, and left 29·8 of tannin, or 50·9 per cent.

These experiments are suggestive of there being an important influence exercised by the water present in the tannin under ordinary keeping and the water and spirit contained in commercial ether.

The behaviour of ether and tannin may be compared to that of ether and water, the analogy being more conspicuous if we take water in a physical condition analogous to the tannin, that is solid water—snow. Add a little to ether and it makes a light ethereal solution. Add a little more and it makes a heavy solution, sinking to the bottom, and a light one. Both of these are solutions of snow and ether. Add more snow and a point will be reached at which the light stratum will disappear, the whole of the ether being saturated with snow, or as we are more apt to express it—water enough has been added to dissolve all the ether. In operating at ordinary temperatures we are apt to lose sight of there being a saturation of the ether in the heavier liquor, because this solution is miscible in all proportions with water, as in like manner the lighter ethereal solution of snow (or water) is miscible in all proportions with ether. We are apt to speak of the phenomenon of solution as if the solvent only were the active body. But if solution is a composition of the molecular motions of the bodies concerned we must take into account the molecular motions of the solids, as well as of the liquid solvents, and if we admit the statement that tannin is sparingly soluble in ether we should guard the statement by adding that ether is largely soluble in tannin.

The length of time during which a small quantity of dry tannin many remain apparently dry and dusty in ether is remarkable, and suggestive of combination taking place between the tannin and ether, analogous to the combination which takes place between some anhydrous salts and water before solution can be effected. For example, dry ferric sulphate thrown into cold water only slowly dissolves, though it is really very soluble and very deliquescent. Its hydration takes considerable time, the solution of the hydrate takes very little. The heavy ethereal liquor may be an etherate of tannin in the same sense as an anhydrous salt may combine with a portion of water and become a crystalline hydrate, and then with a large bulk of water it becomes a solution.

If we accept this proposition, then the "etheration" of the tannin is obscured by the fluidity of the compound, and by our want of a clear definition of what constitutes solution.

The experiment *F* recorded above, in which ethereal solution of tannin shaken with water separated into three strata, the heavy ethereal liquor containing 33 per cent. of tannin against 3 per cent. in the aqueous, suggests that tannin is more soluble in ether than in water. Or to use a rather old-fashioned form of expression, that there is a greater affinity between ether and tannin than between water and tannin. I prefer that old-fashioned statement as being more concordant with the facts, for the solubility in water is even greater than its solubility in ether.

N. To a fluid drachm of water tannin added 60 grains at a time up to 180 grains; the last addition made it pasty while cold, but fluid while warm. Increasing the water to fʒiss. (*i. e.*, 71 grains), it became a brown syrupy liquid while cold. Stated in 100 parts we may say 100 of cold water dissolve 253 parts of tannin, forming a syrupy solution. Being a colloid body, there is no hard and fast line of delimitation to its solubility.

O. Sixty grains of tannin in fʒj. rectified spirit dissolves rapidly. The same result was obtained with B.P. absolute alcohol.

P. Two grains of tannin in fʒj. chloroform, macerated for a day, showed no sign of solution. Thrown on a filter, 44·2 grains of the filtrate left on evaporation a residue too small to be weighed, but capable of giving a colour reaction with ferric chloride equal to that produced by about two or three tenthousandths of a grain of tannin.

Q. Two grains of tannin in fʒj. benzol macerated a day and filtered; 22·5 grains of the filtrate evaporated left a residue too small to be weighed, and giving a scarcely visible colour reaction with ferric chloride. The possibility of using separable solvents in the estimation of tannin in solutions seemed to be indicated by the experiment *F*, and the following gives the results of some tentative trials.

R. Sixty grains of tannin dissolved in fʒv. of water in a separator, fʒj. methylated ether added dissolved. The addition of ½ drachm more ether caused the separation of about 65 grains of a heavy ethereal solution, which on evaporation left 28·7 grains of tannin.

b. fʒiss. more ether added to the contents of the separator (which was a clear brown solution) made it milky, and caused the deposit of a further portion of heavy ethereal solution, which ran off to the extent of 35·4 grains, containing 14·8 of tannin.

These estimates of the weight of the ethereal solutions run off are necessarily very crude, as the evaporation of ether was going on all the time of the running and weighing, but this is not of consequence, as the important point—the quantity of tannin they contained—was determined with comparative accuracy.

c. A third separation of heavy solution took place on adding fʒiss. more ether, but the quantity was small, only five or six drops, and left a residue of 0·8 of tannin. The contents of the separator at this stage were clear while cold, but the warmth of the hand made them milky, the clearness being restored by running cold water over the outside of the vessel.

d. A final addition of fʒiss. ether caused the separation of a light ethereal solution containing 1·5 tannin.

e. The aqueous solution was found still to contain 6·2. The tannin used in this experiment had not been dried, and according to the observation recorded in note *I* it might contain 10 per cent. of water, and on this supposition there was about 2 grains loss in the experiment. The point, however, is that the ether did not remove all the tannin from the water, but nearly ceased to do so when there ceased to be so much present as would make a heavy solution with the ether.

The presence of common salt diminishes the power of water to dissolve ether: and the addition of brine to a syrupy aqueous solution of tannin precipitates the tannin almost entirely. The question naturally presents itself whether the addition of salt to the contents of the separator would make the extraction by ether perfect or nearly so.

Two subsequent experiments with the object of testing this were inconclusive through accidental circumstances. In the first the tannin had not been dried previous to the first weighing of the 60 grains taken for experiment, so the tannin obtained by shaking out was air-dried only and weighed 57·1. The difference in the degree of dryness it might have detracts from the value of the result. In the other case the vessel was broken before the final weighing had been obtained.

In note *I* I recorded the fact that pharmaceutical tannin under ordinary keeping contained so much water as to lose about 10 per cent. on drying in a water-bath.

S. Repeating the experiment again, 10 grains of tannin from the shop stock, exposed to the air in an evaporating dish for twenty-four hours during rather damp weather, gained 0·5 grain.

Heated over a water-bath at about 200° F. (the water not being kept boiling) lost 1·5, making a difference of 15 per cent. between the two conditions, both having the appearance of dryness. In its dry state tannin rapidly absorbs moisture. We may say it is pretty strongly hygroscopic but not deliquescent. Its hygroscopic quality is apt to be overlooked, from the fact that the moisture which it absorbs under ordinary circumstances makes no visible change in its condition.

T.—With the view of testing the disposition of tannin to absorb ether vapour, 10 grains of dry tannin placed in a miniature percolator made of a leech tube, the narrow end of which was tied over with muslin and set in a ½-ounce vial containing fʒj. of dry ether, the top of the tube being corked to prevent very rapid evaporation of the ether, the bottom of the tube standing about half an inch above the surface of the ether in the receiver. The tannin absorbed 6 grains of ether vapour in sixteen hours, and in twenty-four hours had absorbed 9·1 grains, being converted into a pasty mass sufficiently soft for a little to ooze through the muslin. If we had habitually to work in an atmosphere impregnated with ether vapour, as we have to do with one containing water vapour, we should probably say that tannin was not only "etheroscopic," but deliquescent.

U. A similar experiment with absolute alcohol instead of ether showed a similar result taking place more slowly, the vapour evidently penetrating only slowly into the column of dry tannin. In eight hours 0·5 had been absorbed; in forty-eight hours the increase in weight amounted to 2·2, the bottom of the tannin having become pasty. The dry portion was removed, and weighed 7 grains; thus it was 3 grains of tannin which had absorbed 2·2 of alcohol vapour. The tube being returned to its place, the absorption of vapour continued, converting the pasty portion into fluid, which passed through the muslin into the spirit in the bottle below.

Comparing the results of the last two experiments with the experiment on the absorption of water by exposure to the air in damp weather, as recorded in note

S, we might suppose the affinity of tannin for water vapour was much less than its affinity for ether or alcohol vapours, but that is probably a question of temperature and the percentage of vapour contained in the atmosphere in which the tannin is placed. To test this supposition the same apparatus was used with water, as follows:—

V.—The tannin taken was that which had been ascertained to contain 10 per cent. of water. 1·1 gr. of this in the tube, placed over cold water, increased 0·1 grain in the course of thirteen or fourteen hours. The percentage of water now contained in the tannin would be 20 per cent. The whole arrangement was then placed in a beaker set in hot water for two or three hours. This of course increased the per cent. of water vapour in the atmosphere permeating the tannin, and greatly increased the speed of absorption, the tannin becoming pasty and containing at this stage 0·5 of water, or 50 per cent. of the weight of the dry tannin.

From the mode of its production, pharmaceutical tannin is not likely to contain any notable impurities, and such as it may contain are likely to be detected by want of perfect solubility in water, in spirit and in moist ether, or its solubility in dry ether being far from perfect, but as a further confirmation of its purity I have devised the following test, dependent upon its perfect precipitation by ferric hydrate.

W. Twenty grains of tannin and 20 of dry ferric sulphate, each dissolved in ½ ounce of warm distilled water, and mixed. Partial precipitation of both reagents will take place, but if now 40 grains of precipitated barium carbonate be added, the complete precipitation of all these chemicals will take place, and on heating the mixture to the boiling point to expel carbonic acid and facilitate the speedy completion of the reaction, and throwing the magma upon a filter, pure water will come through. This, on evaporation, would indicate if there had been present any substance such as glucose, not precipitable by these reagents.

I have said *dry* ferric sulphate, as the pharmaceutical solution of this salt usually contains nitric acid, which would introduce nitrate of barium into the filtrate. The barium carbonate, if not well washed, is also a source of error.

X. I have obtained results equally good by substituting prepared chalk for the carbonate of barium, provided spirit and water in equally proportions were used for the solvent, dissolving the tannin in methylated spirit, the ferric sulphate in warm water, and then adding the chalk.

Looking over all these results there are sundry questions which I feel tempted to ask, but which I have not yet seen my way to answer.

Is the tannin retained by the water in experiment *F* of the same nature as that in the heavy or light ethereal solutions?

Is the portion insoluble in dry ether, but soluble in moist, the same nature as that which is soluble in dry ether? We might very naturally say no; there must be two or more bodies in commercial tannin. That, however, is not absolutely conclusive.

Is pharmaceutical tannin a glucoside of digallic acid? This has been debated, but it is rather a speculation of pure chemistry than a question of practical pharmacy.

Is tannin changed by drying at 212° till it ceases to lose weight? One experiment seemed to indicate that it partially lost solubility, but that I have not conclusively answered. It is, however, a pharmaceutical problem, and we may inquire whether the B.P. instruction to "dry the tannin in a hot air chamber at a heat not exceeding 212° F." is a suitable limitation.

I have used the term "tannin" and "pharmaceutical tannin" rather than tannic acid, as the writers on this subject differ in their statements, and speak of "natural tannic acid," "crystallized tannic acid," "tannic acid freed from glucose," etc., and I wish it understood that my remarks apply to a product supposed to be obtained by the official process.

The solubilities of tannin as above noted put into tabular form are as follows:—

Tannin and ether forming a syrupy solution.

One hundred parts of meth. ether dissolve 51 to 76 or more of tannin in its commercial state (note *A*).

One hundred parts of com. absol. ether dissolve 102 of tannin in its commercial state (note *G*).

One hundred parts of com. absol. ether dissolve 92 of dried tannin (note *J*).

One hundred parts of ether rectified by sodium dissolve 90 of dry tannin (note *K*).

Tannin and ether forming a mobile solution.

One hundred parts meth. ether dissolve about 9 of tannin in its commercial state (note *D*).

One hundred parts of ether dissolve 2·3 of tannin in the presence of water (note *F*).

One hundred parts of ether rectified by sodium dissolved 2·5 of dried tannin.

Tannin and other solvents.

One hundred parts of cold water form a syrupy solution with 253 parts of tannin.

One hundred parts hot water form a syrupy solution with 300 parts of tannin.

One hundred parts of rectified spirit or absolute alcohol dissolve 120 parts or more of tannin.

One hundred parts of chloroform dissolve about 0·007 parts of tannin.

One hundred parts of benzol dissolve less than 0·007.

Brine dissolves only traces of tannin. The quantity not estimated.

Mr. DOTT said he was not sure that he altogether agreed with Mr. Proctor in the conclusions he had arrived at. Commercial ether contained not only water, but alcohol also, even that of 0·717 specific gravity. Of course tannin being soluble in alcohol, unless it were eliminated entirely the solvent could not be relied on as being ether, for it might be partly alcohol. Commercial tannin was not a definite chemical compound, but a mixture of some kind, and any definite statement as to a substance like tannin being soluble one part in so many could hardly be made. It was soluble practically to any extent in a menstruum in which it was soluble. Given a sufficient time, there was no limit between solidity and a weak solution. It was only as regarded crystalline substances that definite statements could be made as to solubility, and not as to an amorphous substance like tannin. Another point was that sodium was not a good agent for dehydrating ether; it did not completely remove the water from any substance to which it was applied, at least not when alcohol was present.

Mr. MABEN asked if Mr. Proctor had any theory to account for the two ethereal layers.

Mr. PROCTOR said Mr. Dott would not have made the remarks he had if he had read the paper in its entirety, because he had pointed out clearly that the tannin of commerce was not to be regarded as a definite thing. He spoke of tannin rather than tannic acid, because authorities differed as to what tannic acid was. With regard to the dehydration of ether by sodium, he could only say that his authority was the Professor of Chemistry at Newcastle, who recommended that process to get rid of the least trace of water as being the most reliable he could suggest. Mr. Dott shook his head, but he should be glad to hear if he could suggest any better method than digesting it ten days with metallic sodium and then distilling from the same.

Mr. DOTT said it could be found in other cases that hydrate of sodium gave up a certain amount of water, which was always re-formed.

Mr. **PROCTOR** said he would not argue the question if there were experimental evidence to show that he was wrong, but he should like to have the matter proved by experiment. In the absence of any better evidence than Mr. Dott was able to give at present with regard to the separation of water and alcohol he said metallic sodium was a very good medium for separating alcohol. The alcohol itself was decomposed by sodium, and the maceration of the rectified ether again with sodium, and redistilling it did not, he think, allow much probability of there being an imperfect rectification. If there was he should be glad to hear of the experiment which proved it. In the meantime he accepted the statement, as given to him on what he considered good authority, that that was a good means of separating the ether from the alcohol and water which were invariably present in the commercial articles. Again Mr. Dott stated that the solubility of an article of a colloid nature like tannin could not be definite, and that was a point he had not overlooked, but there it was from one degree up to an infinite degree. That he pointed to as regards water, but what about the light ethereal solution being a separate thing which did not mix with a heavy one. There there was a definite point of solubility of ether in tannin, a point it fixed for itself. With regard to Mr. Maben's question, if he had a theory about the two solutions, his theory was that it consisted of a composition of the forces of the two bodies, the solvent and the body dissolved; that in the light ethereal solution the probability was that the molecular movement in the ether raised the tannin up to its own velocity, and that in the heavy ethereal solution the tannin degraded the molecular mobility of the ether to its own degree or something like it. He regarded the two solutions as compositions of molecular motion and determining one another, and they were totally distinct. To get over the difficulty which might be experienced in some minds in saying that there could be these two separate solutions with two separate properties, he put it the other way and said that in the one case the ether dissolved the tannin and in the other the tannin dissolved the ether. If they accepted that it got over the theoretical difficulty of the two separate solutions, both consisting of ether and tannin, which at the same time were totally immiscible. This matter had grown in interest to him considerably in working it out, and if any further light came to him on the matter he should be happy to make it public at some future date.

The next paper was on—

WILD CHERRY BARK AND ITS PREPARATIONS.

BY L. W. HAWKINS, F.C.S.

The bark of the wild cherry, *Prunus serotina*, possesses sedative and mildly tonic properties. Although its value as a tonic is due to the indefinite substance, prunin, there is little doubt that its introduction into medicine was brought about by the hydrocyanic acid it yields on the addition of water. Bentley and Trimen say "The best time for collecting wild cherry bark is the autumn, as it then yields most hydrocyanic acid, to which its properties are more especially due." And again, "The sedative action which the bark exerts on the heart depends essentially upon the hydrocyanic acid it yields." This being the case it is obvious that if the drug is to obtain full justice to its medicinal properties its preparations should be so made as to represent as nearly as possible the whole of the hydrocyanic acid obtainable from the bark, and that this quantity should be fairly uniform.

The amount yielded by the fresh bark varies with the time of the year, the percentage being according to Perot about ·05 in April, ·1 in June, and ·14 in October. As, however, the bark is ordered to be used in the dried state, these figures cannot be taken as a standard for the strength of the preparations.

The bark should be collected in autumn, and as it deteriorates by keeping should be recently dried. The autumn is therefore the most favourable time for using it. Whether or not the *cort. pruni virg.* of commerce is generally that collected in autumn it would be difficult to say, but as we have to use it as we get it, it is only fair to judge it as it comes. Half a dozen samples were obtained from leading houses, and the yield of hydrocyanic acid estimated. This was done by distilling the fine powder with water and titrating the distillate with centinormal silver nitrate solution.

The following were the results per cent.

1	·079
2	·082
3	·137
4	·107
5	·160
6	·133

The preparations in general use are the liquid extract, infusion, and syrup of the United States Pharmacopœia, and the syrup and tincture of the Unofficial Formulary.

The strength of the liquid extract should be 1 ounce in 1 fluid ounce. Commercial samples of it gave the following amounts of hydrocyanic acid in grams per 100 c.c.:—

1	·030
2	·000
3	·000
4	·019
5	·008
6	·016

I can only account for the negative results in Nos. 2 and 3 by supposing them to be made by some process in which the whole of the extractive was heated. The others are much below that indicated by the average yield from the bark.

A sample of the liquid extract was then made with the bark No. 3, containing ·137 per cent. of HCy, the directions of the United States Pharmacopœia being strictly followed. The product was found to contain ·084 per cent. From this it seems that the menstruum which remains unheated is insufficient to readily extract the whole of the acid.

Samples of the infusion, eight times concentrated, were then estimated in the same way. These should represent 32 per cent. of bark. The results were:—

1	·0029
2	·0000
3	·0067
4	·0000
5	·0019
6	·0029

Here again the quantities of acid are much below the theoretical amounts. Nos. 1 and 4 were very much darker than the others. Both of these contained glycerine and appeared to be made by diluting the liquid extract.

A pint of concentrated infusion was made with No. 3 bark. The bark in No. 40 powder was damped with water, left to macerate for 24 hours and then percolated with water till 14 fluid ounces had been collected. This was reserved and the percolation continued till exhaustion was effected. These last runnings were evaporated to one fluid ounce and added to the first portion together with 5 fluid ounces of rectified spirit. On estimating the product the percentage of HCy was found to be ·0428, the theoretical yield being ·0457. Another sample of exact U.S.P. strength made by percolation was found to contain the full amount.

The syrup represents 12 per cent. by weight of the bark. The following were the percentages by weight of HCy found in some commercial samples:—

1	·0007
2	·0000
3	·0011
4	·0014
5	·0029
6	·0005

These results are also below the proper yield. A sample made from bark No. 3 in No. 20 powder according to the U.S.P. process gave ·0152 per cent., the theoretical yield being ·0164.

In the same way six samples of tincture, B.P.C., were examined. The strength should be 1 ounce in 5 fluid ounces, but the quantities of prussic acid found were in this case also too low, the results in grams per 100 c.c.'s being—

1.	·009
2.	·000
3.	·008
4.	·012
5.	·007
6.	·016

A sample made from No. 3 bark yielded ·0228, the theoretical amount being ·0274.

It is evident from these results that the preparations of wild cherry bark do not as a rule represent the full value of the drug, so far as the hydrocyanic acid is concerned. If the hydrocyanic acid found in the six samples of bark may be taken as the usual percentage, not one of the preparations examined can be said to be near its proper strength. This may be caused by the loss of some of the acid in keeping, or else sufficient care is not exercised to ensure its presence. Experiment shows that the infusion, syrup, and tincture may be made of proper strength provided the proper methods be employed, and the products kept free from exposure. The liquid extract does not seem so satisfactory, and the practice of making the other preparations from it by dilution should not be countenanced, unless some means be employed to make it of definite strength, as by the addition of hydrocyanic acid. Although the hydrocyanic acid exists in a very small proportion, there is no reason why this proportion should not be secured. If the preparations in use only contain a small fraction of what they should do, and these fractions vary considerably among themselves, it cannot be expected that *Prunus Virginiana* will obtain the reputation here which it is claimed to deserve in America.

The **President** said this was one of those contributions similar to those they had had on former occasions upon cherry laurel water, and similar bodies containing minute quantities of hydrocyanic acid. There was no reason why the preparations should not be standardized in the way indicated by the author. The bark was not very largely employed in this country, but still it had some uses.

Mr. **Maben** said his only experience was of the syrup; he knew nothing of the tincture or the infusion. Formerly it certainly did deteriorate by keeping, to a very large extent, but when prepared according to the formula of the United States Pharmacopœia, as recommended in the B.P.C. Formulary, it kept better, and if kept from exposure it would be found to be pretty permanent.

Mr. **Wellcome** said the wild cherry bark, when freshly gathered, had a very delightful aromatic flavour, which rarely lasted more than six months after the gathering; it never kept its full flavour for more than a year. It was in its greatest perfection in the autumn and early winter. It was gathered both in the autumn and early spring; in the spring the bark left the trees easily. Its greatest use in the United States was as a flavouring agent, although it was used extensively for making pick-me-ups, wild cherry bitters and such beverages, and it was claimed by many authorities that it possessed decided tonic and nervine properties. No preparation should be made from bark more than a year old.

The following two papers were then read:—

INFUSION OF GENTIAN.

BY WILLIAM JOHNSTON.

There are many who think that the British Pharmacopœia should contain recipes for the more commonly used infusions kept ready in a concentrated form by dispensers. I feel that there is some good ground for this desire; and should be glad to hear the matter discussed in Conference, and to see some practical outcome of the discussion when the next edition of the B.P. is taken in hand. I will try to give a point to the debate by proposing a formula for one of the most frequently ordered of the infusions, viz., that of gentian. Although I have not seen the method published before, nor heard it described, no great originality is claimed for it. Any practical man, by taking a little thought, could have planned it all in ten minutes. It is a suitable process for working on the small scale. It is as follows:—

Take of

Bitter orange peel, bruised Gentian root, bruised	of each, 3 ounces.
Fresh lemon peel	6 ounces.
Rectified spirit	7½ fluid ounces.
Cold distilled water	15 ounces.
Boiling distilled water	a sufficiency.

Mix the orange peel and gentian root with the spirit and cold water, and, into the mixture contained in a suitable vessel, such as a wide-mouthed jar to which a bung can be fitted, grate the lemon peel. This is best accomplished as follows: weigh the lemons—about six, if of medium size; rub off the yellow portion of the rind against a coarse grater; pare off, as thinly as possible, as much of the spongy part as may be found saturated with the essential oil, and add the parings to the mixture; again weigh the lemons, noting the loss, which will correspond with the weight of peel obtained. If necessary, increase that weight to six ounces with more grated peel. Macerate for seven days, stirring occasionally; strain through a press bag or piece of calico, and press out the rest of the infusion. Remacerate the marc with about twelve ounces of boiling distilled water for twelve hours, and again press. Mix the liquid obtained with the previous portions, and set aside for a few days, afterwards filtering and making up with distilled water to a pint and a half.

Though the repercolation process described by Mr. J. Wilson in the *Pharmaceutical Journal* for January 21, 1888, is no doubt a good one, I consider that now given simpler and more likely to meet with the approval of small makers. The price (which comes out about a shilling a pound, exclusive of labour) is satisfactory, and the quality of product excellent. When one part of it is mixed with seven parts of distilled water, the resulting fluid is exactly the same in colour, aroma, and bitterness as the freshly made B.P. infusion; whereas, I have noticed that the concentrated preparation obtained from many wholesale houses is darker in colour when diluted and less fragrant than the pharmacopœial article. The present official formula might still remain as an alternative one, leaving dispensers to choose whichever they preferred. In large dispensing businesses, the old way would probably be retained, because of the saving in spirit; but in smaller ones, a reliable, ready-made "concentration" would often, in busy moments, be hailed as a boon. Some are deterred from using such dispensing conveniences because they are not recognized "by authority." It may be objected that the formula now given is for a weak tincture instead of an infusion; but surely that is rather hypercritical. The difference in therapeutical effect must be practically nil; and if a physician did wish, for some reason, to prescribe an article quite free from alcohol, it would be a very simple matter for him to write "Inf. Gent. Co. Recent.," in his prescription.

It is not meant to be inferred that *all* the infusions are so amenable to concentration as the one now treated of. Thus, it would be somewhat difficult to make a 1 to 7 infusion of cascarilla as aromatic as a fresh one; and, I understand, no concentrated infusion of digitalis is at all equal in value to the "impromptu" preparation. Still, the principle might be adopted wherever it conveniently could, which is certainly the case with the infusion of gentian and a number of others.

TINCTURE OF LEMON PEEL.

BY WILLIAM JOHNSTON.

As a sequence to the suggestion just thrown out for the manipulation of the lemon peel in the making of infusion of gentian, I would recommend that the B.P. formula for tincture of lemon peel be altered to the following:—

"Take of—

Fresh lemon peel, grated	5 ounces.
Proof spirit	2 pints.

"Macerate for seven days, in a closed vessel, with occasional agitation; strain, press, and filter; and then add sufficient proof spirit to make one pint.

"The peel should be obtained direct from the lemons (about five will be required, if of medium size) by rasping off the yellow portion against a rough grater held over the spirit, afterwards thinly paring off the spongy portion of rind saturated with oil and adding the parings to the spirit. The weight of peel obtained may be found by weighing the fruit before and after peeling."

The advantages of this method are these: practically no loss of essential oil by evaporation; increased facility in reducing the peel to maceration state; and, probably, improved exhaustion.

The tincture of fresh orange peel might be made in the same way; only it is so seldom prescribed that its formula is scarcely worth tinkering.

The **PRESIDENT** said he never could quite understand why the Pharmacopœia directed the tincture of fresh orange peel to be made with rectified spirit, and the tincture of lemon peel to be made with proof spirit. Recurring to the discussion on the previous day, there seemed to be a certain amount of rule of thumb with regard to the strength of spirit to be used in these matters. The tincture of fresh orange peel, as now prepared, appeared to be by far the better preparation of the two, and he saw no reason why tincture of fresh lemon peel should not be made by the same process. The peel always contained a considerable quantity of water. Although not sufficiently large to bring the spirituous strength down to that of proof spirit, it would certainly reduce it, and if any alteration were made it should be in that direction.

Mr. **LINFORD** pointed out that tincture of fresh orange peel deposited its oil on mixture with water, whilst tincture of lemon peel did not, and the intention was probably that one should be mixed with water and the other used in elixirs and similar preparations.

Mr. **WILLIAMS** said much more elegant preparations were made with the tincture made with a weaker spirit, and a better flavour was also obtained. The finest flavour was obtained by using a spirit about sixteen over proof to start with. When the process was completed it was generally about sixteen under proof.

The next paper was—

EXACT FORMULÆ FOR THE OFFICIAL ONE PER CENT. LIQUORS.

BY C. A. MACPHERSON.

Liquor Arsenicalis.

Take of—

Arsenious acid in powder Carbonate of potassium	of each 35 grains or 1 part.
Compound tincture of lavender	2 fluid drachms or 3·125 fluid parts
Distilled water a sufficiency to make	8 fluid ounces or 100 fluid parts.

Place the arsenious acid and the carbonate of potassium in a flask with 4 ounces or 50 parts of the water, and apply heat until a clear solution is obtained. Allow this to cool. Then add the compound tincture of lavender, and as much distilled water as will make the bulk 8 fluid ounces, or 100 fluid parts, at 60° F. (15·5° C.)

Liquor Arsenici Hydrochloricus.

Take of—

Arsenious acid in powder .	35 grains or 1 part.
Hydrochloric acid . . .	48 minims or 1·25 fluid parts.
Distilled water, a sufficiency to make . . .	8 fluid ounces or 100 fluid parts.

Boil the arsenious acid with the hydrochloric acid and 2 ounces or 25 fluid parts of the water until it is dissolved, then add as much distilled water as will make the bulk 8 fluid ounces, or 100 fluid parts, at 60° F. (15·5° C.).

Liquor Arsenii et Hydrargyri Iodidi.

Take of—

Iodide of arsenium . . . Red iodide of mercury . .	of each 35 grains or 1 part.
Distilled water, a sufficiency to make . . .	8 fluid ounces or 100 fluid parts.

Triturate the iodides with about 1½ ounce or 15 parts of the water until nearly all is dissolved, then pass through a filter, and wash the latter with sufficient distilled water to produce 8 fluid ounces, or 100 fluid parts, of solution at 60° F. (15·5° C.)

Liquor Atropinæ Sulphatis.

Take of—

Sulphate of atropine . .	35 grains or 1 part.
Camphor water, a sufficiency to make . . .	8 fluid ounces or 100 fluid parts.

Dissolve.

The solution should measure 8 fluid ounces, or 100 fluid parts, at 60° F. (15·5° C.).

Liquor Morphinæ Acetatis.

Take of—

Acetate of morphine . .	35 grains or 1 part.
Diluted acetic acid . . .	70 minims or 1·8 fluid parts.
Rectified spirit	2 fluid ounces or 25 fluid parts.
Distilled water, a sufficiency to make . . .	8 fluid ounces or 100 fluid parts.

Mix the acid, the spirit and 4 ounces, or 50 parts, of the water, and dissolve the acetate of morphine in the mixture, then add sufficient distilled water to make the solution measure 8 fluid ounces, or 100 fluid parts, at 60° F. (15·5° C.).

Liquor Morphinæ Hydrochloratis.

Take of—

Hydrochlorate of morphine	35 grains or 1 part.
Diluted hydrochloric acid	70 minims or 1·8 fluid parts.
Rectified spirit	2 fluid ounces or 25 fluid parts.
Distilled water, a sufficiency to make . . .	8 fluid ounces or 100 fluid parts.

Mix the acid, the spirit and 4 ounces, or 50 parts, of the water, and dissolve the hydrochlorate of morphine in the mixture, then add sufficient distilled water to make the solution measure 8 fluid ounces, or 100 parts, at 60° F. (15·5° C.).

Liquor Potassii Permanganatis.

Take of—

Permanganate of potassium	35 grains or 1 part.
Distilled water, a sufficiency to make . . .	8 fluid ounces or 100 fluid parts.

Dissolve.

The solution should measure 8 fluid ounces, or 100 fluid parts, at 60° F. (15·5° C.).

Liquor Sodii Arseniatis.

Take of—

Arseniate of sodium rendered anhydrous by a temperature not exceeding 300° F. (148·9° C.).	35 grains or 1 part.
Distilled water, a sufficiency to make . . .	8 fluid ounces or 100 fluid parts.

Dissolve.

The solution should measure 8 fluid ounces, or 100 fluid parts, at 60° F. (15·5° C.).

Liquor Strychninæ Hydrochloratis.

Take of—

Strychnine in crystals . .	35 grains or 1 part.
Diluted hydrochloric acid	54 minims or 1·4 fluid parts.
Rectified spirit	2 fluid ounces or 25 fluid parts.
Distilled water, a sufficiency to make . . .	8 fluid ounces or 100 fluid parts.

Mix the hydrochloric acid with 2 ounces, or 25 parts, of the water, and dissolve the strychnine in the mixture by the aid of heat. Then add the spirit and sufficient distilled water to make the solution measure 8 fluid ounces, or 100 fluid parts, at 60° F. (15·5° C.).

In a paper read before the Pharmaceutical Society at an evening meeting in Edinburgh in November, last year,[*] it was shown that the formulæ given in the Pharmacopœia for what are known as the 1 per cent. solutions do not yield products in accordance with their reputed strength, and that there is an indefiniteness about these preparations which is not desirable. With special reference to the strychnine solution, it was pointed out also that the proportional parts formula differs materially from the imperial weights and measures one, and an amended formula was given for this preparation whereby a true 1 per cent. solution can be obtained, identical in composition, whether the imperial or the proportional quantities be used. Dr. Attfield having suggested the supplementing of the paper referred to by another containing formulæ for all the solutions of this class, corrected and arranged in the same manner as the one already given, the subject was again taken up, and the formulæ contained in the first part of this paper were constructed. For the sake of uniformity, imperial quantities for 8 ounces of solution have been given in each case, otherwise official data have been adhered to, except in so far as it was necessary to amend them to bring the finished products into consonance with their pharmacopœial reputed strength.[†] In Donovan's solution the change has been made from 1 part in 100 by weight nominally to 1 by weight in 100 by measure, the advantage of which is obvious. The slight addition of arsenious acid which it has been necessary to make to the arsenical solutions will not affect the characters and tests given in the Pharmacopœia further than to entail the increase of the quantity of the volumetric solution of iodine used in testing the specified quantity of solution from 875 to 883 grain-measures: the specific gravity will practically remain as at present.

Some of the formulæ contain fractions in the centesimal column which may seem to cause a difficulty in working from them, but on closer inspection it will be seen that they do not form any obstacle. However, should it be thought that other fractions such as ·25, ·5, or ·75 would conduce to render the proportional formulæ better adapted for use, they could easily be substituted without materially affecting the character of the respective solutions. Thus, in liquor arsenicalis, by substituting four drachms forty-eight minims of compound tincture of lavender for five drachms in a pint of solution—which is equal in round numbers to one hundred and fifteen minims in eight fluid ounces—the proportion would be altered from 3·125 to 3 per cent., and the colour of the solution would not be sensibly affected. In the morphine solutions, by using the acids in the proportion of 168 minims in the pint—say 67 minims in the 8 fluid ounces—the percentage would be 1·75 instead of 1·82 as at present; and in the strychnine solution the use of 48 minims of acid instead of 54 minims in the 8 fluid ounces would be equal to 1·25 in place of 1·4. In the latter instance the quantity of acid would still be a little over one-fourth more than is necessary to convert the strychnine into hydrochlorate, while in the former the comparatively large amount of acid present could easily allow of the reduction being made.

The proportional parts formulæ present no difficulty when the unit consists of the ounce or its multiples, but when grains and grain-measures are in question it is necessary to emphasize the caution not to confound grain-measures with minims—an error liable to happen in the present state of our weights and measures. To facilitate the conversion of grain-measures into minims, it may be stated as a general rule, sufficiently accurate when small quantities are concerned, that one-tenth of the sum added to any given number of grain-measures will show the equivalent number of minims which require to be used.

Mr. **Martindale** said this matter was of some importance, because the Pharmacopœia was in a very inconsistent position, these solutions being neither percentage by weight or by measure. Take the morphine solutions, they were one part of morphine salts in each case to 99 grain measures, which did not produce 100 grain measures, nor did they produce a definite weight. The writer suggested that they should have actual centesimal parts by measure or centesimal parts by weight. In the case of morphine solutions the spirit present in the solution interfered with that number of centesimal parts by weight. The inconsistency of the present system had been shown, but if they were to approach the continental mode and that of the United States Pharmacopœias they would be consistent; since those works directed one part of a drug to be contained centesimally in so many parts by weight. They also fell into another error on the other side, because as a rule the medicine would be administered to the patient by measurement, and in that way an accurate quantity of the drug would not be administered, because it would not be known exactly the quantity of the drug contained in the measured part without going through a long process of calculation.

The **President** asked if it was not the practice on the continent invariably to weigh rather than to measure in dispensing.

Mr. **Martindale** said dispensing on the continent was carried on essentially by weighing. The English pharmacists rather kicked at that, and thought it was done more expeditiously and accurately by measure.

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[*] *Pharm. Journ.*, [3], xix., 433.

[†] Each solution contains four and three-eighths grains of its particular active ingredient in every fluid ounce or 1 part by weight in every 100 similar parts by measure.

The **President** said it was clearly not more accurately done.

Mr. **Martindale** said English dispensers thought they could conduct the process more expeditiously and more accurately in the case of small quantities. You could put a grain of hydrocyanic acid into an 8 ounce bottle by measuring so many minims much more quickly and accurately than by balancing on a scale and weighing it in.

Mr. **Maclaren** said he knew Mr. Macpherson, and had heard his previous paper read, but to his way of thinking he had taken as the basis of measuring for dispensing purposes grain measures; now that was not so, they took minims, which was quite a different thing altogether; the grain was 437·5 to the ounce and the minim 480. A liquor, one minim of which represented one-hundredth of a grain, should be made of the strength of 96 grains to the pint instead of 87·5, as calculated by Mr. Macpherson.

Mr. **Young** (Barnet) said the question was how the medicine was administered to the patient. Mr. Martindale had expressed some interest with regard to the accuracy of minims and grains, but while medicine was administered by the teaspoonful he thought they need not split straws as to whether it was measured or weighed.

Mr. **Martindale** remarked that in the case of hypodermic injections, which were given by graduated syringes in minims, it would make a serious error, in some cases amounting to as much as one-tenth.

Mr. **Maben** remarked that so long as they had to dispense prescriptions by measure it was impossible to introduce parts by weight, and the Pharmacopœia must continue to have parts by measure. Owing to the difference in specific gravities they would come into endless difficulties if weighing were attempted to be introduced. With reference to Mr. Maclaren's objection he thought he had found a mare's nest. They had nothing whatever to do with whether a minim and a fluid grain were the same thing.

Mr. **Maclaren** said what he wished to point out was that Mr. Macpherson had given statistics which showed that he was in error. He had stated a weighed measure instead of a measured quantity.

Mr. **Plowman** said there was one other aspect of the question to be considered, and that was the prescriber's. It was no use discussing this question until prescribers were educated to prescribe in a different fashion. So long as they prescribed by measure the chemist must follow them, and until medical men were educated possibly in better ways they must, in order to get what was commonly called, but what they knew not to be, one part in 100, put up with the prescribers' conventional one part in 100. The only possible method was to ignore all ideas of specific gravity, and simply to have one grain in 100 minims.

Mr. **MacEwan** said that was just the point at the bottom of this whole difficulty. He believed the reason why the centesimal liquors were introduced into the Pharmacopœia was the desire expressed by the International Congress at Brussels to have all potent solutions made of the strength of one in 100. Instead of being of the strength of one grain in 100 minims the Pharmacopœia recognized 1 grain in 100 fluid grains.

Mr. **Martindale** said no, it was one part added to ninety-nine fluid parts.

Mr. **MacEwan** said he quite recognized the fact that the person who drew up the formulæ had not succeeded in making them exact, but the point he was aiming at was 1 grain in 100 fluid grains, although he did not quite succeed. If a doctor, for instance Mr. Plowman, wanted to prescribe a liquor, and imagined he was getting in 10 minims $\frac{1}{10}$th of a grain of the drug he was entirely wrong. There was only $\frac{1}{10}$th of a grain in 10 fluid grains, and he maintained that the chemist and druggist could not dispense by fluid grains. The fluid grain was not recognized by the Weights and Measures Act.

The **President** said this was a matter evidently for thought, and when the paper appeared in type they might think the matter over, and someone would no doubt send some contributions to the Journal or some other publication on the subject.

(*To be continued.*)

Parliamentary and Law Proceedings.

Suicide of a Chemist.

On Tuesday, October 22, Mr. T. H. Stanley held an inquest at Bloxwich, on the body of Arthur James Newton (35), chemist, High Street, Bloxwich.

Evidence was given showing that deceased had been suffering from sleeplessness for five weeks, and had taken laudanum to procure sleep. On Sunday morning he was heard shouting in a very peculiar way, and he was found with a small jar of extract of nux vomica near him. Dr. Hubbard was summoned, and in reply to him deceased said he had taken about 2 drachms of the extract. The stomach-pump was applied, but death ensued almost immediately.

Dr. Hubbard, in his evidence, said that judging from what came from deceased he had probably taken enough to destroy thirty people.

The jury returned a verdict "That deceased died of poison administered by himself, and that he was at the time of unsound mind, but there was no evidence to show whether he took the poison accidentally or otherwise."

Obituary.

Notice has been received of the death of the following:—

On the 21st of August, Mr. Solomon Perry, Chemist and Druggist, Tavistock. Aged 68 years.

On the 22nd of October, Mr. Horie Holt, Chemist and Druggist, Duke Street, Lower Broughton, Manchester. Aged 53 years.

On the 25th of October, Mr. John Henry Rosson, Chemist and Druggist, High Street West, Glossop. Aged 39 years.

On the 25th of October, at Newcastle, Mr. Robert Mennie, Chemist and Druggist, late of Falkirk. Aged 23 years.

Review.

Wandtafeln zur Microscopie der Nahrungs- und Genussmittel aus dem Pflanzenreiche. Alfred Hölder, Vienna, 1889.

Recognizing the want of good diagrams to illustrate the microscopical structure of articles used as food and condiments, such as might be employed by scientific lecturers or university professors, D. Josef Nevinny, Assistant-Professor of Pharmacognosy and Pharmacology at Vienna University, has made a series of careful microscopical preparations, which have been drawn by Dr. C. Henning and are now in course of publication in Vienna. The series will comprise 60 diagrams in all. The sheets are about three feet long by two wide, and the microscopical details, printed in black and white, are accurately delineated and are of sufficient size to be seen at a considerable distance. The four diagrams already published are tea, saffron, marigold flowers and paprika. The salient characters have been carefully selected with the view of rendering the diagrams useful for teaching the means of detecting adulterations of food. Thus the characteristic idioblasts of the tea leaf and the pollen of the calendula and saffron crocus, the papillæ of the stigma and the papillose epidermal cells of the corolla are clearly shown. The list given in the prospectus of the work includes a large number of drugs, etc., used in pharmacy, among which may be noticed cloves, clove stalks, cassia buds, cinnamon, cassia, sandalwood, ginger, turmeric, dandelion, star anise, cardamoms, nutmeg, mace, almonds, linseed, vanilla, pimento, pepper and ergot.

There can be no doubt that these excellent and truthful diagrams will prove an invaluable aid to the teacher, and as they cost only about two shillings each, there is no reason why they should not speedily come into general use. They are also admirably suited for illustrating museums of food products and economic botany. It is proposed to publish four to six parts every year, each part containing four diagrams.

The only improvement possible to suggest in the diagrams would be that in cases where epidermal and the subjacent tissue are shown in one figure, the line of demarcation might be more distinctly indicated by a lighter shade and a darker one for the respective layers, which at present must, to a novice, appear as if the two had a continuous surface. This of course could also be easily effected by using colouring to indicate the subjacent layer.

Correspondence.

A CONTRIBUTION TO THE PHYSIOLOGICAL ACTION OF THE SEEDS OF GORSE (ULEX EUROPÆUS).

Sir,—In the early part of the month of August, 1889, I was walking along a grassy lane in South Lincolnshire, where there was an abundance of gorse, then bearing an immense number of mature legumes. On opening some of the legumes I found two, three or four seeds in each, and being aware that furze constitutes a valuable food, when bruised, for cattle during the winter months, I adopted the line of reasoning that if the shrub were edible, surely the seed could not be poisonous. Acting on that belief, as nearly as I can remember, I ate the seeds obtained from twenty to twenty-five pods, probably eighty seeds altogether. Within half an hour from commencing to eat the seeds there was experienced a sudden sensation of stupor, prostration, and vertigo; succeeded in a few minutes by a cold, clammy perspiration and an intense nausea. Those symptoms were immediately followed by sickness of the most distressing character, which the least movement of the head appeared to intensify and reproduce. The concomitant effects were general prostration and loss of power in the lower extremities, so that it was necessary to cling to objects to prevent falling. The sickness continued at frequent intervals from 2 p.m. until 9 p.m., when the toxic effect began to abate. During the whole time the sickness lasted there was a most disgusting smell and taste of the peculiar leguminous flavour of the seeds.

The greatest relief was experienced from the administration of oatmeal gruel, about 9 p.m., but even that was not retained on the stomach.

There can be little doubt but that had sickness not supervened there would have been a sufficiency of seeds taken to have caused a fatal result. It is manifest that we have in the seeds of gorse an emetic of the most powerful description, and doubtless its peculiar properties are deserving of further elucidation.

GEORGE WELBORN.

P.S.—Since writing the above I have had my attention called to the paper on "Ulexine," by Messrs. Gerrard and Symons, in the *Pharmaceutical Journal* for June 22 last.

ADMINISTRATION OF THE BENEVOLENT FUND.

Sir,—In reference to the suggestion that the election of annuitants on this Fund should be carried out by the Council of the Pharmaceutical Society I wish to point out that it would have the advantage of saving, 1st, the expense of voting papers; 2nd, the expense to candidates for cards and postage; 3rd, the expense of time and exertion incurred by their friends and supporters; 4th and lastly, but that most important consideration, saving the painful publicity given to every case.

As it is, the Committee decide on the merits of each case, and it must continue to do so. I have been utterly unacquainted with more than two for whom I have ever voted—and have used the privilege merely on the recommendation of some wholesale firm who probably had no personal acquaintance with the object of their good wishes. Then, again, not more than half the voting papers are returned to the Square.

The medical profession has a Benevolent Fund for its numerous poor brethren, but no one knows who are the recipients of the charity outside the Committee appointed for its distribution. Thus the inevitable degradation of many a sensitive nature is prevented.

I believe the funds of the Society would be increased and more justly distributed if this new departure were adopted. The Local Secretaries in every town or district would find it not a difficult matter to sift every case, so that no applicant might be placed on the list of candidates who was unworthy of the distinction.

In conclusion, allow me to add, I should, if the Committee decide to take the affair into their own hands, make an effort to increase my subscription, and to induce others to do the same, whether they at present pay one or two "widow's mites, which equal one farthing."

The payment of 5*s*. per annum by every chemist and druggist would place the Fund in a more prosperous and healthy position.

SEPTUAGENARIAN.

VINUM IPECACUANHA BY FRACTIONAL PERCOLATION.

Sir,—When making a stock of ipecacuanha wine about a year ago I thought fit to evaporate the percolate in fractions. Operating on 8 ounces of root the first pint of percolate was evaporated to a soft gelatinous consistence, which, scarcely losing by continuation of heat, as found by weighing at intervals of about half an hour, was mixed with a portion of the sherry. The percolation was continued for 3 pints more. Just about this time a client who had eaten more fish than could be well digested asked for an emetic, and half an ounce of the new ipecacuanha wine acted almost immediately.

Having a further supply to make shortly after the Pharmaceutical Conference discussion on the subject notes were taken of the process. Making 1 gallon, 8 ounces of root, coarsely powdered, placed in the percolator and the acetic acid poured on; this being rather more than was required to moisten, what passed through was poured back and mostly absorbed. After twenty-four hours percolation was commenced by adding 10 ounces of distilled water night and morning. The first 25 ounces of percolate (an oversight, as I had intended taking out at 20 ounces), yielded 5 ounces of dark-brown gelatinous extract; the next 20 ounces of percolate yielded 60 grains, and the following 10 ounces only 4 grains of dry brittle extract. It was considered unnecessary to go further with the process.

The product scarcely smells acetous, and last year's make kept well. The result shows that the B.P. formula may be made easier (and, I think, without risk of imperfect exhaustion of the drug) by using about one-third the water.

It would also be interesting to know if the evaporation in fractions has any real advantage over the B.P. method. At any rate, the greater part of the extract is subjected to heat for a shorter time, though the evaporation of the second and third percolates is so much more rapid that possibly when the necessary quantity of water required is known the alkaloid would not have suffered more by one evaporation than by the three. Probably by working on larger quantities of root even less water would be required.

Northampton. J. CLOWER.

Associate in Business.—The sale of the article under its proper name would involve the necessity for the seller holding a licence.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Morrison, Taylor, Spurr, Giles, Associate, A. C.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 9, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

THE Council meeting last Wednesday was attended by seventeen members, the absentees on that occasion being Messrs. ABRAHAM, EVANS, HAMPSON and WATT. Diplomas were granted to fourteen persons who had been duly registered as Pharmaceutical Chemists, one person was elected a member of the Society, and twenty-two persons were elected Associates of the Society. The report of the Finance Committee furnished an indication that the Society's new buildings are progressing satisfactorily, inasmuch as it recommended that payments should be made to the contractors during the present month on the certificates of the architect. Reference was incidentally made to the satisfactory condition of the Benevolent Fund balance, which will enable the Committee to pay the annuitants in January out of the present year's receipts. It is encouraging to learn that there has been a good response to applications which have been made for support, and that the efforts which have been made in that direction by the Secretary, the Local Secretaries throughout the country, and by others have been productive of such good results. The uninvested donations have now reached the amount of forty-seven pounds, and as the investment of receipts on this account is necessary, according to the regulations, there is now an opportunity of increasing the invested funds to the extent of a hundred pounds for any one who desires to make up that sum. The report of the Benevolent Fund Committee recommended that one grant of ten pounds and two grants of five pounds should be made, and stated that the consideration of other cases had been deferred for further inquiry. The President took occasion to correct the misapprehension that appears to have arisen in some quarters as to the remarks made at the previous Council meeting in reference to suggested alterations in the mode of electing annuitants. Those remarks should be regarded as they were intended, merely as expressions of individual opinion concerning a possible means of doing away with the need for canvassing, which is considered by some as being one of the most objectionable conditions appertaining to the administration of the Benevolent Fund. In all instances the members of Council who thought the proposed change might be useful in that respect were also of opinion that other points had to be considered as well, and that in any case the opportunity for making such a change was still very remote, and could only become possible in the event of certain objections to the proposed plan being removed. On reference to the official report of what took place it will be seen that this was the case.

On the presentation of the report of the Library, Museum, Laboratory and House Committee a discussion arose on the subject of lending books from the Society's library. It appears that a large number of the books are annually sent into the country on loan, and that it has been found necessary to provide duplicate copies of books of reference which are thus in demand, so as to have one copy that can be retained always in the library and one copy to lend. That is an arrangement which calculated to be of very great advantage in many respects, but it is evidently one which cannot be carried out beyond certain limits without unduly appropriating to that purpose funds that should be available for the continued extension of the library. For instance, text-books and most works of an educational character are not the class of books that the Society should be called upon to lend. Every apprentice ought to provide himself with books of that kind. Even in the case of works of a more elaborate and expensive kind it seems to be in the interests of the library an essential condition that no book should be lent unless there be a duplicate copy. The opinion expressed by Mr. SCHACHT that the library would be more used if principals and advanced students thought they would be pretty sure to find there what they wanted illustrates the necessity of maintaining the efficiency and repute of the Society's library as a resource for reference, and the case he mentioned of LOTHAR MEYER'S 'Chemistry' having been out when he desired to see it seems to point to the necessity for a limitation of the books which can be borrowed. There is good reason for thinking that MEYER'S 'Chemistry' is not the kind of book requiring to be kept in duplicate in the Society's library, and if that be the case it ought not on any account to be lent out. This seems to be a situation in which it is necessary to choose the lesser of two evils, and if members living at a distance are unable to enjoy so full a use of the Society's library as those living in London, that is scarcely a reason why the library should be at any moment deficient of any of its books. The real necessity pointed to would seem to be that of establishing provincial libraries in connection with the local pharmaceutical associations through the country, such as were spoken of by Mr. ATKINS and Mr. SOUTHALL as existing in Sheffield and Birmingham. To form reference libraries is one of the most possible lines of activity at the present time for such associations, and in that way much of the need for borrowing books from the Society's library would be done away with. Mr. NEWSHOLME's suggestion as to the payment of the carriage of books lent to apprentices in the country may be regarded as an expression of the earnest solicitude he has always manifested for the promotion of study among the younger members of the trade. In that sense it calls for sympathy, especially when it is remembered that under existing conditions young men have not only to be induced to join the Society, but also to apply themselves to study, but we must on the whole confess to thinking, with the Vice-President, that almost all the real requirements in the way of borrowing books could be satisfied as things now are, and that if some little outlay be requisite in particular instances, it would be in every way worth while to incur it.

On the subject of railway rates, which is now under consideration by the Board of Trade, it would seem that the points affecting chemists and druggists are to a great extent eclipsed at present by questions affecting still larger interests. It seems probable that some considerable time must elapse before any sensible progress can be made towards a settlement of the entire matter in dispute, but it is at least deserving of notice that the railway representatives disclaim any intention of raising their actual charges, and declare that they consider it their interest to maintain good relations with their customers.

An Evening Meeting of the Pharmaceutical Society in London will be held at 17, Bloomsbury Square, on Wednesday evening next, the 13th inst., when a communication from the Research Laboratory on "The So-called Mussaenda Coffee of Réunion," by Professor Dunstan, will be read, and a paper "On the Occurrence of Pararabin in Sterculia Gum," by J. H. Maiden, F.L.S., F.C.S. The chair will be taken at eight o'clock, but the lecture theatre will be opened an hour earlier to afford an opportunity for the inspection of specimens and apparatus that may be exhibited.

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An Evening Meeting of the Society will also be held in Edinburgh, at 36, York Place, on Wednesday evening, November 20, at half-past eight o'clock, when an Inaugural Address will be delivered by Professor T. R. Fraser, M.D., F.R.S.E.

* * *

A meeting of the chemists and druggists of Sheffield and district will be held in the rooms of the Sheffield Pharmaceutical and Chemical Society, on Wednesday evening next, commencing at 8.45, when the subject for discussion will be "Who is the Seller of a Poison under the Pharmacy Act?"

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The Annual Conversazione of the Chemists' Assistants' Association is to be held on Thursday evening next, at the Portman Rooms, Baker Street.

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The opening meeting of the School of Pharmacy Students' Association will be held on Thursday, November 14, when the election of officers will take place, and an Introductory Address will be delivered by Professor Green. The chair will be taken at 7 p.m. by the President, Professor Attfield.

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We regret to state that information has been received of the death on the 3rd inst., of Mrs. therine Mary Amelia Sutterby, who was elected nnuitant on the Benevolent Fund in 1882.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, November 6, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Cross, Gostling, Greenish, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Robbins, Schacht and Southall.

The minutes of the last meeting were read and confirmed.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Bygott, John William.
Cargill, David Allan.
Davies, David Sidney.
Flint, Charles.
Foster, Murray Toogood.
Jeffcoat, Joseph George.
Jones, William Thomas.
Lakeman, Nicholas Frank
Sayers, William Charles.
Seccombe, Charles William.
Peck, Ernest Saville.
Stonham, Herbert Lovett.
Stuart, William.
Tabor, Thomas Slade.

ELECTIONS.

MEMBER.

Pharmaceutical Chemist.

William Charles Sayers, of Lewisham, having passed the Major examination, and tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES.

The following having passed the Minor examination, and paid (as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society.

Andrew, John Herbert	Oldham.
Barclay, John	Birmingham.
Blanchford, Reginald Arthur	Sutton.
Bush, James Edward	Dunmow.
Carpenter, Albert Hemsley	London.
Cooling, Francis Charles	Bath.
Cullen, Frederick Spencer	Norwich.
Douthwaite, Hy. Lonsbrough	Pocklington.
Geen, Charles Alfred	Exeter.
Griffiths, William Robert	Clynderwen.
Innes, John	Douglas.
Kent, Thomas Oliver	Wye.
Lord, William Butler	Lancaster.
Lunn, Arthur	Cambridge.
Lyne, Walter Henry	Grantham.
Morrow, Charles	Hornsea.
Poll, George John	Wells, Norfolk.
Robinson, Bernard Christopher	Wolverhampton.
Severs, Charles	Kingston-on-Thames
Smith, Richard Silcock	Norwich.
Taylor, James	Eccles.
Tingle, Joseph Grantley	Kettering.

The name of the following person who has made the required declaration and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

James Lloyd, 123, Battersea Road, London, S.W.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

Reports of Committees.

FINANCE.

The report of this Committee was of the usual character, and included a recommendation that a sum not exceeding £1500 be paid to the contractors for the new building during the month of November on the certificates of the architect.

The **President**, in moving the adoption of the report, said the Benevolent Fund was in a very satisfactory condition, the subscriptions having come in rather better than usual at this season of the year, and amounting to £181. The Committee would be able to pay the annuitants next January out of this year's receipts, which was not always the case. It was a subject for congratulation that the friends in the country had responded very satisfactorily to the usual application made to them, and the Council should know that the Secretary by his private efforts in this direction towards the end of the year had rendered great service to the Fund. On the donation account a sum of five guineas had been received, so that the amount uninvested had been increased to £47. This was kept with legacies, and under the regulations was invested as soon as it reached £100. There was an opportunity therefore for any one who wished to increase the invested funds to make up the donation account to £100 before the end of the year.

The report was unanimously adopted.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£5 to the widow (aged 60) of a registered chemist and druggist. Applicant, who has had four previous grants of like amount, is wholly dependent on her relatives. (Essex.)

£5 to the widow (aged 56) of a registered chemist and druggist. Four previous grants, amounting in all to £30, have been made in this case. Is unable to do much from chronic illness. (Cheshire.)

£10 to a registered chemist and druggist (aged 54) who has been bedridden for over a year. He had a similar grant last year. (Kent.)

Two cases had been deferred for further inquiries, and one had not been entertained.

The **Vice-President** (in committee) gave some detailed information with reference to one of the applications for assistance.

On resuming, he moved the adoption of the report and recommendations.

The **President**, in putting the motion, said he was perhaps somewhat responsible for the misapprehension which seemed to have arisen in some quarters with regard to what was said last month as to the mode of electing annuitants. The gentlemen who sat round the table took a deep interest in the welfare of their brethren, and were very anxious to save their feelings as much as possible when application had to be made for relief, and one of them at the last meeting said he hoped the time would come when some different form of electing annuitants might be adopted, one which in his judgment would be less trying and humiliating to the candidates than the present system. A conversation ensued, in the course of which several members expressed their views, and he himself stated that he should be very glad to see the day when the Council could elect the annuitants. It appeared, however, that this conversation had produced a misconception, some members having failed to notice that all the speakers were emphatic that the time had not yet come for any change; and he himself was very particular in stating that those who were in favour of the change should see that the income was about doubled before the scheme could be entertained. They were all mindful of the advantages arising from the present system, and did not contemplate any change. He mentioned this because he had seen some adverse criticism of a sort which seemed to show that those who criticized the proceedings had not read what was said.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
July	Day . .	509	29	6	19
	Evening .	133	12	1	6
August	Day . .	92	7	0	4
September	Day . .	74	11	2	6

Circulation of books.	Town.	Country.	Total.	Carriage paid.
July	139	110	249	£1 6 0
August . . .	46	53	99	13 10
September . .	59	93	152	1 3 2

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Glasgow University, Calendar, 1889. From the University.

University College, London, Calendar, 1889. From the College.

University College, Dundee, Calendar, 1889. From the College.

Yorkshire College, Calendar, 1889. From the College.

City of London College, Calendar, 1889. From the College.

St. Bartholomew's Hospital, Statistical tables of patients during 1888. From the Hospital.

Institution of Civil Engineers, Charter, etc., 1889. From the Society.

Chemists' Assistants' Association, Proceedings, session 1888–89. 2 copies. From the Association.

Manchester Literary and Philosophical Society, Memoirs and Proceedings, 4th ser., vol. 2. From the Society.

Botanical Society, Edinburgh, Transactions and Proceedings, vol. xvii., pt. 2. From the Society.

Royal Dublin Society, Scientific Proceedings, new ser., vol. vi., pts. 3–6.

— Scientific Transactions, ser. 2, vol. iv., nos. 2–5. From the Society.

Royal Society of New South Wales, Journal and Proceedings, vol. xxii., pt. 2. From the Society.

Society of Chemical Industry, Address by the President, 1889. From the Author.

Berlu (J. J.), The Treasury of Drugs unlock'd, 1690. From Mr. Edward Horner.

Butler (E.), Syllabus of Lessons on Arithmetic, 3rd ed., 1869. From the Author.

Curtman (C. O.), Lessons in Chemical Analysis, 3rd ed., 1889. From the Author.

U. S. Department of Agriculture, Bulletin no. 13, Foods and Food adulterants, part 4, Lard, 1889.

— Bulletin no. 21, Report of Experiments in the Manufacture of Sugar by Diffusion, 1889. From the Department.

Chicago College of Pharmacy, twenty-eighth announcement, 1889. From the College.

Philadelphia College of Pharmacy Alumni Association, Annual report, 1889. From the Association.

Ephemeris, vol. 3, no. 4. From Dr. E. R. Squibb.

India, Revenue and Agricultural Department, Selections from the Records, by the Reporter on Economic Products, vol. 1, nos. 17–19; vol. 2, no. 1.
From H. M. **Secretary of State for India.**

Adrian, Étude historique sur les extraits pharmaceutiques, 1889. From the **Author.**

Figueroa (E. de), Le solenodon Cubanus, 1888.
Figueroa (D. de), Le lépidostée manjuari, 1888.
From Señorita doña D. **de Figueroa.**

Goppelsroeder (F.), Über Capillaranalyse, 1889. 2 pamphlets.
— Farbelectrochemische Mittheilungen, 1889.
From the **Author.**

Smithsonian Report, 1886, part 1.
From the **Smithsonian Institution.**

For the Library in Edinburgh—

Philadelphia College of Pharmacy Alumni Association, Annual report, 1889.
From the **Association.**

Ephemeris, vol. 3, no. 4. From Dr. E. R. **Squibb.**

Smithsonian Report, 1886, part 1.
From the **Smithsonian Institution.**

The Committee had recommended that the undermentioned books be purchased:—

For the Library in London—

Beilstein's Organische Chemie, 1886–89.
Bernthsen's Organic Chemistry, 1889.
Watts' Inorganic Chemistry, 1889.
Groves and Thorp's Chemical Technology, 1889.
Wall's Dictionary of Photography.
Haydn's Dictionary of Dates, 1889.
The Secretes of Alexis, 1562.

For the Library in Edinburgh—

Pharmaceutical Journal, 48 vols. bound.
Edinburgh Pharmacopœia, 1735.

A letter from the Secretary of the "Mathematisch-naturwissenschaftliche Classe der Kaiserliche Akademie der Wissenschaften in Wien," agreeing to exchange publications with the Society, had been received, and the exchange approved.

The Librarian had reported that at the recent examination of the Library the undermentioned books were missing:—

Bentley's Organic Materia Medica.
Oliver's Elementary Botany.
Remsen's Organic Chemistry.

The Librarian had presented his report of the annual meeting of the Library Association held in London in October.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest	Lowest.	Average.
July	Morning	553	38	5	20
	Evening	83	9	1	3

August, 96; September, 122.

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of Biennial Henbane.
From Messrs. H. M. and R. **Usher**, Banbury.

Two specimens of exalgine in fine crystals.
From Messrs. **Brigonnet** and **Naville**, Paris.

Specimen of *Cryptocoryne spiralis*.
From Mr. D. **Hooper**, Ootacamund.

Specimen of Strophanthus pod.
From Dr. R. **Blondel**, Paris.

Specimens of Cascara Sagrada bark from Northern Oregon, from Southern Oregon, and from Seattle, Washington Territory.

Salt pseudomorphs from the cutting of the Manchester Ship Canal at Warburton.
From Messrs. **Kay Brothers, Limited**, Stockport.

Specimen of *Swertia angustifolia* and volatile oil of *Pandanus odoratissimus*.

Six specimens of the Lignum Aloes wood of Eastern commerce and thirteen microslides illustrating their structure, etc.

Three microslides illustrating the odoriferous glands of the bracts of *Pandanus odoratissimus* and five microslides illustrating the structure and secretion of the bark of *Boswellia Bhau Dajiana*.

Specimens of the plants of *Andropogon muricatus* and *A. Schœnanthus*; and fruits of *Tetranthera citrata*.
From Professor **Van Eeden**, Haarlem.

Specimens of the berries of *Kraussea coriacea*.
From Mr. J. **Medley Wood**, Durban Botanic Gardens, Natal.

Specimens of crude and recrystallized sugar from ipecacuanha. From Mr. J. O. **Braithwaite.**

The following donations to the Museum in Edinburgh were reported.

Flowering branch of *Rhamnus Purshianus*.
From Mr. **Peter MacEwan**, F.C.S.

Two flowering specimens of *Hyoscyamus niger*.
From Mr. **Thomas Fairgrieve.**

The Staff of the Society's School had attended and reported on their respective classes.

Mr. **Schacht** asked if the number of applications for books from the country was at all on the increase. He should like to know whether that branch of the Society's operations was successful.

The **President** said his impression was that it was successful, but he could not give the actual figures at the moment. He did not know that there was a continuous annual increase; it varied somewhat, but since the new regulations had been made, the number of books sent to the country had enormously increased. It had been found necessary to buy duplicate copies of reference books in order to have one set always in the Library, and one set to lend; such books for example as Watts's 'Dictionary,' 'Gmelin,' and so on. During the last three or four years nearly all reference books had been duplicated for this purpose.

Mr. **Schacht** said he mentioned the matter in order to draw attention to the fact that the Society possessed a splendid library which was very easy of access to all members.

Mr. **Newsholme** asked if the Council could see its way to pay the carriage of books to country readers both ways? It would be a great boon to apprentices and assistants who had not much money to spare.

The **President** said the fact was that a great many persons in the country got books through the carriers with whom they had contracts, and thus did not have to pay any carriage, but, of course, an apprentice who sent for a book direct would have to pay. The Society did not spend very much on the carriage of books, and possibly the present system might occasionally prevent an apprentice or assistant obtaining a book, and he would undertake to bring the question before the Committee.

Mr. **Newsholme** said that occasionally people in his town came to him to get books through Sutton; but it was not, he thought, desirable to rely on that means entirely.

Mr. **Southall** asked if there was not a library in Sheffield.

Mr. **Newsholme** said there was a library, but it was not at all like that in Bloomsbury Square.

The **President** remarked that it could not be expected that every town should possess such a library as that of the Society.

Mr. Atkins said Sheffield had a very nice nucleus of a library, to which one member of the Council had contributed very handsomely, and perhaps others might do the same. It would not be a very gracious thing, perhaps, to present worn out volumes to the country libraries, but if there were any surplus works which could be spared to the Sheffield or other local libraries he should like to put in a word for them.

Mr. Southall imagined that the state of things at Sheffield was something similar to that at Birmingham, where there was a library quite sufficient for the ordinary wants of apprentices. There might be an exception occasionally, but very rarely.

Mr. Cross asked if they had several copies of each work at Birmingham.

Mr. Southall said that was so in some cases. He referred, not to the public library, but to that of the Chemists' Association.

The **President** said it should be borne in mind that all those who entered the business should be prepared not only to get the requisite knowledge, but also to pay for it to a certain extent. Whilst disposed to do all he could for everybody, he did not think the Society was bound to provide common textbooks, which every one ought to provide for himself. There was a tendency amongst some to want to borrow the latest editions of every elementary work on chemistry or botany, but he thought every apprentice ought to buy books of that kind for himself, because he could not really do his work properly without. With regard to those who were more advanced and wanted to refer to larger works, Mr. Newsholme's suggestion deserved consideration. He felt more and more the difficulty in the way of apprentices who had mastered the elementary books, and wanted special information from larger books, such as Miller, Armstrong, or some other work on organic chemistry. These books were continually getting antiquated, new editions were coming out, and it was very costly for any one to keep up with either chemical or botanical science. These books ought to be lent with the greatest possible facility, but elementary books, such as were often asked for both there and in Edinburgh, he did not see that the Society was called upon to provide.

Mr. Schacht thought the proper course would be to continue to make the library, as it had been in the past, a thoroughly good one, illustrative of the sciences connected with pharmacy, and the Council should not look so much to provide for the wants of apprentices as to the wants of their own members, whose own libraries would naturally be deficient in the more important works which were continually coming out. What was really wanted in a reference library was books which would give exact information on minute points; such information as would only be found in some special memoir. He thought the library would be more used if principals and advanced students remembered that they would be pretty sure to find what they wanted there. He had sent up twice for a book and been informed by the Librarian that the book was out, and that he would have to wait, and in the case of such books it would be well to have two or three copies.

The **President** said since he had been President he had impressed on his colleagues the importance of having at least two complete copies of important books of reference, so that one being out, the other might always be in. Very often a man came up from the country to make a reference to a particular work, and it was very aggravating not to find it. Indeed, in the case of certain books it was a question whether there should not be more than two copies. He was quite prepared to submit Mr. Newsholme's suggestion to the Committee, but while he would willingly recommend an increase in the number of copies of what might be called, in the largest sense works of reference, he should object to make the library either there or in Edinburgh a collection of copies of Attfield's chemistry and so on to be distributed to the students.

Mr. Richardson asked if the works of reference were ever sent out.

The **President** said yes, when there were duplicates; some could not be duplicated, and they were not sent out; but of important books sets had been purchased, and one was always in the library, while the other could be borrowed.

Mr. Schacht said the book he wanted to borrow was Lothar Meyer's 'Chemistry' soon after it was purchased. In one respect he was glad to find that he had been anticipated, and that the book was out. In that case he presumed there were two copies. He could not get it for some weeks.

Mr. Martindale observed that it would add to the usefulness of the library and the convenience of members if they would make a point of returning a book as soon as done with. As to the utility of the library to country members he thought it was the desire of the Council to give as much help as possible; the question of paying carriage both ways might be considered, but it was a great help to have it paid one way.

The **President** said when a new book of importance camé out, everybody wanted to see it, and even if a dozen copies were bought there would be a run upon it for a time.

The **Vice-President** hoped before the matter was remitted to the Committee that members would express their opinion on the question of carriage both ways. His own opinion was strongly against it. Not only young men but old ones also appreciated that which cost them something much more than what they got for nothing. It was essential that some member of the Society should be responsible for books obtained by the juniors, and if a principal were applied to by a member of his staff there was hardly one who would hesitate to be responsible, and in nineteen cases out of twenty the carriage would cost nothing, as most of them had a contract for the carriage of small parcels. If the Society were to pay the carriage it would be so much extra expense, with very little advantage to anybody. He was disposed to give every facility for assistants and apprentices getting books, but did not think any appreciable advantage would be gained by this proposal, whic would probably cost much more than was expected.

Mr. Martin said he had the greatest sympathy with Mr. Newsholme's suggestion for offering facilities to apprentices, but to those who were really in earnest it was not a very serious matter to pay carriage one way, and if it were paid both ways and the books were delivered there would be some slight temptation to send for books merely out of curiosity, thus putting the Society to expense without any real benefit to the borrower. He knew there was a feeling that country members could not make so much use of the library and other advantages of the Society as those in London, but he would point out that the so-called London members mostly lived a long way from the Square, and had to pay 'bus fare both ways and spend a good deal of time in going backward and forward to consult the books. If a man, by simply writing a postcard, could get a book delivered without any trouble or loss of time, he would be in a better position than a London member. The parcel post was very cheap, and he thought it should be paid one way by the borrower, as a guarantee that he really wanted the book he sent for.

Mr. Hills was heartily in accord with the views expressed by the Vice-President. People prized most what cost them something. If this change were introduced people in the suburbs would probably save their time and omnibus fares and send for their books at the expense of the Society.

Mr. RICHARDSON said there were a good many libraries about the country connected with pharmacy, and he thought if the authors of new books were approached in the right way they would very often present copies.

Mr. NEWSHOLME said he was not on the Library Committee and should not have an opportunity of expressing his views on this point there. He did not think the majority of country chemists had contracts with Sutton for carriage such as the Vice-President referred to. The argument seemed to have turned mostly on the question of principals or masters obtaining books; he did not object to them paying half the carriage, or even the whole, but the class he was principally concerned about was that of the apprentices connected with the Society. They paid half-a-guinea a year, for which they no doubt got full value, but it was to the interest of the Society to do everything to get hold of these young men, and if paying the carriage of books were the means of inducing more to join the Society he thought it would be a very wise expenditure. Last year there had been a considerable increase in the number of these apprentices in Sheffield, and this matter had been brought before him once or twice. He quite agreed that the London men had no advantage in this respect, perhaps the reverse, but that was no reason why every inducement should not be offered to young men to join the Society.

Mr. GOSTLING was entirely in sympathy with the Vice-President. The small amount of self-sacrifice required from the students would tend to make them value the books more and would do them good. There might be exceptional cases in which a studious youth was under very disadvantageous circumstances, and there probably the Committee would be willing to make an exception, but as a general rule he thought the present practice was quite liberal enough.

The PRESIDENT said no doubt the Committee after this discussion would be able to arrive at a satisfactory conclusion on the matter. He now moved the adoption of the report, and in doing so would mention that Professor Planchon had presented several volumes to the library, and in doing so wrote in a very enthusiastic manner as to the kind reception which he had received from the officers of the Society in London, which he said had rendered his visit "un véritable enchantement."

The motion was at once agreed to.

DIVISIONAL SECRETARY FOR EAST MARYLEBONE.

The PRESIDENT said Mr. Martindale, having now become a member of the Council, had thought it better to resign his position as divisional secretary, but he had looked round and was prepared to move the appointment as his successor of Mr. Richard Thomas, 13, Upper Baker Street, a pharmaceutical chemist, and one who was likely to interest himself a good deal in the work of the Society. He believed he would fill the office very satisfactorily.

Mr. GREENISH seconded the motion, which was carried unanimously.

THE DUNDEE CHEMISTS' ASSISTANTS' AND APPRENTICES ASSOCIATION.

The PRESIDENT said an application had been received from the Honorary Secretary of this Association asking for some assistance in the shape of books. The application was not in the usual form, and the information was by no means ample, and he would suggest that it be referred to the Library Committee.

Mr. SCHACHT asked if it was exclusively an assistants' association.

The PRESIDENT said it was clear that pharmaceutical chemists were assisting it as honorary members.

Mr. NEWSHOLME said that if the majority of the members of the Association were connected with the Society it would be advisable to entertain the application favourably.

The PRESIDENT understood there was only one member of the Association who was connected with the Society, but that was not the sole ground for giving assistance if good educational work was being carried on.

The application was referred to the Library Committee.

REPORT OF EXAMINATIONS.

October, 1889.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (16th)	6	3	3
„ (17th)	6	4	2
„ (23rd)	6	4	2
„ (24th)	6	2	4
	—24	—13	—11
Minor (16th)	27	13	13
„ (17th)	25	9	16
„ (18th)	31	12	19
„ (23rd)	28	7	21
„ (24th)	24	9	15
	—135	—51	— 84
	159	64	95

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (16th)	2	1	1
Minor (16th) . . .	10	5	5
„ (17th)	14	6	8
„ (24th)	14	11	3
„ (25th)	14	9	5
	—52	—31	—21
Modified (16th) . . .	1	1	0
	55	33	22

Preliminary Examination.

8th.—Candidates, 242. Passed 112. Failed 130.

24th.—8 Certificates by approved examining bodies were accepted in lieu of the Society's examination.

RAILWAY RATES.

The PRESIDENT reported that he had attended the Inquiry into Railway Rates on October 29, but the Society being petitioners, not objectors, his name was not formally entered as appearing on behalf of the Society. They had all probably gathered from the press that the inquiry would take a long time, and if it should be necessary before the conclusion for him to appear, he should be happy to do so, but his impression from the information he had obtained was that most of the details which affected their trade would be adjusted in a friendly way. The great fight would be with regard to interests much greater than those of chemists and druggists, whose carrying trade from a railway company's point of view was very small. When he spoke to a railway man about empties he smiled, and said the empties they had to consider were those big enough to fill a waggon, such as empty pianoforte cases, coming back from the north. They had to devise rules to meet such cases as that, and the maximum rates were never intended to apply to small matters. The question of terminals was very important, and if the railway companies were not able to agree with the objectors, it was quite possible there would be further legislation. The great point was that the railway commission was fixing a maximum rate which would apply to all companies in future, and which was higher than the existing rate, and as they said would probably always be higher than the existing rate; but inasmuch as it was desirable that all railway companies should charge on the same general scale, so that every trader might know what certain classes of goods would cost, it was necessary to have a maximum scale. It might be necessary to charge a little more in one district than another, on account of special circumstances; for instance, in some places sheds required to be built to accommodate the goods. The great difficulty was in the classification, but as far as he could gather, there was a disposition on the part of the companies to arrange terms as far as possible; in fact a fresh schedule had already been issued by London and North Western Railway Company.

Mr. Atkins said no doubt the chief difficulty lay in the classification. He presumed the wholesale houses would, to a great extent, protect the interests of the retailers by defining what the classification meant. He could give some most absurd illustrations of what had occurred through want of technical knowledge on the part of the railway companies.

Mr. Southall thought wherever there was competition the traders would be all right, but where that was absent the higher rates would rule.

The President said that was just the point. The notion of the companies was that Parliament had authorised them to charge a maximum rate, and that where the carriage of a particular class of goods would involve them in a loss it would be hard to compel them to carry those goods at the existing rate. They also laid stress on the fact that it was their interest to carry as much as possible, and so be on good terms with their customers.

Mr. Gostling hoped they would get not only a better classification, but a reduction in the maximum, but the companies were very loth to alter their charges. There was one class of goods in which he dealt largely, and he had endeavoured to get the Great Eastern Railway Company to modify existing terms so that he might get it all by rail instead of partially by water, but he could not move the company at all.

The President said that brought up another question about which there was a good deal of misconception. It was held by the railway companies that traders had no real grievance with regard to a charge until it was made. What the Act prescribed was that there should be maximum and minimum schedules; that the tribunal now sitting was only formed for the consideration of those schedules and the question of terminals, and that the question of actual charges could not come before it. If, for example, under the schedules drugs were charged higher than the existing rates, those who were aggrieved could go before a court specially constituted for the purpose, and the Commission could order the rate to be reduced to what it was before, or even lower if good cause were shown. This was important because some of the objectors confused the schedules with the actual rates. If the companies fixed the rates above those now in use the traders could go to the Commission and ask for a reduction.

Mr. Richardson said, very few would dare to fight a rich railway company; they would prefer to pay what was imposed. The fight would have to take place on the schedules.

The President said the position taken was that this inquiry had nothing to do with the actual charges, but only with the schedule of rates. Then when the schedule was obtained, if the company increased the charge on any class of goods beyond what it now was, those who imagined they were injured could go before the Railway Commission with a complaint.

Mr. Southall: If they were strong enough.

The Vice-President: Would it not be easier to go before a County Court Judge?

The President said that the Railway Commission had equitable powers. The maximum rate mentioned in the schedule was a good deal higher than the existing rates, but the companies said they did not propose to charge the maximum, but if they did the traders could appeal to the Railway Commission.

Mr. Martindale remarked that the class of goods which most affected retail chemists were what were called "smalls," and it was a curious thing that such articles came from Germany at less cost than from Yorkshire. This formed an important item of a chemist's expenditure, but the parcels post had done a good deal for them; it had swept away a good deal of the railway company's traffic in "smalls," perhaps to their advantage, because they did not want to be bothered with it.

Mr. Atkins said the question of empties was very important, and to chemists in the country who had anything like a business carriage was quite a rental. In his own business he was amazed at what they had to pay under this head. A few years ago they had merely an entry charge for empties, but now it was a charge by weight. He had a small interest in a London company, which he should certainly do some business with if he could, and if he only had the carriage of the goods to pay for he might do so, but the carriage back of empties rendered it impossible.

The President said as far as he could gather the great difficulty arose in the classification. The railway companies had to devise a system which should apply to every railway company in the kingdom, and he could feel for those who had such a task to perform. For instance, one striking absurdity was that empty bottles which had been used were charged more than a similar weight of new ones. That was, they came in a different class. On these points some modifications had already been made by the London and North Western Company, and in opening the case for that company, Mr. Pope, Q.C., said he trusted that the negotiations with traders would go on privately, and that they might be able to arrange classification charges which would be satisfactory to both sides.

General Purposes Committee.

The Report of this Committee included the usual letter from the Solicitor as to the progress of cases placed in his hands.

Several cases of alleged infringement of the Pharmacy Acts were considered by the Committee and proceedings recommended.

The Committee had also considered some alterations in the notices to superintendents and candidates for the Preliminary, suggested by the College of Preceptors, and recommended their adoption.

The Council went into committee to receive and consider this report. On resuming it was unanimously agreed to.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at the rooms, Great Russell Street, on Thursday, October 31, the President, Mr. Ellwood, in the chair. The following paper was read on—

Photomicrography.

BY M. E. SWAN.

The subject of the present paper is one which I believe will be of greater or less interest to all present, and is also one in which though practically only a beginner myself I trust to be able to show how comparatively simple and inexpensive are most of the processes involved.

All who use the microscope—and amongst such must fairly be included the student of pharmacy who at those trying interviews with certain veteran pharmacists at "No. 17" is expected to recognize plants and organs of plants displayed under the microscope—all who use the microscope must at times have felt the desire to possess a faithful delineation of some of the objects (unique it may be in some cases) coming under examination, and specially when it is desired to show the feature of some minute object to a roomful of people at once, without requiring each one to advance to a table and take a perfunctory peep down the tube of the microscope.

This can be done, you say, by a diagram, but not every one is sufficiently facile with pencil or brush to make such a success, while I shall hope to show you that such can be converted into a lantern slide suitable for a demonstration at a trifling outlay of time and material.

Photomicrography is the newer title of the art which used more generally to be known as microphotography, but the latter name is now almost exclusively applied to the production of those beautiful little photographs of pictures, etc., which Mr. Dancer makes for examination with the lower powers of the microscope.

The art, however, with which we are concerned, namely, that of making enlarged pictures of minute objects is simple, and that it may be cheap is self-evident from the nature of the apparatus before you and with which I generally work.

The essential apparatus are, a microscope, which I assume you all possess; this is preferably one having a short and wide body, a camera of the simplest construction, together with a few dishes and reagents.

It is an advantage to have an adjustable base board on which to set up the apparatus, but even this is not absolutely essential.

The camera can be made by any amateur joiner out of any light case, such as a soap box, at a cost of next to nothing, the only part necessary to purchase being a back, as it is called, and the cheapest form I know is Lancaster's metal double back, which will carry two plates 3¼ × 4¼ back to back and costing about 2*s*. 6*d*.

A dark room is necessary to work in, but at night time there are generally but few difficulties in the way of the photographer, and a little ingenuity will generally succeed in darkening any ordinarily lighter room even in daytime. My own work room is rendered suitable for photography in less than ten seconds by lifting a canvas and paper screen into the window space and securing it there by two turn buttons. This screen has a square hole containing a sliding piece of ruby glass, which was the most expensive part of the whole thing, which did not cost two shillings to make. A connection must be made to adapt the tube of the microscope to the lens hole of the camera; but even this may be dispensed with and a black cloth used to stop any stray light entering.

The light may be either daylight or artificial, and the latter, except under certain circumstances, is generally preferable, being more manageable, and further, as most of my own work is done at night, is absolutely necessary. A paraffin lamp is all that is needed to supply the light, and if a flat frame is used the edge of the flame should be used as the source. The bull's eye condenser is used so that a bright image of the flame is focussed on the object, and the camera being in position the object is focussed on the ground glass of the camera.

A velvet lining tube should be inserted into the body of the microscope to prevent central flare. A good "fine adjustment" to the microscope is desirable, one that acts readily and accurately both in approaching and withdrawing from the object, and if its movement is truly in the optical axis of the instrument (which unfortunately is very rarely the case), so much the better when photographing different objects which do not lie all in one plane.

The focussing screen now demands attention; ordinary ground-glass is too coarse, except for very rough focussing. An improvement is to varnish a sheet of plain glass with an ethereal solution of sandarac, which dries with a very fine smooth surface. A still better screen is a polished glass plate with a few lines ruled on it. The image on such a screen is invisible to the eye alone, but may be viewed with a lens, and when the image and the lines on the glass both appear equally sharp the best focus has been obtained.

Perhaps the best method is to have a wooden screen perforated with holes, into which a spare eyepiece is slipped to such a depth that the diaphragm coincides with the plane in which the plate lies in the "back," or, in other words, with the ground surface of the ordinary screen. With such an arrangement, or a modification of it, it is easy to obtain sharp definition with so high a power that the image would be absolutely invisible on the ordinary screen, owing to the loss of light and amplification.

The time of exposure will vary with the intensity of the source of light, colour and density of the object, sensitiveness of the plate, and the magnification of the object. By using plates of one degree of sensitiveness and always using the light as nearly as possible under the same conditions, two of these variables can be eliminated, and by remembering that roughly the time varies as the square of the linear amplification, an idea can be formed of the proper exposure.

It would be highly desirable that some standard should be arrived at, but the difficulty of determining a standard of light has not yet been fully overcome.

The nearest approach to any refinement of the kind is that described in a 'Manual of Photomicrography,' by Dr. Bousfield, and involves the use of Warnerke's sensitometer screen.

This screen, which consists of a series of spaces numbered from one to twenty-four, containing smoke-coloured tissues of regularly increasing density, by application to the focussing screen, affords a guide to the intensity of light falling on it; and the method of use is to read the last number visible, and knowing the rapidity of the plates in use, refer to a table which has been deduced from a number of experiments.

In colour experience alone must guide, reds and yellows, as a rule, are favourable to photography, while blue and violet, which are transparent to the actinic rays, are difficult to obtain satisfactory negatives from.

As an example of the variation in exposures, I have photographed an object with a 2-inch objective, giving about 25 diameters on the screen, allowing only two seconds, and obtaining fair density, while with a ⅛-inch, and extending the camera so as to obtain about 800 diameters, I have allowed half an hour, and then found the plate somewhat under exposed.

Any of the well-known brands of plate may be used, either ordinary speed or rapid, but there is no advantage in the use of rapid plates with low powers, say up to ½ an inch; after that, exposures begin to become tedious, even with rapid plates, so much so that any-one doing much work requiring high powers would have to obtain an illuminating source of higher actinic power, such as the electric arc or oxyhydrogen lime light.

Magnesium can also be used, but is rather costly, and there is much difficulty in dealing with the smoke from it and in keeping the glowing point accurately in the focus of the condenser.

Sunlight has even been used with success by Dr. Woodward in America, and with the heliostat to obtain a constant beam good definition has been obtained up to 5000 diameters.

The exposure made, the plate is taken into the dark room and there developed. As most present will be familiar with this part of the process, I will only briefly review it for the benefit of those who are not acquainted with the details.

The plate, which is a square of glass coated with gelatine, holding in suspension various haloid salts of silver, is after exposure to all appearance the same as it was before, but a subtle change has taken place, for now all those parts of the plate upon which light has fallen during exposure are now highly sensitive to the action of certain reducing agents, many of which might be employed, but practically we have to choose between three processes, viz., ferrous oxalate, pyrogallol and quinol.

The developer is poured on to the plate, and the latter is watched in a "safe" light until the image has well appeared and shows well through the back, which if all has gone right should be in two or three minutes; the plate is then washed in two or three changes of water and fixed in thiosulphate of soda or "hypo," as it is more commonly called.

This "hypo" dissolves out of the film all the unchanged salts of silver, but leaves untouched that part that has been blackened or reduced by the developer.

The fixing bath should be allowed to act for fully ten minutes, in order to completely remove all unreduced silver from the film, and then must be subjected to a prolonged washing in running water till all traces of the salt is removed, or the negative will inevitably deteriorate.

The negative is now allowed to dry spontaneously, and if valuable may be varnished to preserve it; but this is not absolutely necessary, as it does not improve the printing qualities, and with ordinary care the plate does not suffer any injury in printing.

Printing may be effected on ordinary sensitized albumen paper by daylight, but if the opportunities for printing only occur at night, bromide paper may be used.

The surface of bromide papers resembles that of the plates used for the negatives, and good contact prints may be made by gas or lamplight, which must be developed in exactly the same way as the plates, viz., with ferrous oxalate or quinol, pyrogallol as a rule not being so well adapted for paper development.

Lantern transparencies can be produced in exactly the same way on gelatine coated plates, either by contact printing or the use of camera and lens.

The preparation of a negative and print must close my remarks to you, and I can only express the hope that some of you who have not yet attempted this fascinating art may feel stirred to make a beginning.

The author demonstrated his practical acquaintance with his subject by conducting the process through its successive stages before the members. The negatives he obtained were remarkably clear, and exhibited in a high degree the progress that has taken place in the photographic development of microscopic objects.

Mr. Ellwood (the President) said the paper implied a knowledge both of microscopy and of photography. As pharmacists, they were necessarily acquainted with the microscope, and many of them took more than a passive interest in photography. He said that in consequence of repeated inquiries for information on the subject of photomicrography, Mr. Shenstone had contributed to the *Pharmaceutical Journal* ([3], vol. xix., p. 802) a sketch and description of apparatus that he had employed. Mr. Swan's idea in using an eyepiece he thought was an improvement upon the suggestion of Mr. Shenstone to employ zinc tubes. The difficulty of the process seemed to lie in the somewhat arbitrary fashion in which they regulated the time of exposure. He thought some idea of the amount of light that was required to produce a particular negative might be determined by using a Crooke's radiometer, as had been suggested by a French experimenter.

Mr. Smorthwaite, as a practical photographer, paid a high compliment to Mr. Swan for the skill he had shown in obtaining such excellent results under circumstances which were, to say the least, disadvantageous. With reference to the apparatus itself, dealers in photographic materials had not overlooked the question of photomicrography, and Messrs. Mawson and Son suggested that the object glass might replace the microscope altogether, whilst Robinson's small camera might be fitted on to the microscope. The most common cause of failure was the difference which existed even in a good objective between the chemical and the optical focus, and when this was appreciable it was almost impossible to get sharp and satisfactory pictures. It was impossible to use Crooke's radiometer in an ordinary room for estimating the amount of light that might be necessary to produce the negatives, because it was so sensitive to heat rays, and the simple presence of the operator would render the observations inaccurate and unreliable. He did not altogether agree with the varnished glass for focussing; if the ordinary plate of ground-glass were carefully washed, dried and rubbed over with oil it formed a most excellent screen for obtaining the proper focus.

Mr. Smith made some inquiries respecting the use of certain stains.

Mr. Richards referred to the "pin holes" which so frequently disfigured photographic prints, and asked if the author had had any experience in the use of "meta-bisulphates," which in the hands of some operators seemed to develope a green fog.

In replying Mr. Swan confirmed the statement of Mr. Smorthwaite with reference to the unsuitableness of Crooke's radiometer as a measure of the light used —remarking that that instrument was quite as much affected by heat as it was by light. He again alluded to the Warnerke sensitometer screen, which he had described in his paper, and said that it was available as a photometer. One of the advantages connected with the shortened apparatus which he employed, was that the fine adjustment was within easy reach of the operator. The lengthened tubes of Messrs. Barker's apparatus, for example, necessitated the employment of a rod and pulley connection with the fine adjustment. Mention having been made of the connection often necessary in the case of over or under connected lenses in order to obtain the true actinic focus, the author remarked that the objective then in use, a two inch, appeared to give the test negative when at its true visual focus, but with his ¼ inch his plan was, after getting the sharpest possible focus, to withdraw the objective from the stage by a distance which was represented by ¼th to ⅛th of a turn of the mill-head. In referring to the use of an oiled screen to receive the image, he then showed an image of an insect preparation on a screen which had been rubbed with vaseline, but enforced his previous remark that the sharpest focus was to be obtained by the use of a spare eyepiece and a perforated screen, and showed a modification of this, in which the screen was replaced by a narrow slip of wood, perforated with one hole to receive an eyepiece to the proper depth, and which enabled it to be moved to all parts of the image, and not merely to certain fixed points, as in the square perforated screen. The staining fluids used in the micro-preparations were next referred to. Eosin (blue shade) appeared to be the most awkward to deal with; the use of a screen of signal-green glass being advocated together with a prolonged exposure. The effect of the screen was to produce neutral tints with eosin-stained preparations. With logwood single stained preparations he had not experienced any great difficulty. In reply to Mr. Richards the author explained that he always brushed the plates in water with a flat camel's-hair brush to avoid air bubbles, which sometimes adhered to the plate with great persistence, and which were, unless removed before development, a fruitful source of pinholes. He possessed no experience in the use of "meta-bisulphate," though he knew sulphite to be an excellent preservative.

A vote of thanks was proposed to the author by Mr. Blackham, and seconded by Mr. F. Ashley Rogers.

Mr. Swan, in acknowledging the compliment, concluded by expressing a hope that his efforts to explain a process, which at first sight appeared complicated and difficult, but which in reality was simple and inexpensive, might encourage some of those present to give it a trial.

Provincial Transactions.

NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

The annual meeting was held in the University of Durham College of Science on Thursday, October 31, Mr. N. H. Martin, F.L.S., etc., in the chair.

Report of the Council.

To the members and associates of the North of England Pharmaceutical Association—

The Council has to report that since the last annual meeting the rooms at St. Nicholas Chambers have been given up, and that the Association is now permanently located in the buildings of the Durham College of Science.

The Association now numbers 49 members and 30 associates, and the library contains 199 volumes, having been enriched by the gift of books from the Pharmaceutical Conference.

In the last session there were seven students who attended the lectures on chemistry and five worked in the laboratory. One of our students obtained the prize in chemistry. The botanical lectures were attended by twelve students. There were no lectures on materia medica and pharmacy, partly because the entries were small, but in the case of materia medica also in part because of our removal from St. Nicholas Chambers to this room having given the honorary curator (who is also the lecturer on materia medica) so much extra work that it was felt to be too much to ask him to lecture to a very small class.

Although our Association did not officially take part in the entertainment of the Pharmaceutical Conference which has recently visited us (this duty being undertaken by a separate local committee), yet our position in connection with the college rendered it easy to obtain and to place at the disposal of the Conference all the facilities which they required for their business and pleasure.

In conclusion the Council hopes to maintain the Library and Museum in their present state of efficiency, and to continue to provide the means of education for the young men of the district who wish to become pharmacists, and it is to be hoped that each year will show a growing appreciation of the advantages which our Association has provided.

The report of the Treasurer was then read, and showed that the Association was financially in a very satisfactory position.

On the motion of the President seconded by Mr. T. M. Clague the reports were adopted.

The Certificates of attendance upon the Botany Class in the last Session were distributed.

The President's Address.

Gentlemen,—If you will direct your thoughts back over the literature of the past forty-eight years, since the establishment of the Pharmaceutical Society, and remember how many addresses have been written and delivered, and upon what a variety of topics, more or less bearing upon pharmacy, you will agree with me that I may well be excused for a feeling of discouragement that the Rules of our Association demand that I, for the third time, shall attempt to give you an address. This feeling does not, however, arise entirely from the fact that the ground has been so amply cultivated; that men, whose names adorn pharmacy, as well as science, have in their turn spoken and written; or that I may not hope to add a single mite, by way of instruction, to what has already been said. But it finds its chief cause in the feeling of hopelessness that it is all of no use, that men may preach and pray, but those into whose hands are committed the practice of the art and calling of pharmacy will go on their own way, and that a way not altogether in the direction of the elevation of their calling.

Before I proceed to any other topic, I think this may be a convenient time and place to briefly review our history as an Association, to recall the object with which we set out, and to see to what extent we have succeeded; and where we have failed to realize those hopeful aspirations which many of us shared at the commencement.

The first circular issued was dated March 25, 1885, and by it the chemists of the district were invited to meet together "to take into consideration the desirability and feasibility of establishing a Local Association of Chemists, which may take action with a view to provide for the North of England the means of education in pharmacy and the kindred subjects required by the examinations of the Pharmaceutical Society." This circular was signed by the Local Secretaries of the Pharmaceutical Society for Newcastle, Sunderland, South Shields and Durham.

The first meeting was held and several subsequent ones, which I need not take you through in detail. At these meetings suggestions of various kinds were made as to what should be the objects, and what the scope of our Association; but in the outcome, the Association was formed upon the very definite platform of "the establishment of suitable facilities for pharmaceutical education in the district;" and it is from that point of view that I wish to direct your attention to what has been done.

The four absolutely essential requirements in education are rooms, teachers, books and specimens. Rooms were soon obtained in St. Nicholas Chambers, and for three years, from July, 1885 to July, 1888, we had possession of two rooms, which, although small, were admirably suited for the requirements of our Library and Museum; and for the delivery of such of our lectures as were best given in contiguity to our Museum.

The means at our disposal and the fees which we could reasonably demand from our students, rendered it impossible for us to go far afield for our teachers; but with regard to the very important subject of chemistry, theoretical and practical, the interest taken in our work from the first by the Durham College of Science, and the assistance which we received from the Principal of the College and the Professor of Chemistry, enabled us to provide for efficient instruction in chemistry without making any demands on our resources to establish and equip a laboratory of our own.

With regard to the other subjects, we also found in Newcastle men who were able and willing to deliver courses of lectures on botany, materia medica and pharmacy.

By the liberality of several donors (a list of whom is given in the report of our first annual meeting), and by a very substantial grant from the Pharmaceutical Society, we were enabled to acquire a good library of the standard works of pharmacy, and a useful museum of materia medica specimens, and to purchase suitable cases and bottles, so that books and specimens might be properly taken care of and rendered available to the pharmaceutical students of the district now and hereafter.

In the four essentials of pharmaceutical education it was not long before our School of Pharmacy was fully equipped. The result has been that chemistry and botany have been taught in every session since our commencement, and we have had two complete courses of materia medica and pharmacy.

In 1887 the ardour of some members of our Association began to cool, and resignations were by no means uncommon, so that by the end of that year and in the beginning of 1888 the outlook was not altogether a reassuring one for those who had borne the heat and burden of establishing the Association, and who were still loyal to it. It was felt that very soon the question of whether or not the Association could continue, with its annual expenditure and its few contributors, would have to be answered. At that crisis the great benefit that we had derived from our connection with the College was made apparent, and the Council of the Association was enabled to negotiate with the College authorities terms upon which we were admitted to a home in this building, and to a share in all the privileges which it entails, without being saddled ourselves with a burden greater than, if need be, a few of us can very comfortably bear.

As an Association, I think we may congratulate ourselves that the past four years have not been wasted, and that we have accomplished the very modest task with which we commenced our existence. We may feel assured also that there is an element of permanence about our work which will make what we have done a factor in the future education of pharmacists in this district, whether that education remains voluntary as now, or is rendered compulsory by any future legislation.

In contemplating where and how we may be considered to have failed, I do not think we can be said to have done so because our evening meetings and the contribution of papers to our Association have been few. It was not a part of our programme to add our contribution of mere words to the stream of more or less uncertain value which is being poured out. For my part, I think that so far from its being a sign of weakness, or of failure, I congratulate my fellow members that they have had the courage to resist the temptation to read papers, unless they had something which it was worth while to record in a permanent form. Nevertheless, we have been in the past and we shall in the future, be glad to welcome any member to read a paper upon any original work, if he chooses to make our Society the medium of its communication.

We have not had as many students as we should have liked, but in this, too, we have not failed, because this was a thing we did not, and could not, set before ourselves as an object that we could control. The supply of educational facilities has been provided; but the demand for them must come from the innate love of knowledge or from the sense that it is part of the duty or self interest of the students to avail themselves of them.

I have probably said enough as to our Association, and may conclude this part of my address by stating that the policy of the Association in the future will be to maintain those facilities for pharmaceutical education which have successfully been created, and we confidently hope the demand for education will show that we have done wisely.

With your permission, I will now say a few words upon that well-worn theme of education. At first sight one would think that everything that the ingenuity of man could suggest had been said upon this subject, but in every age there seems to grow up along side the great truths of that age a number of fallacies which may to a large extent be traceable to the exaggerations of the truths.

I want you to think with me of education from two points of view, the first as a duty which we owe to ourselves and to the community in which we live, and the second as a source of happiness to ourselves and by reflex action also to the community.

With regard to education as a duty, I wish at once to specialize and to direct my remarks to the class I am addressing and to their particular occupation. When a man chooses a calling in life, from that moment it becomes a duty to himself for him to devote the best powers of his mind and body to learn that calling and to acquire all the knowledge he can about it. Before choosing his occupation in life a young man may take counsel with himself and weigh and consider all that can be said for and against any particular profession or occupation, either as a source of earning his daily living, or with regard to his own particular likes and dislikes, but when once the die is cast, and a youth has said; I will be a pharmacist, or I will be a soldier, from that moment he owes it to himself, whether he likes it or not, or whether he is disappointed or otherwise as to the remuneration he may get, to give the best powers of his mind and body and to give the chief place in the apportionment of his time to becoming a good pharmacist or a good soldier. In this he will derive a satisfaction in the exercise of his pursuit which he can get from no other source whatever. If he does not do this from the outset, and continuously throughout his career, he has no right in after life to grumble that the rewards and the prizes of his occupation have not fallen to his share. He has not worked honestly to deserve them.

It is also the young man's duty to the community in which he lives that he shall become educated in his calling, whatever that may be, or if he has not, he is to that extent dishonest and inflicts an injury upon Society. A grocer should know his business so well that he can vouch that the article which he sells to his customer is a genuine one. The ironmonger that the knife or the spade is an honest one, and so forth. If this is the case with all other trades, how much greater is the necessity which is laid upon pharmacists that they should know all that can be known about the articles in which they deal, because upon such knowledge may often rest the health and even the lives of those by whom they are surrounded. If chemists and those who are to become chemists would learn their business with their duty to themselves and to their neighbours constantly in mind, I feel certain their influence over those with whom they come into contact would be such that the result would be satisfactory from every point of view.

And now having tried to enforce upon you the duty of education, I must warn you against one of the exaggerations of the truth I have been considering. Education is not intended to make every man into an original investigator or a public instructor. We have recently had, as you know, the Pharmaceutical Conference in our midst, and you also know of the establishment of a Research Laboratory at Bloomsbury Square, and your imaginations have doubtless been fired with the glory and the halo which surrounds the individual who commits his discoveries to paper and reads them before some society or other. I do not wish to damp your enthusiasm, and if it is the result of a heaven-born spark of genius which is in you, I have no fear that I shall do so, but what I want to impress upon you is that for the ninety and nine out of every hundred the *primary* use of education is to enable them to perform their duty with greater satisfaction to themselves and greater benefit to their neighbours. There may be found a solid ground of satisfaction for those who have not been fortunate enough to be among the world's discoverers, and who have too much self respect to present a repetition of what has been already done as original work of their own. In the past the great men whose thoughts and work revolutionized the world, were not often the products of the system of forcing, and societies, royal and otherwise, often enough gave such men and their discoveries the cold shoulder. It is as a reaction from this, and also to supply the needs of so many societies which must place themselves *en évidence*, and of the reams of paper which must receive their weekly or daily libations of ink, that we now rush into the opposite extreme; and the little thinkers and pseudo discoverers receive an amount of praise, which goes a long way to turn their heads from the true aim of life. I want you to fix it in your minds that the true, as distinguished from the false, purpose of education is the performance of our daily duties.

The second thought to be considered is of education as a source of happiness. Here it would be easy to dilate upon the pleasures of literature, of art, of music, and so on, which the blessing of a liberal education may bring into our lives: but again I am content to take pharmaceutical education, and consider a few of the ways in which directly and indirectly it may be made a source of happiness. Directly, of course, by the feeling that the pharmacist is oftentimes, in the exercise of his calling, the means of bringing joy and happiness into many families. There is no one, except the physician and surgeon, who can honestly indulge the feeling that he is a useful factor to the community in which he lives to so great an extent as the chemist, if he practises his vocation honestly. If he does not, but allows himself by modern competition to be driven to tamper with the quality of his drugs and thereby endangers the health of his customer, he should of all men be the most miserable.

Here I am tempted to digress and to speak of another duty which is incumbent on the man who has honestly qualified himself to conduct his business, and that is the duty which he owes to himself and his neighbour to see that he obtains from the public honest remuneration for his services. One writer upon this subject has said he knows of no principle which should guide us but the one consideration of how we may in the long run make the most money. This has never presented itself to me as a worthy object to set before ourselves, to make money as such. It is true we cannot do without it, but it is equally true that if we are honest and upright men we can do with very little of it rather than dishonour ourselves and debase our business by entering into several of the modern forms of competition. The question of fixing the actual amount of profit which may be demanded from the public in relation to particular trades is a complicated one, and it is more easy to follow in one's own life an unwritten code of honour and to aim at an ideal, than it is to put the same into words which may not be cavilled at, for the guidance of others.

It is, however, of the indirect sources of happiness which I wish to speak in connection with pharmacy. In no other trade are men by the necessities of their calling conducted to the very gates of so many sources of pure and unalloyed pleasure as in pharmacy. When the young pharmacist has so far completed his education that he may be said to be competent to exercise his profession, he must be intellectually dull indeed, if there has not been awakened in him a desire to proceed further along one of the many avenues of knowledge opened out to him. He knows something of physics and chemistry, and may easily learn to love one of the many branches into which these ramify; but as a source of the purest pleasure the introduction to natural history which he has received through botany and zoology should never fail him. I know the long hours and close attention which is required of the chemist, and that even when the outward and visible sign of attention to duty has been removed the chemist's apprentice and assistant is often confined to his post, but though his opportunities for contact with nature in the shape of walks into the country may be few and far between, as compared with his whilom schoolfellow, who has become a draper or a grocer—if he will use his opportunities and train his eyes and mind to see and think, a single walk will enable him to bring home a more ample contribution to solid pleasure than a dozen evenings spent in mere peripatetic exercise, whether it be along the pavements or around the billiard table. I would therefore urge upon every pharmacist to cultivate a love of nature, which will introduce him to whole realms of beauty and to sources of happiness of which the outer world has no conception, and when his daily task is done will lift his soul above the sordid cares and petty worries of his every day life. You may not all have read Mr. Alfred Russell Wallace's recent book on "Darwinism," and will, I am sure, not think it out of harmony with the advice I have been giving you, if I quote those beautiful lines from a poet-artist with which he concludes his tenth chapter on "Colour and Ornaments Characteristic of Sex."

"*On a Peacock's Feather.*

In Nature's workshop but a shaving,
Of her poem but a word,
But a tint brushed from her palette,
This feather of a bird!
Yet set it in the sun glance,
Display it in the shine,
Take graver's lens, explore it,
Note filament and line,
Mark amethyst to sapphire,
And sapphire to gold,
And gold to emerald changing
The archetype unfold!
Tone, tint, thread, tissue, texture,
Through every atom scan,
Conforming still, developing,
Obedient to plan.
This but to form a pattern
On the garment of a bird!
What then must be the poem,
This but its lightest word!
Sit before it; ponder o'er it,
'Twill thy mind advantage more,
Than a treatise, than a sermon,
Than a library of lore."

Mr. T. Rheeder proposed, Mr. A. Wright seconded, and Mr. T. M. Clague supported a hearty vote of thanks for the President's admirable address.

Mr. J. J. Dakers proposed the election of the following officers to form the Executive for the ensuing year, seconded by Mr. T. M. Clague:—

President, Mr. N. H. Martin; Vice-President, Mr. John Harrison; Secretary, Mr. Charles B. Ford; Treasurer, Mr. Thomas Rheeder; Council, Messrs. Bolam, Dunn, Stuart, Usher, Watson, Wright, Foggan, Sarsfield, Noble and Brayshay.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The second meeting of the session was held on Thursday, October 31, in the Society's rooms, 6, Colquitt Street, when a paper was read by Mr. T. H. Wardleworth on "The Flora of the Wallasey Sand Hills."

In the course of an excellent paper Mr. Wardleworth described the peculiar formation of the sand dunes and the consequent variety of plant life to be found there. One section was formed of dry shifting sand, which necessitated long and deep roots to fix the plant and secure moisture. The other section consisted of hollows corresponding to meadow land, where there was more soil formed by the drifting leaves and decaying vegetation. The latter were richer in flora than any other part of the sand hills, and the daisy, eyebright, yellow rattles, milkwort, British orchis, grass of Parnassus, star of Bethlehem, etc., were frequently to be found. Special attention was paid to the powers of adaptation displayed by many flowers, especially by the sand grass and sand sedge, which play such an important part in the maintenance of the hills in position.

The paper was illustrated by dried specimens, diagrams and the microscope.

Mr. Wardleworth, who was listened to with great attention, was accorded a hearty vote of thanks at the close.

The next meeting will be held on Thursday, November 14, when short papers will be read by Mr. H. Wyatt, Junr., on "Some Dry Reactions of Simple Salts," Mr. I. R. Johnson on "The Influence of Light on the Growth of Plants," Mr. G. E. Grattan will contribute some "Notes on Dispensing."

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The opening meeting of the twelfth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, October 30, at 9.15. Mr. A. Russell Bennett, President, in the chair. There was a large attendance.

The minutes of the last meeting having been read and approved, Mr. McEwan, Vice-President, read the report of the Committee on the Association Prizes Competition. Four competitors had entered for examination. All of them had made a very creditable appearance and the prizes had been awarded as follows:—1st prize (value £2 2*s.*), to Mr. George Shaw, 17, North Bridge, with 89 per cent. of marks. The second and third prizes were equally divided between Mr. Reginald E. Macdonald, 41, Argyle Place, and Mr. William Smith, 119, George Street, who had each attained 77·5 per cent. of marks. A special prize, presented by Mr. John Findlay, was awarded to Mr. Alexander Cruikshank, 56, Newington Road, who obtained 73 per cent. of marks. The Committee expressed their gratification at the high average of marks attained by the candidates, but expressed a hope that a larger number of apprentice members would take advantage of the valuable opportunities offered by the prize scheme. The prizes were then presented by Mr. William Gilmour, Chairman of the Executive of the North British Branch.

Mr. A. Russell Bennet, President, then proceeded to deliver the following:—

INAUGURAL ADDRESS.

Gentlemen,—With this meeting we enter upon a new season, and it is with considerable misgiving that I address you this evening for the first time from this chair. Were it not that I feel confident in relying upon the cordial assistance of the office bearers and members of this Association, I should certainly have hesitated to occupy a position which has been previously held by men much better qualified to fill it with satisfaction to themselves and advantage to others. My position is rendered no more easy from the fact that I follow one who has risen to the very top of his profession, and whose high attainments are well known to you all.

I have had no small difficulty in choosing a subject on which to address you, as popular subjects have already been fully treated by previous presidents. After some consideration I came to the conclusion that some remarks on our Association and its work would prove interesting to most of you, and that for two reasons:

1st.—Very few of the present members know the whole history of the Association.

2nd.—We have little more than entered upon our second decade, and the opportunity seems a convenient one for reviving the past eleven years' work of the Association, and also for taking a brief glance at the advances made in chemistry, materia medica and pharmacy generally during its existence.

This Association, as some of you know, was the outcome of a suggestion made at a reunion of the chemists' assistants of this city in the spring of 1878. A good many years previous to this there was in existence an association known as the "Wilson Association," and so-called in honour of the late Dr. George Wilson, who was a warm friend of the pharmaceutical student. The proceedings of this association do not appear to have been published, and after an existence of about ten years it ultimately became defunct.

The present Association was formed in the year 1878 by a few of the assistants in town, and has therefore been in existence for eleven years. It commenced with a membership of forty-seven, and has gradually gone on increasing, and last session we had over ninety members on the roll. It is, I believe, the oldest of the kind in the country, with the exception of the London Association, which was started about the same time. At the time of its formation the members had to work under considerable disadvantages, but, thanks to the efforts of the original members, most of these disadvantages have to a large extent been overcome, and now the work of the Association, though still requiring zealous effort, goes on much more smoothly and satisfactorily than was possible in its earlier days. All along the Association has had the advantage of being granted the use of these rooms through the courtesy and kindness of the Pharmaceutical Society. Its success has also been due in a large measure to the active and lively interest taken in its proceedings by the local officials of the Society.

The papers read throughout the various sessions have all been of an interesting and useful character, many of them being printed *in extenso* in the Pharmaceutical and Trade Journals. With regard to these papers suffice it to say that after a careful study of all the records of the Association I have come to the conclusion that all of them have been highly practical and eminently instructive. Doubtless in the day when pharmacists will have a fuller say in the compilation of the national pharmacopœia, it will be found that many of the seeds sown here, though now apparently lying dormant, will spring up and bear fruit.

Any notice of the history of the Association would be incomplete without reference to the Prize Schemes which have formed so important and fruitful a part of its work. The working expenses of the Association being small, the surplus from annual subscriptions accumulated in the hands of the treasurer. In the year 1881 the Committee had seriously to consider how best to dispose of the money in hand, and it was ultimately agreed to institute a Prize Scheme for the benefit and encouragement of apprentice members. The course of study required for the competition was arranged on the lines of the requirements of our professional examinations, and the first prize takes the form of a free ticket, admitting to a course of lectures on chemistry in the Edinburgh School of Medicine. The other prizes have always taken the form of books suitable for pharmaceutical students.

The interest taken in the Association by the fathers of the craft was pleasantly shown when Mr. Ainslie, of Messrs. Gardner and Ainslie, stepped forward and offered an annual prize (value £1 1*s.*) to be competed for by apprentice members in the department of pharmacy. This offer was supplemented by a former President, Mr. Wm. Aitken, and several extra prizes have been given by friends of the Association. I would take this opportunity of urging upon every apprentice member the desirability of coming forward to the Ainslie Pharmacy Prize Competition in March.

Another interesting feature of the Association's work is the botanical excursions. These were instituted three years ago, and have proved of great interest and practical value to those studying for examination, as well as to those studying for pleasure. As a result of these excursions a herbarium has been formed for the use of the Association, and is making satisfactory progress. As you will observe from the syllabus, the more recent additions will form the subject of a paper during the present session.

Leaving our Association and its work, let me glance for a moment at the advances that have been made in the various branches of our calling during the period of our Association's existence. Without doubt the greatest interest centres around the coal-tar derivatives. The high cost of natural quinine in the early days of our Association gave a fresh impetus to the search for some mode of forming it synthetically. This, though unsuccessful, has led to the introduction of many new remedies, some of which have had only an ephemeral existence, while others are now well established. Of the former I may mention *kairin*. Introduced in 1881, there was for a short time a demand for it, but it seems to have dropped out of use. Its place has been well filled by *antipyrin*, as to which it is rather to be regretted that its praises have been too freely sung, the result being its indiscriminate use by all and sundry. Among others that might be mentioned are *phenacetin*, for which there is a steady demand; acetanilid, which has the merit of being the cheapest; salol, naphthol, hydronaphthol, urethane, amylene hydrate, hypnone, paraldehyde, sulphonal and saccharin.

In the department of materia medica very important work has been done. The alkaloids of cinchona and cuprea, aconite, belladonna, nux vomica and opium have been very thoroughly studied. Coca and its alkaloid, cocaine, though discovered so early as 1860, have been brought into extensive use during the lifetime of our Association. The great success of cocaine has led to the introduction of one or two more or less suspicious substances. Hopeine, said to be obtained from American wild hops, attracted a good deal of attention, but Dr. Paul has shown it to be a mere mixture, and the scarcity of wild hops in America confirms the doubts as to its origin. Drumine, a similar body said to be got from *Euphorbia Drummondii*, was reported from Australia, but chemical examination proved it to be merely calcium oxalate. Whether its introduction was due to fraud or gross ignorance I have never been able to discover.

In the science of botany great advances have been made during recent years, and the methods of teaching it have undergone a very marked change. Now-a-days the system adopted is to group all the facts and laws of the science round the life history of certain plants selected as types. Botanical classification has also been carefully correlated and consolidated in that great work, the 'Genera Plantarum' of Bentham and Hooker. In it the best points of all previous systems have been preserved and blended into one, and the study of systematic botany has been much simplified through the various names given by different observers having been reduced to something like order. The influence of this work is very perceptible in the new edition of the Pharmacopœia. The study of the microscopic forms of plant life has received a great impetus, and under the name of bacteriology is now pursued as if it were a science by itself.

One of the most important events to us as pharmacists, during recent years, is doubtless the appearance of the British Pharmacopœia of 1885, but it has already been so frequently noticed here that I need not further refer to it now.

Another important event is the appearance of the B. P. C. Formulary. I will only say of it, that in reducing to order the ever increasing army of non-official remedies it is doing good work, and I trust it will go on and prosper.

Before closing, allow me to say a word about the advantages to be derived from membership of such an Association as ours. Edinburgh is a centre for education and examination. Many young men come here from all parts of the country. Very often they are without friends, and do not know where to find them. Here we make all welcome, and many valuable and lasting friendships are the result of our meetings. Intercourse with fellow craftsmen here tends to round off the angularities which are apt to adhere to all of us. At our meetings all new remedies are discussed as soon as they appear, and those who may not otherwise have the opportunity can see and handle them for themselves. New theories in connection with various sciences are also discussed, and thus we are able to keep ourselves abreast of the times.

It has often been said that imitation is the sincerest form of flattery, and in this respect our Association has been flattered. Members leaving us have been instrumental in starting similar associations elsewhere, and we heartily wish them every success in following our footsteps.

And now, in conclusion, we have seen that others have laboured, and we have entered into their labours. Let us faithfully carry them on, labouring for that ultimate end of knowledge which Bacon described as employing the gift of reason to the benefit and use of mankind, and always remembering that—

> "Labour with what zeal we may
> Something yet remains undone;
> Something uncompleted still
> Waits the rising of each sun."

In moving a vote of thanks, which was cordially awarded, Mr. Donald McEwan, Vice-President, said he thought it was a great advantage to have such a history to look back to as that referred to in the address. The Association also offered great advantages for enlarging their experience of the practice of pharmacy, and its social advantages, of which their annual conversazione was the most conspicuous feature, were also of the highest value.

Mr. Gilmour, in seconding the motion, said he had listened with much pleasure to the President's interesting review of the Association's work. There was one point which he would like to emphasize, and that was the great value of the prize scheme. He would most strongly advise the apprentices to enter these competitions, for they would thereby gain that confidence which was so desirable under examination. It mattered little though they failed, for after all the prize was not the best thing to be gained. The knowledge acquired had a permanent value. Another feature of their work was the morning botanical excursions. He thought that was a grand idea and of great value to those who had very little opportunity for outdoor recreations. At Dundee the other day he had ventured to speak in high terms of the mental, moral, and physical qualities of the present generation of chemists' assistants in Edinburgh, and he believed all these good qualities would be materially benefited by these early excursions. He thought the address would keep up the prestige of their Association, and he had great pleasure in seconding the vote of thanks.

Mr. D. B. Dott said he had much pleasure in hearing of the flourishing condition of the Association. It was often said that there was more enthusiasm in the junior Association than in the older one, and that was very natural, for young men were always more enthusiastic. The reference to *drumine* reminded him of an incident in his own experience. He had sent to him a substance said to be a new opium alkaloid. On igniting a little on platinum foil he found that it nearly all remained, and on testing it turned out to be simply calcium sulphate with a little adherent *papaverine*. Doubtless the discoverer had got a slight colour reaction with sulphuric acid, and jumped to the conclusion that he had found something new.

Mr. Thomas Thompson said he could cordially endorse what previous speakers had said. He was much gratified to see so large a turn out, and could congratulate those at the head of the Association on the scientific and interesting syllabus they had prepared for the session. He thought this Association offered a splendid opportunity of investigating and discussing things that occurred in their ordinary experience in such a way as to benefit themselves and others. The discussion was continued by Messrs. Coull, Duncan, Henry, Hill and Lunan.

Mr. W. B. Dougall was elected Secretary, Mr. J. Findlay, Assistant Secretary, and Mr. A. J. Clark member of Committee. The Chairman having intimated that the next meeting, on November 13, would be an open one under the charge of Mr. George Coull, B.Sc., Ex-President, the meeting was closed.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting of the session was held in the Association's rooms, 74, Commercial Street, on Thursday evening, October 31. Mr. John Forsyth in the chair. There was a very large attendance, doubtless due to the fact that it was the first of the series of "Musical and Social evenings" which are to be held in connection with the Association during the winter.

The arrangements for the evening were in the hands of Messrs. Alexander Adam and D. Johnstone, and these gentlemen provided an excellent programme.

The committee which was appointed to make arrangements about the conversazione then met. Mr. Isaac Hyslop was appointed secretary of this movement. After discussion it was decided to hold the First Annual Conversazione and Ball on Wednesday evening, December 18, 1889, in Speed's Hall. It is to be hoped that not only the members of the Association but a number of the local chemists will turn out to this Ball and make it a complete success.

The next meeting of the Association will be held on Thursday evening, November 14, when a paper on "Putrefaction and Fermentation" will be read by Mr. Frank W. Young, F.R.S.E.

British Pharmaceutical Conference.

MEETING AT NEWCASTLE-UPON-TYNE.

Wednesday, September 11.

(*Concluded from page* 359.)

As a sequence to the foregoing paper the following was read—

LIQUOR MORPHINÆ MECONATIS.

BY C. A. MACPHERSON.

The pharmacopœial solution of morphine bimeconate is a preparation which is nearly allied to the official 1 per cent. solutions, and like them has an indefiniteness about it which is not desirable. On comparing its formula with that given for the morphine hydrochlorate solution, it seems as if it were intended to have both solutions of the same alkaloidal strength, the same quantity of morphine hydrochlorate being ordered for what presumably is intended to be in each instance 2 fluid ounces of solution. Such a result cannot be obtained in practice, since in following the official process a loss of alkaloid is sustained, which will be greater or less according to the care and skill exercised by the operator; and the finished product, instead of containing 5¼ grains of 'bimeconate' in each ounce, as it would if there were no loss, is more likely to approximate to the strength stated in the Pharmacopœia—about 5½ grains in 1 fluid ounce.* Strangely enough, while an attempt has been made to have both solutions of the same alkaloidal strength, the official dose of each has been based not on the proportion of alkaloid contained in it, but upon that of its particular salt.

In the Pharmacopœia it is stated that the bimeconate solution is about the same strength as tincture of opium, as regards meconate of morphine, but the only reason for adhering to this somewhat indefinite standard seems to be that it was the one adopted for the unofficial preparation of which it is an imitation. It thus becomes a question whether it would not be advisable to include this preparation in the 1 per cent. solutions, and supersede the present tedious and inexact process by one which will yield a definite product. This could be accomplished by adopting either of the following formulæ:—

(1) *Liquor Morphinæ Meconatis.*

Take of—

Morphine meconate† . .	35 grains or 3·5 parts.
Meconic acid	10 grains or 1· part.
Rectified spirit	2 fluid ounces or 87·5 fluid parts.
Distilled water a sufficiency to make . . .	8 fluid ounces or 350· fluid parts.

Mix the morphine meconate, meconic acid and rectified spirit, and add as much distilled water as will make the solution measure 8 fluid ounces or 350 fluid parts at 60° F. (15·5° C.)

(2) *Liquor Morphinæ Meconatis.*

Take of—

Morphine hydrate‡ .	25 grains or 1·25 parts.
Meconic acid . . .	20 „ „ 1 part.
Rectified spirit . . .	2 fluid ounces or 43·75 fluid parts.
Distilled water, a sufficiency to make	8 fluid ounces or 175 fluid parts.

Mix the morphine hydrate, meconic acid and rectified spirit, and add as much distilled water as will make the solution measure 8 fluid ounces or 175 fluid parts at 60° F. (15·5° C.).

The first formula yields a solution containing 4⅜ grains of morphine meconate in each fluid ounce, or 1 part by weight in 100 similar parts by measure. The second one differs slightly, the proportion of meconate in this case being 1·006 per cent.

It may be objected that by adopting the proposed formula a weaker preparation would be substituted for the one previously in use. Such certainly would be the case, but the difference is not so very great and the objection is not insurmountable. By calculation it is found that a tincture made from opium yielding 10 per cent. of morphine should contain the equivalent of 5·58 grains of "bimeconate" in each ounce or 1·27 per cent.; this is equal to 4·95 grains or 1·13 per cent. of meconate. The proposed solution contains 1 per cent. of meconate, which is equal to 1·127 per cent. of "bimeconate." The decrease in strength could easily be compensated for by increasing the dose, and by making this the same as for the other morphine solutions it would be more in unison with the actual potency of the preparation than the official dose is with that of the present one. By changing the name to that indicated, which is the more correct one, there could be no misunderstanding as to what was meant, while there would be the advantage that a standard solution of a well-defined salt would be employed in place of an indefinite one of a hypothetical compound.

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* The statement in the 'Extra Pharmacopœia' that it contains about 6⅓ grains in the ounce is incorrect.

† $(C_{17}H_{19}NO_3)_2C_7H_4O_7,5H_2O$. Dott: *Pharm. Journ.*, [3], ix., 883.

‡ $3C_{17}H_{19}NO_3,9H_2O$. Dott, *Pharm. Journ.*, [3], xviii., 702.

The following three papers were then read—

The Strength of Commercial Samples of Scheele's Prussic Acid.

BY R. WRIGHT,

Pharmaceutical Chemist.

It is a well-known fact that the above acid as found in retail pharmacies varies greatly in strength, and it was deemed desirable to ascertain whether a similar variation occurs in the strength of samples sent out by wholesale houses.

With this object in view a small supply was procured from several of the principal drug houses. In all, twelve samples were obtained. Of these, one was said to contain 4 per cent. hydrocyanic acid; three were said to contain 5 per cent., three were described as being rather more than twice as powerful as the acid prepared by Vauquelin's process; one was stated to be nearly three times the strength of the pharmacopœial article, while the labels on the remainder afforded no clue whatever to the strength of the contained solution. The process employed for estimating the strength of the various samples was as follows:—About 2 grams of the acid to be estimated was weighed into a flask, into which 15 or 20 c.c.'s solution of potash (B.P.) had been introduced, the mixture diluted with distilled water, and titrated with decinormal solution of silver nitrate, the production of a permanent turbidity indicating the end of the reaction.

Litmus was used as an indicator, and the percentages given represent the mean of two estimations.

No. of sample.	Percentage amount of HCy.
1.	3·6
2.	3·7
3.	4·0
4.	4·2
5.	4·4
6.	4·8
7.	4·9
8.	5·0
9.	5·0
10.	5·1
11.	5·1
12.	5·7

From the above table it will be seen that the strength of the specimens examined varies between the limits of 3·6 and 5·7 per cent. HCy, a difference of 2·1 per cent.

In view of the variation in the strength of this acid, and the consequent danger attending its administration in large doses, it is very desirable that a definite standard of strength should be fixed.

The Unofficial Formulary Committee might usefully take the matter in hand with a view to securing uniformity in the strength of so potent a medicinal agent.

The Relative Value of Chloroform and Alcohol, and Mixtures of the Two, for the Extraction of Aconite and Belladonna Roots.

BY R. WRIGHT,

Pharmaceutical Chemist.

In Squire's 'Companion to the British Pharmacopœia,' directions are given for making two preparations termed chloroformum aconiti and chloroformum belladonnæ.

The process consists in percolating the powdered root with chloroform, and the finished product is of such strength that a fluid ounce is equivalent to 1 ounce of the root.

The preparations named are used to some extent in pharmacy, and are to be found quoted in most of the wholesale drug lists.

With a view of ascertaining whether chloroform had any advantage over alcohol for the extraction of aconite and belladonna roots, and also what was the specific action of mixtures of the two in definite proportions upon these roots, two series of experiments were instituted.

In the first series, 10 grams of the root in No. 40 powder was macerated with 200 c.c. menstruum for fourteen days, the mixture being shaken daily. It was afterwards filtered. In the second series 50 grams of the powdered root was moistened with menstruum, and the mixture packed in a percolator. A further supply of menstruum was added, and when the liquid commenced to drop the lower orifice of the percolator was closed, and the whole allowed to macerate for three days. Percolation was then commenced, and allowed to continue until 100 c.c. of percolate had been obtained.

The following processes were employed for estimating the alkaloidal strength of the tinctures:—

Belladonna.—The simplest and most reliable process for the estimation of the belladonna alkaloids was found to be that proposed by Dunstan and Short, *Pharm. Journ.*, vol. xiv., p. 625. Twenty c.c. of the tincture to be estimated was shaken up with two successive 10 c.c. distilled water, by which means the alkaloids are withdrawn from solution in the chloroform-alcohol mixture with the alcohol, the chloroform retaining the colouring matter. The latter is drawn off, the alkaloidal solution rendered alkaline with ammonia, and the alkaloids removed by agitation with two successive 10 c.c. chloroform. The mixed chloroformic solutions are afterwards evaporated in a clean tared platinum dish over a water-bath, until the weight is constant.

In experiment 1 in each series the colouring matter was removed by shaking with chloroform, and in No. 6 the alkaloids were removed by agitation with dilute alcohol.

Aconite.—It was first attempted to apply the process employed for the belladonna tinctures to the estimation of those of aconite. It was found, however, that the chloroform not only retained the colouring matter, but also some of the alkaloid, and therefore the following process was adopted:—

Twenty c.c. of the tincture was introduced into a porcelain dish, with 1 c.c. dilute sulphuric acid (B.P. strength) and 9 c.c. distilled water, and the mixture evaporated over a water-bath until the chloroform and alcohol had been driven off. The residual solution was filtered when cold, the filter being washed with another 10 c.c. distilled water. The mixed filtrates were rendered alkaline with ammonia, and the alkaloids extracted by agitation with two successive 10 c.c. chloroform. The mixed chloroformic solutions were then evaporated over a water-bath in a tared platinum dish until the weight of the residue was constant.

The following tables represent the results obtained. In each case two estimations were made, the mean of the two being taken as correct.

The important conclusions to be drawn from the results recorded in the tables are—

(1) That chloroform, *per se*, does not nearly exhaust aconite and belladonna roots of their alkaloids.

(2) That a mixture of chloroform and alcohol is superior to alcohol alone as a menstruum for their extraction.

Table I.—Representing Alkaloids obtained from the Belladonna Tinctures.

Menstruum employed.	Quantity taken.	Alkaloidal residue in grams. Series I.	Series II.
Alcohol 84 p.c. . .	20 c.c.	·006	·030
Alcohol 4 vols. Chloroform 1 vol.	20 c.c.	·008	·040
Alcohol 3 vols. Chloroform 1 vol.	20 c.c.	·006	·035
Alcohol / Chloroform equal vols.	20 c.c.	·007	·035
Alcohol 1 vol. Chloroform 3 vols.	20 c.c.	·007	·033
Chloroform	20 c.c.	·006	·011

Table II.—Showing Alkaloidal Residues yielded by Aconite Tinctures.

Menstruum employed.	Quantity taken.	Alkaloidal residue in grams. Series I.	Series II.
Alcohol 84 p.c. . .	20 c.c.	·009	·066
Alcohol 4 vols. Chloroform 1 vol.	20 c.c.	·009	·074
Alcohol 3 vols. Chloroform 1 vol.	20 c.c.	·009	·076
Alcohol / Chloroform equal vols.	20 c.c.	·009	·068
Alcohol 1 vol. Chloroform 3 vols.	20 c.c.	·009	·056
Chloroform	20 c.c.	·006	·034

NOTE ON AN IMPURITY IN A COMMERCIAL SAMPLE OF SODIUM SALICYLATE.

BY R. WRIGHT,

Pharmaceutical Chemist.

In dispensing a mixture with a fresh supply of sodium salicylate received from one of the leading drug houses a few days ago, it was remarked that the salicylate was not easily and completely soluble in cold water.

As sodium salicylate is a very soluble salt it was judged that some foreign substance must be present in it.

In order to ascertain the nature of the impurity, 500 grains of the salicylate was shaken up with 2 ounces of distilled water to dissolve out the soluble salt. On standing, a white, granular precipitate subsided. The mixture was thrown upon a filter, the precipitate well washed with distilled water, and dried in a water-oven.

In this way 8 grains of the substance was obtained. It possessed the following characters and properties:— In minute white crystals, destitute of odour, with a sweetish, rather acrid taste. Heated in a narrow tube, it fused and sublimed without decomposition. Heated on platinum foil it was entirely volatilized. Slightly soluble in cold water; more soluble in hot water. It was soluble to some extent in chloroform, more so in alcohol, and freely soluble in ether.

The aqueous solution was acid to test-papers, and effervesced on the addition of sodium carbonate.

From alcohol it separated in long needles; from a concentrated aqueous solution in stellate groups of short prismatic crystals; from a weaker solution in long needles.

The aqueous solution gave a violet coloration with ferric chloride; and a white crystalline precipitate with mercuric chloride, soluble in acids.

Heated in a sealed tube with concentrated HCl it yielded CO_2 and phenol.

The above tests indicate free salicylic acid as the impurity present in the salicylate.

Mr. **PLOWMAN** said it was very important to know what were the best solvents, and he noticed in one case there were four volumes of alcohol to one of chloroform, and in the other three to one. Was there any special reason for altering the volumes in the two menstrua?

Mr. **NAYLOR** said he had had an opportunity of testing the impurity in the sample of salicylate of soda referred to by Mr. Wright, and he found the melting point corresponded precisely with the melting point of commercial salicylic acid.

Mr. **GROVES** said he should like to remark on the weakness of chloroform for extracting aconite and belladonna roots. On one occasion he found a chloroform belladonna liniment contained but a very small portion of the alkaloid, practically none, and in considering the matter he thought possibly it might be due to the fact that the alkaloids existing in the roots were in a saline condition. They were not alkaloids, but salts of alkaloids. They knew very well that when an alkaloid was dissolved in either chloroform or ether it was easily shaken out by acids, even acetic acid would remove the whole of it. He made some experiments by moistening aconite and belladonna roots with ammonia, allowing it to remain about two hours, then drying carefully, and then percolating with chloroform; he found they yielded much more alkaloid. But there was some difficulty in percolating with chloroform a body so mobile and so heavy that it ran through the marc too quickly, so that it had to be restrained by a tap. It was also desirable that spirit should not be mixed with the chloroform. Belladonna and aconite were often mixed with oil, and if spirit were used together with chloroform the miscibility would be destroyed to a great extent.

The **PRESIDENT** said these matters were very interesting. He himself for years had made chloroform belladonna liniment and aconite liniment also freely by percolation of the roots by chloroform, and therefore he was rather surprised to see what little solvent power the chloroform had on the roots. He was glad to hear the remarks of Mr. Groves, for they had all been making this liniment, which was proposed by the late Mr. Peter Squire, who recommended that it should be made from belladonna root by percolating with chloroform. It showed the advantage of coming together and discussing these points. With regard to hydrocyanic acid, it was very much to be regretted that notwithstanding the attention which had been called to this matter these varying strengths should still be found. Scheele's acid was little used in dispensing compared with the official acid, but there was no reason why it should not be somewhere near 4½ per cent. when met with in the trade.

Dr. **THRESH** said, in answer to Mr. Plowman, that Mr. Wright in the table gave the amount of alkaloid obtained by using various proportions of alcohol and chloroform. He (Dr. Thresh) had simply selected from the table the figures showing the results with pure alcohol and chloroform and the mixtures that gave the greatest yield. In the one case, that of aconite, 3 to 1 of chloroform gave the largest percentage, whilst in the case of belladonna it was in the proportion of 4 to 1.

The last paper read was on—

CASEARIA ESCULENTA.

BY DR. P. S. MOOTOOSWAMY, F.L.S., TANJORE.

Nine species of casearia are described by Roxburgh, of which five are indigenous to Southern India. *C. esculenta* is a large shrub or small tree with leaves alternate oblong, entire and smooth; flowers axillary and greenish-yellow; stamens and nectaries united at the base. The tree is found in the Circar mountains, the Travancore ghauts, and Varoosa-puthee, and other parts of the Tanjore district. It belongs to the natural order Samydaceæ.

The root is the part employed in Hindu medicine and sold in medical bazaars. The Tamil names are

Kadalashingi and *Kadaloorangi*, and its Telugu name is *Gundu gungura*. The tree takes its name, it is said, from the root having the supposed property of drying up the sea.

The root is of various sizes, usually about an inch in diameter, sometimes more, sometimes less. The surface is bright yellow, and scales off in very thin layers like tissue paper. The bark is reddish-brown. The wood of the root is light brown and made up of one or more concentric layers according to the age of the tree. When the drug is powdered in a mortar the broken pieces of bark adhere together on account of the fine, long, silky liber cells. The cobweb-like appearance of the partially powdered drug, and the bright yellow coating of the bark are two characters, I think, which distinguish it from all other articles of Indian materia medica. Sometimes another bark is called *Kadaloorangi*, which is in long fibrous pieces, and has a bitter and astringent taste. This other bark I have found to be from *Kydia calycina*, belonging to the Malvaceæ, and containing, like most plants of that order, very gummy properties.

Casearia root is now coming into use as a valuable medicine for chronic enlargement of the liver, for hepatic obstructions and for piles. It is a gentle aperient, notwithstanding the tannin present, and the dose should be equal to 2 to 3 drachms of the root. I have long known it to act as a specific in diabetes when administered in powder or decoction. One part of powder with one-fourth its weight of sugar is given twice a day. The formula for decoction is

Root bark of casearia	ʒij.
Cinnamon bark	℥ij.
Aniseed	℥ij.
Water	℥x.

To be boiled down to three ounces. Dose, one ounce and a half twice a day. It is considered to be an alterative in skin diseases by some Vythians, especially in that disease called *Padurthamaray* in Tamil, where a spreading hepatic complaint affects the lower part of the abdomen and extends around the back. The fresh bark is ground with water and applied to the parts affected. The extract and syrup of casearia are the preparations now consumed in Bombay to a great extent. The extract is made by exhausting the powdered root with water, and evaporating to the consistence of a soft extract; the dose of this is 20 grains. The syrup is a solution of the extract in sugar and water, and contains 20 grains in two teaspoonfuls.

Mr. D. Hooper has analysed the roots of *Casearia esculenta*, and furnishes me with the results of his investigation as now communicated. The drug contains 3 per cent. of neutral yellowish resins soluble in ether and partly soluble in spirit of wine. About 10 per cent of tannin, giving a greenish colour with ferric chloride, was contained in the alcoholic extract. This tannin, from the composition of its lead-salt and the formation of a soluble crystalline product when boiled with diluted acid, resembled rhatania-tannic acid of Wittstein. Water dissolved out an organic acid having the peculiar characters of cathartic acid, both in its chemical tests and physiological action. The root also had a small quantity of starch, and left 4·8 per cent. of mineral matter when burnt.

The PRESIDENT said the Conference was very glad to find a gentleman in India, a native doctor, had sent this communication, which had been received through one who had always been deeply interested in pharmacy, Mr. David Hooper.

THE BELL AND HILLS FUND.

Mr. NAYLOR said the books were on the table, which consisted of nine volumes provided by the Bell and Hills Fund, through the generosity of Mr. Hills in memory of Jacob Bell, and two volumes given by Mr. Thomas Hanbury in memory of his brother Daniel, being that gentleman's 'Science Papers,' and 'Pharmacographia.' Such a gift was made to every town having a local association which the Conference visited. The books were the selection of the North of England Pharmaceutical Association, which, as Mr. Martin would tell them, had had some difficulty in making a choice, having already such an excellent library. He had much pleasure in making the presentation.

Mr. N. H. MARTIN said as President of the Local Association it devolved upon him to accept this munificent gift on its behalf. It was not at all necessary that the visit of the Conference should be commemorated in this tangible manner to prevent it being forgotten, but he need not say that the pleasure would be enhanced by the fact that day by day and year by year they would have before them in the library these volumes to remind them of the visit. Mr. Naylor had referred to the existing library, which was founded some three years ago, in which they were fortunate enough to possess a number of books from the collection of Henry Deane, the first President of the Conference, and also some which had belonged to Henry Brady, but they would all be delighted to have in addition to those two honoured names those of Bell, Hills and Hanbury associated with the library. A portrait of Jacob Bell, an original proof signed by Landseer, hung on the library walls, and as the students contemplated it, he hoped it might prove a stimulus to them to imitate his example and work for pharmacy. He regretted very much to say that up to the present their library and museum had proved to be in excess of the local requirements, as shown by the demand for books and specimens, but it was to be hoped that the masters, assistants and apprentices would be so stimulated by the visit of the Conference and the excellent papers which had been read to become more enthusiastic for education and original research, that in another year's time such a complaint would not have to be made. These volumes were so magnificently bound that it almost seemed a pity to use them, but he took it the highest compliment they could pay to the donors would be to use them so continually that when the Conference came again to Newcastle in twenty-five years' time the binding would be well worn and the pages well thumbed, whilst the contents had been absorbed by the students, who would show by the papers then read that valuable use had been made of the gift.

THE FORMULARY COMMITTEE.

The PRESIDENT moved the re-appointment of the Formulary Committee, which had a considerable deal of work in hand, though not quite ready for publication.

Mr. SIDNEY PLOWMAN seconded the motion, which he suggested would sound better if it took the form of requesting the members of the Committee to continue their labours for another year. He had had occasion before to refer to the great services which this Committee had rendered, and he was quite sure the motion would be carried.

The motion was carried unanimously.

THE PLACE OF MEETING IN 1890.

Mr. R. REYNOLDS said he was requested by his colleagues on the deputation from the chemists of Leeds which attended the Conference to lay before it an invitation, requesting that Leeds might be honoured by being chosen as the next place of meeting. It might seem strange that a town of such magnitude had not yet had the privilege of entertaining the Conference, but the last meeting of the British Association in Leeds was in 1858, and that Conference was born five years later. The British Association had visited the county of York three times since then, at York, Sheffield and Bradford, and, of course, those circumstances had not been favourable to the early selection of Leeds. It was probably felt that there might be too much even of Yorkshire, and although an invitation had been sent in the meantime, it was only accepted last year, when Leeds was fixed upon for next year's meeting and all arrangements were in train. It was therefore hoped that as usual the Pharmaceutical Conference would accompany or precede the British Association in its visit. He would not use any exaggerated language in order to attract members, and would admit Leeds was a town in which the work exceeded the play, but that would be no novelty to pharmacists. There were many matters of interest to be seen; they had in connection with the modern university system one of the three colleges constituting the Victoria University, having a building corresponding in scope and object to that in which they were assembled. Their industries were of a varied character, in fact they rather claimed to have a greater variety of manufactures than almost any other town. He could not boast, as the gentlemen in Newcastle who were putting off their armour might, but he could modestly promise that they in Leeds would do their best to make the meeting a success. He had been very much pleased with the admirable reports of that meeting given in the local press; he knew the difficulties of reporting such meetings, and remembered some years ago when Mr. Groves read a paper entitled "The Rancidity of Fats in connection with Ointments," it was reported as being "The Rancidity of Facts," but he could cap that example by what appeared in a Leeds paper that morning, which in referring to the President's address said "he expressed the hope that the Conference in conjunction with the Medical Council would succeed in getting the British Pharmacopœia declared obsolete and illegal." If, however, through this report, the Conference had at all lost public confidence in Leeds, which was a very law abiding town, he trusted matters would be put right next year if the invitation were favourably received.

Mr. G. **Ward** desired to add a word in support of the invitation. He was quite sure that the magnitude and importance of Leeds were such that it was quite time it received a visit from the Conference.

Dr. **Thresh** moved that the invitation so cordially given to the Conference by Mr. Reynolds and Mr. Ward on behalf of the Leeds chemists be cordially accepted. He was himself a Yorkshireman, who came from near Leeds, and was proud of it; he could assure the members they would meet with a hearty reception if they went there.

Mr. **Conroy** seconded the motion, which was at once agreed to.

Votes of Thanks.

Mr. **Schacht** moved—

> "That the cordial thanks of the non-resident members of the British Pharmaceutical Conference be given to the Local Committee, and especially to Messrs. Martin, Clague, Proctor and Harrison for the very successful manner in which all the arrangements connected with their visit to Newcastle had been carried out."

He was very glad the word *all* had been introduced into the resolution, as it recalled to their minds the very varied duties which the gentlemen referred to had undertaken and carried out. It was not the first time he had had the pleasure of proposing such a resolution, for the members of the Conference were generally extremely well received by their brother pharmacists, who always appeared anxious to do the best they could, but it was not always that the locality was so fortunately placed as Newcastle happened to be, and the gentlemen or ladies concerned had thrown a spark of originality into the proceedings, which was unique, having very kindly made special arrangements by which the ladies whom some members were fortunate enough to bring with them, had occupation and amusement provided for them while their companions were otherwise engaged. It was only right to say that this part of the Committee's work had been very highly appreciated.

Mr. **Benger** had the greatest pleasure in seconding the motion. There was nothing but congratulation to be given to the Local Committee for the very successful efforts which had been made to provide for the comfort, convenience and recreation of the members and the lady visitors.

The motion having been carried unanimously,

Mr. **Martin** said it was a very great gratification to him, and must be so to his colleagues, who had so ably and energetically assisted him, to hear gentlemen of so much experience say that all the arrangements had been carried out to their satisfaction, and such testimony was an ample reward for any little trouble they had taken. If there had been any little hitch or shortcoming he hoped it would be considered their misfortune rather than their fault. There still remained the excursion, as to which he might say that every effort had been made to secure fine weather for the trip.

Mr. T. **Maltby Clague** said it would be absurd for him to say that there was no work for a local secretary; there were too many present who had already filled the office, and he should not like either to deceive any of the embryo local secretaries who were listening to him. There was a great deal of work, but there were many redeeming features about it. It brought one in contact with one's neighbours, and showed that some of the most genial good fellows in the world were to be found in the ranks of pharmacy. Such labour, like virtue, was its own reward, and he should be quite ready to undertake the post then, if they were back again in the same position as in the previous year, knowing what he then did of the duties.

Mr. **Proctor** said he thought members had had enough of him during the last two days, but he would not detain them long. They had arranged the matter very nicely beforehand, it being agreed that Mr. Clague was to have all the work, Mr. Martin all the glory, and himself all the cash, in consideration of which he was to fill up a gap in the list of names and make the thing look respectable.

Mr. **Woolley** moved—

> "That the best thanks of the meeting be given to President, Principal and Council of the College of Science for having placed the College at the disposal of the Conference for its meeting at Newcastle."

The proposition would commend itself to everyone present, who would all feel how fortunate they had been in being privileged to use that beautiful building. It was very pleasing indeed to find that wherever they went they had such privileges afforded them, such buildings having grown up all over the country and the process still continuing. This was some recognition of the power and usefulness of the Pharmaceutical Conference. Newcastle had every reason to be proud of that beautiful building, which, however, was only a portion of what it was destined one day to be. He had been much interested in inspecting the chemical laboratories, and could not but think that the young men of the neighbourhood were very fortunate in having such an institution in their midst.

Mr. **Maben** seconded the motion, which was carried unanimously.

Mr. **Martin** said the staff of the College were too busily engaged in connection with the arrangements for the British Association to be present, but as a humble member connected with the College he would accept the vote which had been passed, and which he was sure would be a gratification to the Principal.

Election of Officers.

The following gentlemen were elected as the officers of the Conference for the ensuing year:—

President.—C. Umney, F.I.C., F.C.S.

Vice-Presidents.—M. Carteighe, F.I.C., F.C.S., S. Plowman, F.R.C.S., A. Kinninmont, W. Smeeton.

Treasurer.—W. Martindale, F.C.S.

Hon. General Secretaries.—J. C. Thresh, D.Sc., M.B., and W. A. H. Naylor, F.I.C., F.C.S.

Local Secretary.—F. W. Branson.

Other Members of the Executive Committee.—J. E. Brunker, M.A., M. Conroy, F.C.S., R. H. Davies, F.I.C., D. B. Dott, F.R.S.E., A. W. Gerrard, F.C.S., T. Maben, F.C.S., B. S. Proctor, F.I.C., F. Ransom, F.C.S., J. Harrison.

Auditors.—T. Rheeder and G. Ward.

Mr. Groves moved—

> "That the hearty thanks of the Conference be accorded to the President for the very able and courteous manner in which he has conducted the business of the meeting."

He said all present were as well able as he was to judge of the ability displayed by Mr. Umney, and must have noticed how thoroughly he had brought out the points arising on the various papers. The Conference was much indebted to him, not only for his address, but for much of the success of the meeting.

Mr. Proctor seconded the motion. It had occurred to him over and over again during the discussions how much the President had added to the value of the discussions by his opening and concluding remarks.

The motion was carried by acclamation.

The President said he had said so much during the last forty-eight hours, that he hesitated almost to say anything more, but he could not help thanking the members for the very great kindness he had received from them and for the renewal of their confidence as shown in again placing him in the post of President. It had been a great pleasure to him to come there and see some of his old friends who were almost grey-headed when he began his career twenty-five years ago. He had always looked forward to getting to the front, and if all young men would strive to do their best, they might be sure their chances of success would become better as their calling advanced. He had only to allude to the training and the help he had received from the Pharmaceutical Society and the Conference as an incentive to young men to do all they possibly could to make themselves perfect in the art and practice of pharmacy.

Parliamentary and Law Proceedings.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* CHARLES TYRELL.

Before his Honour Judge Leonard at the County Court, Southampton, on the 22nd ulto., The Council of the Pharmaceutical Society of Great Britain sued Charles Tyrell, of the St. Luke's Drug Stores, Bevois Valley, Southampton, for five penalties of £5 each for selling or keeping open shop for the retailing, dispensing or compounding of poison upon various dates.

Mr. C. W. Langley Flux (Flux, Son and Co.) appeared for the Council; Mr. W. L. Bell appeared for the defendant.

Mr. Langley Flux stated that the action was brought under the provisions of the Pharmacy Act, 1868, the penalties sued for being fixed by Sec. 15 of that Act. The defendant carried on the business of a chemist and druggist, although not qualified so to do.

Proof having been given of two purchases at the shop, styled the St. Luke's Drug Stores, in Bevois Valley, and that on both occasions the defendant was himself the seller, Mr. Bell admitted each of the purchases alleged in the particulars, and that defendant was the seller in each case. He submitted that there was a registered man in the business and that was all the Act required.

In answer to Mr. Langley Flux defendant admitted that he was in partnership with Mr. W. E. Moffat.

His Honour reserved judgment to the next court.

In delivering judgment on the 5th inst., his Honour said the action was adjourned in deference to some points raised by Mr. Bell, though at the same time he (the Judge) expressed himself that he had very little doubt as to the law on the subject. He had since taken the advantage of going carefully into the facts, and had come to the conclusion there was no answer to the action of any kind. His Honour quoted from the Pharmacy Act, to show its objects, and said he believed it to be one of the most useful Acts ever passed for the safety of the public. Every provision was made that it should be carried out literally. The defendant had admitted that he was not qualified, and the whole object of the Act was to prevent persons not qualified making up poisonous drugs. As to the suggestion of Mr. Bell as regarded the partnership it was provided for by Section 3, and defendant had not complied with that. He therefore gave judgment for the plaintiffs.

Mr. Bell: My point is that defendant had a partner who was qualified.

Judgment was entered for the plaintiffs for the penalties sued for with costs.

Obituary.

Notice has been received of the death of the following:—

On the 30th of October, Mr. Michael Charles James Harris, Chemist and Druggist, West Street, Axminster. Aged 70 years.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ASSAY OF IPECACUANHA WINE.

Sir,—When I sent my paper on the "Assay of Ipecacuanha Wine" to be read at the late Conference I had operated upon the wine only, and certainly the results obtained justified the hope there expressed that the process might prove useful. I have since worked with aqueous solutions of emetine dissolved in a slight excess of acetic acid, and find that under these circumstances little or no re-solution of the mercuric iodide takes place. What may be the cause of the different behaviour of the wine residue and the aqueous solution I am at a loss to conjecture; it must be due to some constituent of the root, as the evaporated residue of sherry wine possesses no property of the kind. I write to prevent disappointment on the part of those who might otherwise investigate the capabilities of the process.

THOS. P. BLUNT.

W.P.—According to the author of 'Pharmacographia,' "Scraped or decorticated ginger is often bleached either by being subjected to the fumes of burning sulphur or by immersion for a short time in a solution of chlorinated lime. Much of that seen in the grocer's shops looks as if it had been whitewashed, and in fact is slightly coated with calcareous matter, either sulphate or carbonate of calcium."

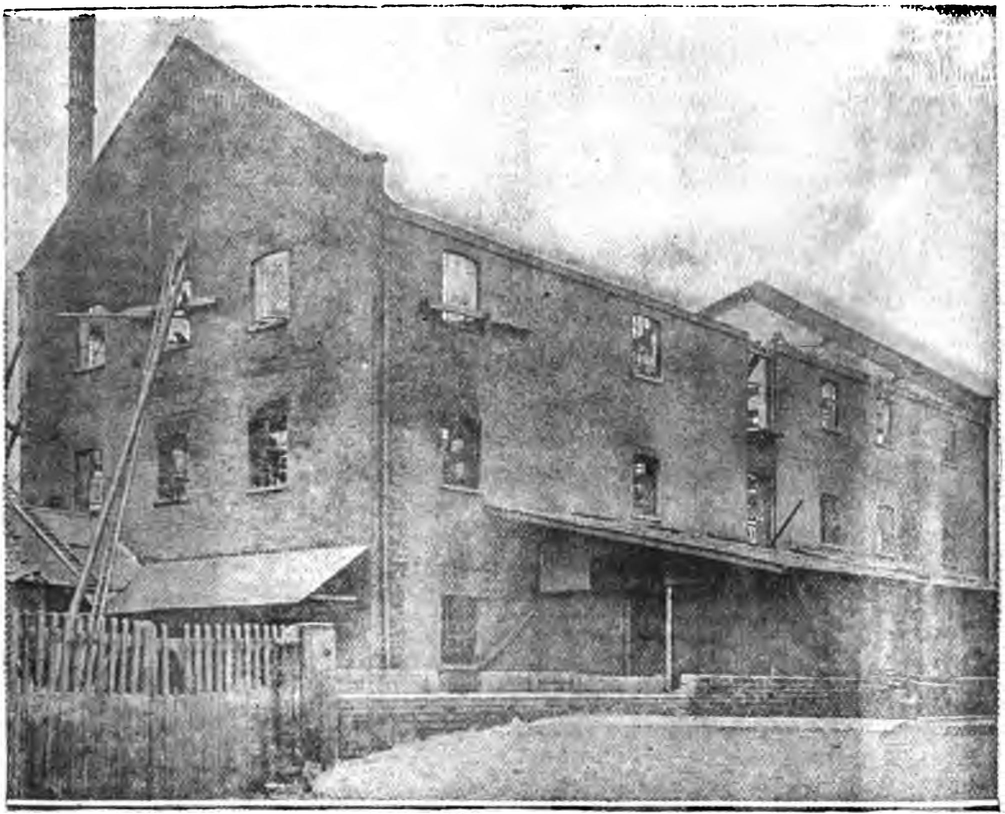
Test for Albumen.—A correspondent asks for the formula for Esbach's Solution used as a test for albumen.

Erratum.—On p. 348, col. ii., line 7 from bottom, the term suggested by Mr. Bird should be given as "bacteriad" instead of "bacterial."

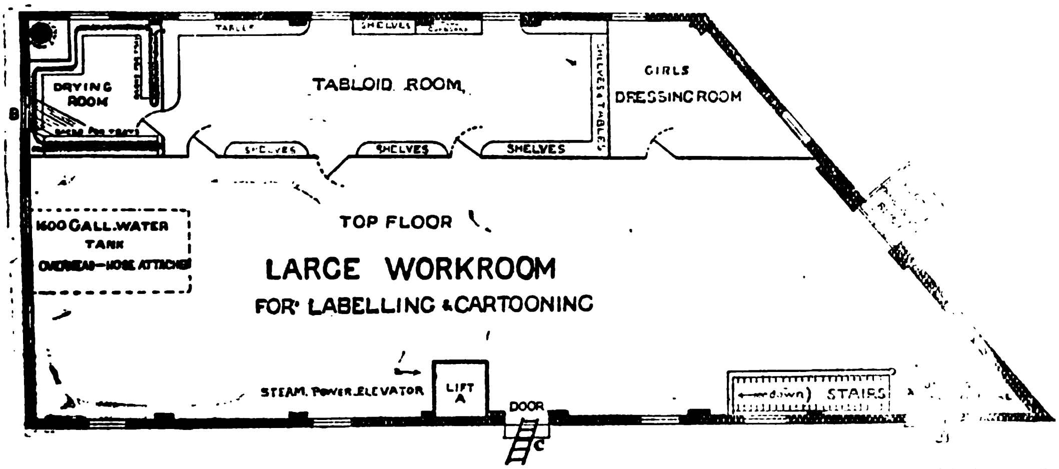
COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Wilson, Robertson, Corder, Tayler, Martindale.

The Story of Our Fire.

LONDON. SATURDAY, NOV. 9. 1889.



MAIN BUILDING of Burroughs, Wellcome & Co.'s Wandsworth Laboratories. Destroyed by Fire, Sept. 12th, 1889.
(From Photograph by W. Ingle, Pimlico.)



A. Large steam-power (elevator) lift, capacity eight persons, time top to ground floor one minute, return one minute.

B. Southern window of drying-room, showing where sun's rays fell on trays and floor at 2.15 P.M.

C. Ladder always kept by this door as means of exit to lean-to roof, 10 feet below, in case of need. All employes, except several men who remained to combat the flames, easily got out of the building by the main stairway within two minutes after the alarm.

D. Window at head of stairway where Jacobs lost his life, and Ashby escaped height from ground 27 ft. 9 in. The fire reached this corner about thirty minutes after it started in the drying-room, 90 feet distant, with only one hose playing upon it.

E. A 1,600 gallon tank of water in roof over drying-room, with hose attached. Three dozen fire pails were also kept filled, and a large number of hand grenades were distributed throughout the building.

WILLIAM GODFREY JACOBS, Fireman of the Metropolitan Fire Brigade, who Heroically Lost his Life at the Burning of Burroughs, Wellcome & Co.'s Wandsworth Laboratories, September 12th, 1889

(Engraved for The Graphic from Photograph by Messrs. St. George & Huskisson, London.)

THE FATAL FIRE.

Most of our friends are aware of the conflagration which destroyed our works at Wandsworth on the 12th September last, and which resulted in entirely stopping our Manufacturing department for more than a month.

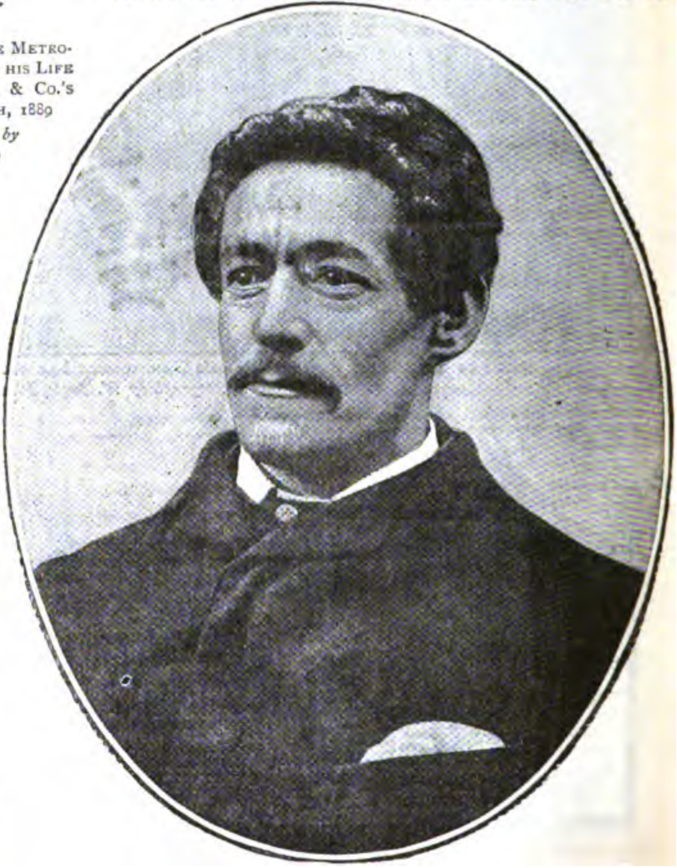
The following extract from *The Times* of September 13 is one of the most nearly correct newspaper reports of the incidents of the Fire.

"A terrible fire occurred in South London yesterday afternoon. It broke out at the large works of Messrs. Burroughs, Wellcome & Co., manufacturing chemists, on the banks of the Wandle, at Dormay's Wharf, Bell Lane, Wandsworth, and, unfortunately, resulted in the death of a fireman named Jacobs and in serious injury to another member of the brigade. The fire broke out in a very high building of three floors. At a quarter past two o'clock it was found that the upper part of the premises was in flames. No time was lost in raising the alarm, and in a very short space of time the manual engine at the fire-station in Wandsworth High Street was turned out. On the arrival of the men at the fire a stand pipe was immediately brought into use, and three of the firemen—Engineer Howard, Third Class Fireman W. G. Jacobs, and Third Class Fireman C. W. Ashby—ran the hose up the staircase in order to get at the flames. The staircase was at the further end of the building, and the men had then to work ack again along the upper floor of the cture in order to reach the spot where fire was raging. Engineer Howard, having placed his men, sent for further assistance. The two men stood on the top floor directing the hose in the midst of a cloud of suffocating smoke, and the stream of water appeared to be having a good effect upon the flames when there was a terrific burst, and the escape by means of the staircase was cut off. Both men rushed to the window, and the crowd below heard a cry from above to 'throw up a line.' The fire was rapidly advancing on the men while they were pulling at the bars of the window and endeavouring to break them. In the meantime, a scene of terrible excitement was proceeding below. Engineer Howard had endeavoured to rejoin his men, and, finding that this was impossible, rushed about to find external means for their escape. Three rungs of the ladders always carried on the engines were joined together, but these would not nearly reach the window. Then a builder's ladder was procured, and was lashed to the first combination. Even this fell short of the window by a few feet. But the crowd raised a cheer when they saw that Ashby, who was a small man, had forced his way through the iron bars, and in some extraordinary way had managed to drop or fall on to the top of the ladder and cling to it. He got safely to the ground, but was dreadfully burnt. His mate, Jacobs, was never seen alive again. By this time steamers from all parts of London had arrived on the scene, and the fire was got under. As soon as the premises had cooled somewhat the charred remains of Jacobs were recovered. The smoke had evidently overcome him, and he had dropped down on his face."

EXTRACTS FROM *THE TIMES* REPORT OF THE INQUIRY.

Statement by Francis.

"Mark Francis stated that he was a member of the Fire Brigade stationed at High Street, Wandsworth, and together with others received the call to the fire at 2·19, and they were out with



CHARLES WILLIAM ASHBY, Fireman of the Metropolitan Fire Brigade, who at the Burning of Burroughs, Wellcome & Co.'s Wandsworth Laboratories, Bravely stood by his Comrade Jacobs until Severely Burned, and then Narrowly Escaped with his Life.

(From Photograph by W. Ingle, Pimlico.)

the engine in three minutes and proceeded to the fire. He was then sent back to telephone to Kennington that the large chemical works at Wandsworth were 'well alight,' and to ask for help, and then returned to the fire. Engineer Howard sent him up on to the top floor to see whether he could assist Ashby and Jacobs, who had carried the only available hose up there. He accordingly went there, but the smoke was so dense that he could not stand, and he had to crawl along on his hands and knees and guide himself by the hose towards them. He called on to Jacobs, 'Do you want a spell'—a sea term meaning did they want any help—'with the branch?' He heard Jacobs reply, 'No,' but could not see him. Shortly after this he was overpowered by the smoke and rolled down a whole flight of stairs on to the first floor, where it was all ablaze. Finding he could do no good up there, he went downstairs out into the air to recover himself, and saw Ashby and Jacobs at a window on the top floor calling for help, and they asked for a line to be thrown them, but there was none handy. He then ran to the engine for the ladders, which they joined, but found they were not long enough. But several people helped with others, and they lashed them together, and he went up and found Ashby hanging to the window-sill. He guided his feet to the ladder and got him down to the ground, and again ascended the ladder to assist Jacobs, but found he could not reach the window for the dense volumes of smoke which were pouring out of it. When he again descended he saw Jacobs at the window, but directly afterwards he threw up his hands and fell back. A few minutes afterwards, and the flames leapt right up to the top of the house. When another engine arrived they played on the open window to try and save their mate, and after getting more help he ascended the ladder again, broke in the iron window frame with his axe, and saw Jacobs lying on the floor under the window quite dead with part of his legs burnt off; he then got help and Jacobs' remains were lashed to a ladder and brought down."

STATEMENT BY POLICE-SERGEANT SIMMONS.

"Police-sergeant Simmons, 40 V.R., described seeing Jacobs pushing Ashby through the open window and holding him up; it was elicited that the only available hose was playing on the room in which Jacobs was till the arrival of other engines, and that the fire-escape was not taken to the buildings. Thereupon Mr. Sexton Simonds explained that in accordance with the rules of the Fire Brigade it would be the duty of Jacobs to see that his junior was got out in safety here, and therefore the probability was that Ashby was saved by these means while Jacobs was too exhausted to help himself. Jacobs also could not get through the same aperture as Ashby, being a very big man, and on reference it was found that when he joined the Brigade at 20 years of age he stood 5ft. 9½in. in height, was 38½in. round the chest, and had raised a fire-escape in a remarkably quick time."

The opening in window through which Ashby escaped was 22 inches wide by 10¼ inches deep.

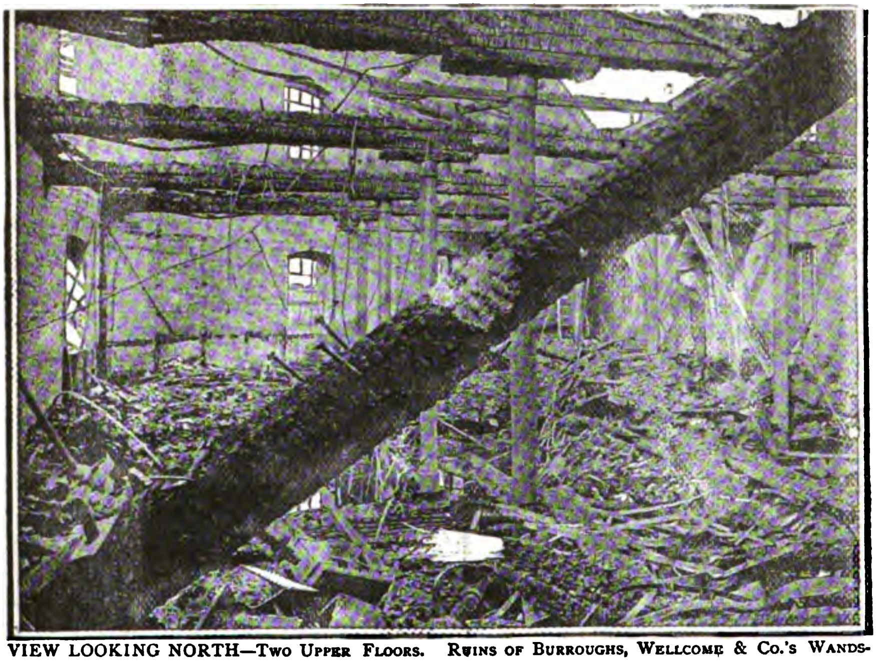
MARK FRANCIS, FIREMAN OF THE METROPOLITAN FIRE BRIGADE, WHO DID GALLANT SERVICE AT THE BURNING OF BURROUGHS, WELLCOME & CO.'S WANDSWORTH LABORATORIES, SEPT. 12TH, 1889.

STATEMENT BY ASHBY.

"The injured fireman, Charles William Ashby, described what took place inside the building. He, with Pritchard, Jacobs, and Howard, had not been on the top floor more than four minutes when the smoke and heat became too great for them to continue their labours, and they made for the windows to endeavour to get some air. Prior to this they had heard no explosion, nor had they noticed any fumes other than the ordinary smell of wood burning. The smoke suddenly came towards them in a roll, and by the feel of it they could tell it was both fire and smoke

The fire seemed suddenly to rush upon them from the centre of the building, and they first of all sought to descend by the staircase; but the rush of smoke and flame rendered this impossible. Jacobs was with him all the time, and, seeing that he was very much exhausted by the smoke, the witness partly led and partly dragged him to the window for fresh air. In order to escape they first tried to force the window-bars out with their hands, and then with their feet, but they were too strong. He then broke the glass with his helmet and made another attempt to get the bars out, and finally somehow got outside and hung on to the sill, but did not know whether Jacobs assisted him.

"They had their axes with them, but did not use them, as they thought they were too small to be of any use. Jacobs got his out, but he did not know whether he used it. He could not say why Jacobs could not also have got out. The aperture was probably not large enough, or he was too far gone. He remembered being on the sill and that someone got hold of him, and that somehow his feet touched the ladder. In reply to Mr. Wallace, *he said he now knew that if they had used their axes they could have broken down the framework of the window*, but he had had no previous experience of breaking down cast-iron window-bars."



VIEW LOOKING NORTH—Two Upper Floors. Ruins of Burroughs, Wellcome & Co.'s Wandsworth Laboratories. *(From Photograph by W. Ingle, Pimlico.)*

This ordinary light cast-iron factory window-sash was easily broken by Francis with a fire-axe precisely like those carried by Jacobs and Ashby, and their failure to use their axes was undoubtedly due to their being overcome by smoke. These window sashes have been wrongly described as huge wrought-iron bars.

It took about thirty minutes for the fire to reach from the drying-room to the corner where Jacobs lost his life, a distance of about 90 feet, with only one stream of water to check its progress; this proves that the fire did not spread with excessive rapidity. The distance to the ground from the sill of the window at the head of the stairs where Ashby escaped is 27 feet 9 inches, and not 70 feet, as has been wrongly stated. The rapidity with which our employés left the building is, as expressed by the Government Inspector, the best evidence as to the provision of proper exits. Our instructions were that safety of life was to be the first consideration in case of fire. All our employés got out in two minutes, except several men who remained and bravely rushed to the seat of the fire and threw hand grenades until forced out of the building by heat and smoke.

The Ruins.

As shown by the accompanying illustrations, the fire did its work unsparingly, leaving nothing but havoc and ruin. Our elaborate and costly machinery, chemical and pharmaceutical apparatus, of steel, copper, and iron, were wrecked, fused, twisted, and tangled in unrecognisable heaps, partly buried in the *débris* of broken tiles, ash, and cinder, while the more perishable glass of chemical apparatus and various coloured bottles had lent itself in its melted state to eccentric decorative effects. The wedgwood and porcelain ware had crumbled into tiny fragments, and the remnants of the beams with other woodwork were but shafts and masses of lustrous charcoal.

As is so often the case, the fire-fiend played quaint pranks; some almost indestructible things were completely demolished, while the firm's formula-book was found in the midst of cinders with but the covers and outer edges charred—the contents quite intact. Many of the beautifully graven white metal boxes, with silk labels, which we use for putting up tabloids, were fused together into great blocks, while some of the fragile little crystal glass flacons used as containers for saccharin tabloids passed through the fire without injury.

The direct loss of property is nearly covered by insurance, but our indirect loss by complete interruption of our manufacturing department is very great. However, we feel our misfortune as nothing in the face of the sad fate of one, and the severe injury of another, brave fireman. This feature of the fire has been most painful to us, and we have not failed to provide for those who were dependent upon the deceased fireman. The great public recognition of the heroic conduct of Jacobs, as shown at the public funeral, and the regret at his untimely death manifested throughout the country, has been extremely gratifying to us. We need hardly say that it would not have been our wish that any man should endanger his life to save our property. As to the cause of the fire we are entirely ignorant, the most searching investigations have utterly failed to elicit any conclusive evidence, and in the absence of evidence we do not feel justified in placing blame upon any one.

As to the various theories advanced, we have pinned ourselves to none, but are inclined to place great weight upon the views expressed by the two distinguished experts—Mr. C. Napier Hake, F.C.I., and Mr. John Moss, F.C.I., F.C.S. —whom we requested to make independent inquiries and experiments. The results are shown in their reports published herewith.

It will be observed that both these gentlemen describe our precautions against fire as being exceptional and unusually stringent in works of this kind.

The theory of ignition by focussing of the sun's rays was first advanced by Mr. Roger W. Walker, the chemical expert and barrister who appeared for us at the inquiry. He found all the conditions favourable to this theory and the other experts adopted this theory as the most probable.

The perfection of our products depends in a great measure upon scrupulous cleanliness in every step of our processes of manufacture, and not only were the floors of the tabloid and drying-rooms frequently scrubbed and daily swept, but the walls, ceilings, shelves, and every article in the rooms thoroughly dusted—this to prevent contamination of one drug with another or the smudging of the snowy-white tabloids with fugitive specks of dust—for the most minute particles make themselves apparent.

These measures prevented the accumulation of dust of any nature, and were in themselves important safeguards against the presence of ignitable dusts.

Last winter we had a slight touch of fire, but it was quickly put out with a bucket of water. Our investigation at that time convinced us that it was caused by a match, and not by chemicals, as has been erroneously stated. It was in consequence of this fire that we instituted such rigorous rules respecting the use of matches.

Chlorate of potash and sugar make about the most ignitable chlorate mixture. This combination, in the form of chlorate of potash lozenges, has been manufactured and sold by chemists and confectioners for many years, without, so far as we can learn, a single case of fire arising from them. In our processes we do not in any case combine sugar with chlorate.

The detonation of chlorate combined with sugar or other organic matter is invariably attended with a sharp report, which could be heard at a considerable distance. No such report was heard by any of the employés, though several were within a few yards of the drying room when the fire broke out.

It should be noted that there was no sugar in the drying-room except a very small quantity mixed with citric acid and bicarbonate of soda, and this was on a tray in a compartment quite by itself.

Our Chlorate of Potash Tabloids contain nothing but the drug pure and simple, without any admixture whatever, and, in the combinations with borax, the borax acts as a deterrent.

Mr. Hake's Report.

C. Napier Hake, F.I.C., of Great Smith Street, Westminster, who was called in by the firm as an expert, then put in a report as to the probable cause of the fire. He said he had given exclusive attention to explosives for years as chief assistant in Dr. Dupré's laboratory, and for the last six years as consulting chemist and explosives expert. He had carefully read and considered the transcript of the shorthand notes of the evidence and the letters which had been put in. He had received tabloids from the firm on October 8, and had made various experiments with chlorate mixtures, which he reported on as follows:—

Experiments with voice tabloids.—Six tabloids heated separately over a Bunsen flame on a platinum lid. Tabloids melted and decomposed; in no single instance was there any tendency to inflammation or explosion. Tabloids placed on platinum lid and brought into direct contact with flame melted without inflammation. Several tabloids were ground up into a very fine powder and dried in a water-bath at a temperature of 200° F. A portion spread on a wooden floor and struck a sharp glancing blow with a wooden mallet decrepitated slightly on two occasions. No spark or flame was observed. A portion spread on a wooden floor and struck under the same conditions with a mallet made of untanned hide. Same results as last experiment. A portion spread on floor and struck with the heel and sole of boot. No decrepitation caused, although this experiment was repeated several times.

The above experiments were repeated under conditions of temperature similar to those of the drying-room, where the fire is supposed to have originated. A piece of floor-boarding was kept at a temperature of over 100° F. for about thirty minutes. The mallets and the dry powdered tabloids were kept at the same temperature for the same length of time. Under these conditions it was observed that the powder decrepitated somewhat more easily, that is to say, the decrepitations were more frequent than when striking the powder under ordinary conditions of temperature. In no case, however, was a spark or flame produced. Striking the powder with the heel and sole of the boot (which had not been previously warmed) produced no effect whatever.

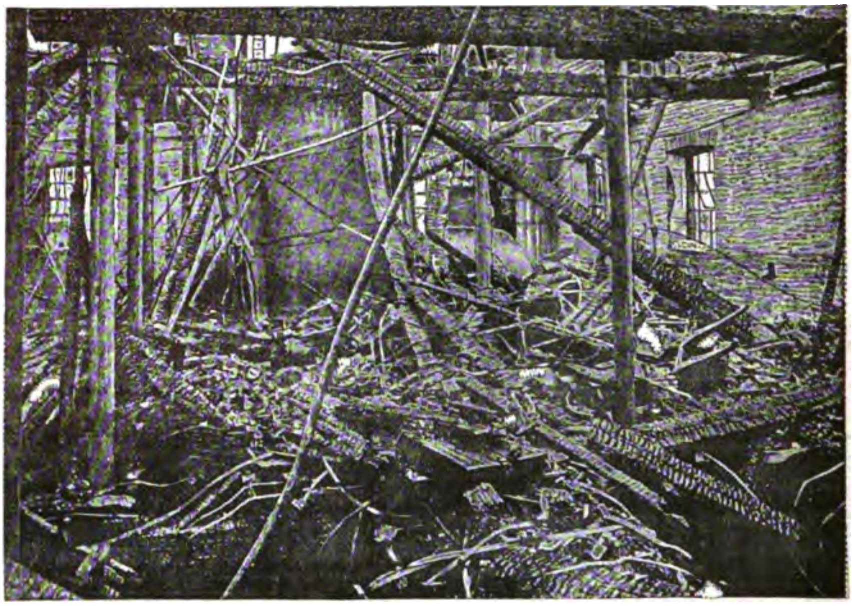
Some of the dry powdered tabloids were filled in the crevices of the wooden floor in the laboratory, the space so filled being about 6 inches in length. A wax match was stuck in the same crevice, with the head resting on the powder. On drawing the sole of the boot across the head of the match it ignited, and the fire spread rapidly along the crevice containing the powder. This experiment was repeated four times with the same result.

Some dry powdered tabloids placed between two sheets

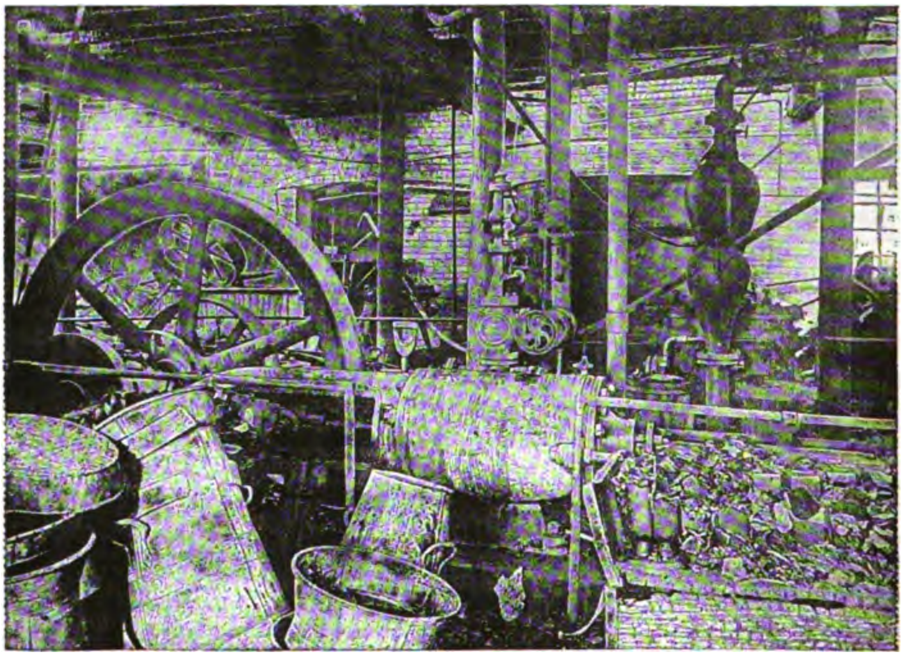
SOUTH END, GROUND FLOOR. Ruins of Burroughs, Wellcome & Co.'s Wandsworth Laboratories.
(*From Photograph by W. Ingle Pimlico.*)

of paper. The corner of the paper was set fire to, and as soon as the flame came in contact with the powder combustion increased rapidly, and the paper was consumed.

These experiments were repeated with mixtures of dry powdered tabloids and dry floor dust. The proportions taken were—firstly, 90 parts tabloid powder to 10 parts dust, and second, 80 parts tabloid powder to 20 parts dust. Except that the dust had a somewhat deterrent effect on the inflammation, the results were similar to those recorded above.



VIEW LOOKING SOUTH—Two Upper Floors. Ruins of Burroughs, Wellcome & Co.'s Wandsworth Laboratories. (*From Photograph by W. Ingle, Pimlico.*)

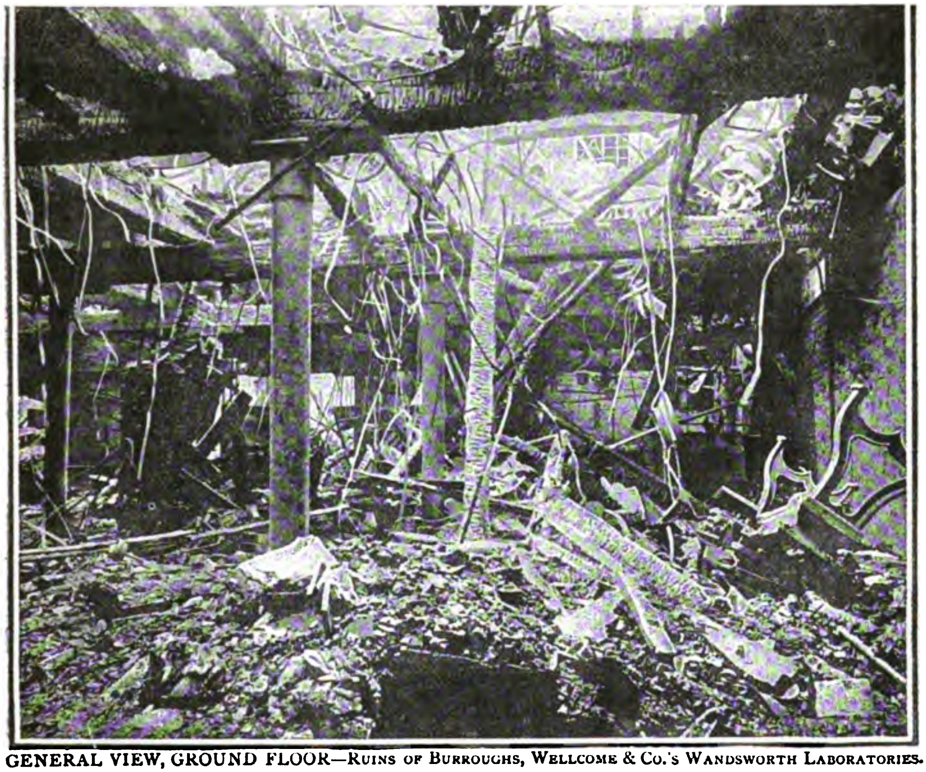


ENGINE ROOM.—Ruins of Burroughs, Wellcome & Co.'s Wandsworth Laboratories. (*From Photograph by W. Ingle, Pimlico.*

Lastly, experiments were made with mixtures of chlorate of potassium and sugar, the object being to see which proportion of these ingredients was most favourable in order to produce a detonating mixture which would be accompanied by sparks or flame when struck with a mallet. It was found that a mixture of 90 per cent. chlorate and 10 per cent. sugar in a dry and finely powdered condition, when spread on a wooden floor and struck with a leather mallet, detonated with a copious production of sparks. A mixture of 80 per cent. chlorate and 20 per cent. sugar under similar conditions and treated similarly resulted in loud detonation accompanied by flame.

Mr. Hake added: In consideration of the above experiments, which were carefully carried out and several times repeated, *I am of opinion that the tabloids, as manufactured by you, are non-explosive and non-inflammable.* That, although one cannot say it is impossible, yet, in my opinion, it is highly improbable that the fire was due to friction exerted directly on tabloid powder, either contained in the crevices of the floor mixed with dust or lying on the floor, but that it might have been caused through the medium of a match. On the other hand, it is difficult to conceive how the ignition of a quantity of powder sufficient to cause such a sudden conflagration could occur without the attention of the person who caused it being attracted by it. One would expect a fairly loud detonation from the explosion of a match; a hissing noise always accompanies the ignition of a mixture of chlorate and any combustible matter; and a small quantity of powder, if ignited by a match, would burn very violently for a short time only—possibly sufficiently long to ignite the woodwork, but then combustion would proceed comparatively slowly. Considering that the lowest drying tray was about 18 inches above the floor, it appears improbable that the fire should have communicated from the floor to the tray during the short time which elapsed between the exit of Copeland from the drying-room and his return, when he observed the whole place in flames. Of course, if paper were lying on the floor in a favourable position the flame might have communicated with a tray in a comparatively short space of time, but, as far as I can see, there is no evidence to show that this was the case.

As regards the suggestion that the fire was caused by the concentration of the sun's rays on the paper covering the tabloid powder on the trays, it appears to me that the conditions were *not unfavourable* to this theory. It is well known that fires have not unfrequently originated from such a cause, and the facts that the day on which the fire occurred was a very warm one, that bottles of thick glass were standing on the window sill, and that the panes of glass in the window were thick and uneven, would all point to a possible explanation in this direction. I understand from Mr. Wellcome that the paper used for covering the tabloid powder while drying on the frames was used over and over again for the same purpose. Under these circumstances the paper would, no doubt, absorb moisture from the wet powder, and would in time become more or less saturated with chlorate of potassium in a very finely divided state. The results of continued exposure of such saturated paper to heat would be to render it more sensitive to an increased elevation of the temperature than paper not so treated.



GENERAL VIEW, GROUND FLOOR—Ruins of Burroughs, Wellcome & Co.'s Wandsworth Laboratories.
(*From Photograph by W. Ingle, Pimlico.*)

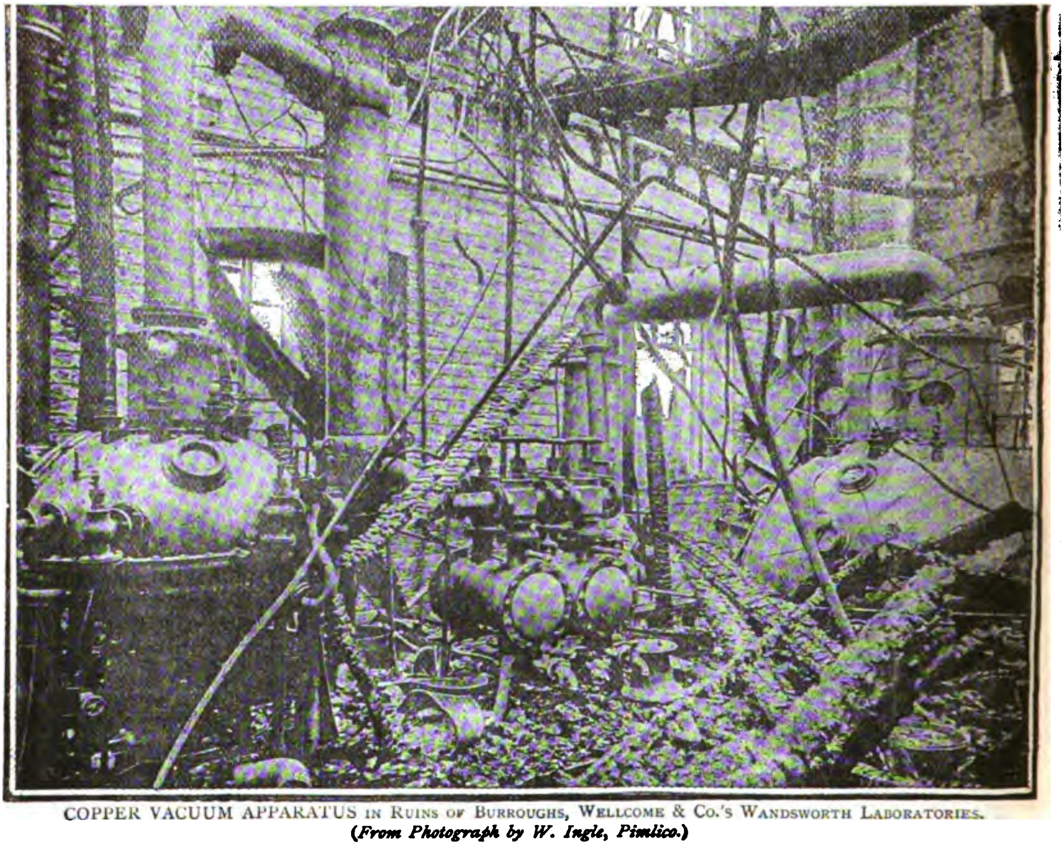
If the fire originated in the paper covering the chlorate, the suddenness of the outbreak and the rapidity with which it spread would be conceivable.

Your instructions addressed to Dr. Smith which relate to precautions against fire, show, in my opinion, that you adopted measures which are quite unusual in factories of a similar nature.

Mr. Hake was examined at great length in reference to this report, and it was brought out in his evidence that wood-work saturated with chlorate of potash had been set fire to by focussing of sun's rays through rough heavy window glass in one of the great chlorate works in England.

Mr. Moss's Report.

A report was next put in by Mr. John Moss, F.I.C., F.C.S., manufacturing chemist, and formerly Demonstrator of Practical Chemistry to the Pharmaceutical Society of Great Britain, who has had experience in the manufacture of chlorate of potash and is familiar with its characteristics.



Copper Vacuum Apparatus in Ruins of Burroughs, Wellcome & Co.'s Wandsworth Laboratories.

(From Photograph by W. Ingle, Pimlico.)

To test the probability of the suggestion that the fire might have been caused by ignition of dust by Copeland's boots, Mr. Moss had prepared a mixture of chlorate of potash and sugar, which was more sensitive than any of the mixtures in the drying-room where the fire originated. He also procured a piece of timber which had for many years formed part of the floor of a drying-room. He strewed some of the mixture on this timber and endeavoured to ignite it or draw a spark therefrom by striking and rubbing with the heel of Copeland's boots, but entirely failed. He also failed with chlorate of potash when mixed with dust obtained from the floor of a drug warehouse and carefully dried. He repeated the experiment with chlorate of potash alone, with "voice tabloids" reduced to powder and with potash and borax "tabloids" reduced to powder. He failed in each case.

A spark from a match-head was easy to obtain, but it was improbable that such a spark could start under a boot and set fire to a substance raised some twelve to twenty inches above it on a rack. He had succeeded in detonating chlorate of potash and sugar, and, less easily, powdered voice "tabloids," by spreading the powder on a stone or board and striking smartly in a slanting direction with a piece of dry hard wood. He also succeeded, but with much greater difficulty, with chlorate of potash and dust. *In every instance the effect was confined to the particle struck, and did not spread to the particles in contact with it.*

With regard to the suggestion referring the origin of the fire to solar heat, it was a matter of common knowledge that paper and wood can be ignited by intense sunlight, produced by bringing the sun's rays to a focus by means of a lens such as a burning-glass, a double convex eyeglass, or by a lenticular body such as a bottle or carboy, or a corresponding inequality in the glass of a window. Platinum and quartz had been melted by the sun's rays in the focus of a plano-convex lens, and Buffon, the celebrated French naturalist, succeeded in setting fire to timber at a distance of 80 to 90 yards by concentrating the sun's rays upon it.

Mr. Moss added, "It has been stated in evidence that the day of the fire was exceedingly hot, and also that the chlorate of potash and the 'voice' powder lay in the track of the sun's rays. Both these substances will cause ignition when in contact with organic matter such as paper at a temperature below the igniting point of paper alone, and it is not unreasonable to suppose that the paper covering one of them or on which it lay became ignited by the focussing of the sun's rays by ripples in the ancient glass which was in the windows. The fact is certainly possible, and to my mind, taking all the circumstances into consideration, is even highly probable.

"I have had experience of several drying rooms, especially in the manufactories of wholesale druggists, and from the description given to me by Mr. Wellcome of the one in which the fire originated, as well as from the plans which I have seen, I am of opinion that it was well arranged in the usual manner.

"I have read the letter of instructions sent to Dr. Smith by Mr. Wellcome, and am of opinion that the precautionary measures therein ordered relative to the use of matches, and the provision that all whose duty takes them to the drying-room shall wear list or rubber-soled shoes, are unusually stringent."

This ends, we hope, the chapter of misfortune. We look forward to brighter things, which will cause us soon to forget this sad disaster.

Very respectfully,

Burroughs, Wellcome & Co.

Snow Hill Buildings, London, E.C.

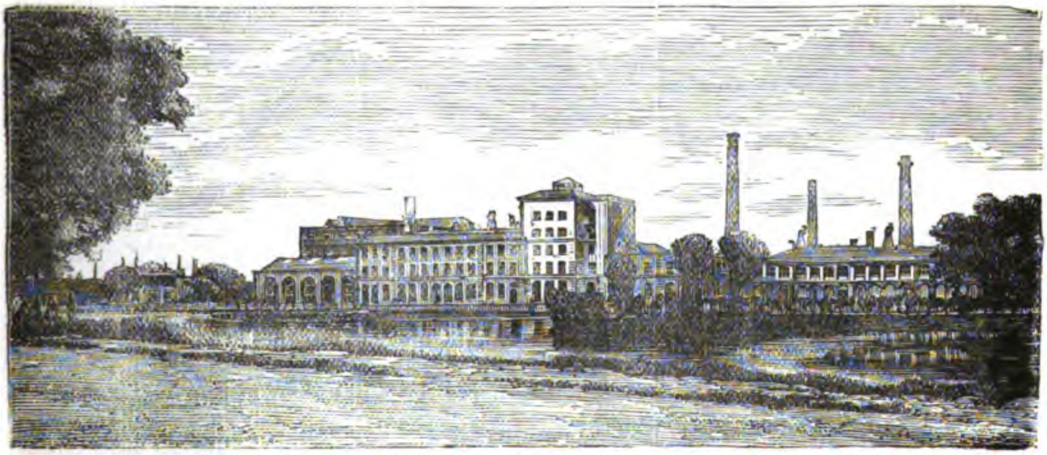
Triumphs of Pharmacy.

LONDON. SATURDAY, NOV. 9TH. 1889.

Improvement and Progress.

We have fought many battles for Progressive Pharmacy, and now we have had to fight a fierce battle against fire. In the battles of pharmacy, victory has been ours at every step, but in this battle of fire we frankly own we have been severely (not fatally) worsted; time will tell how we stand this crucial test.

We deeply appreciate the many cordial expressions of sympathy and encouragement received from friends and strangers in all parts of the world. We thank those who have been good to us in the past, and have applauded our efforts to advance pharmacy, and we feel truly grateful to all who have been kind and indulgent about the execution of their orders during this fiery ordeal, when it has been necessary for us to send ounces instead of pounds and dozens instead of grosses, that all might have a share of the limited quantities of the stock we held.



Burroughs, Wellcome & Co.'s Snow Hill Laboratories, Dartford, Kent.

Those parasites who show more enterprise in mischievous than in good deeds, and who have endeavoured to make the most of our misfortune by sending out their vile imitations as substitutes for our articles, we leave to the misery of their own troubled dreams and to the contempt of all honourable men. It is a satisfaction to learn that such substitution has been severely resented in many instances, and that the contrast between such abortive products and our own perfected goods has been so apparent as to enhance the already high estimation of our manufactures. With zeal, energy, and enterprise we hope soon to make good our losses and rise above this disaster, advancing with even more rapid strides than in the past.

Perfection shall be our aim in all our products. Nothing "is good enough" that can be improved.

Though our machinery and apparatus were destroyed, we were fortunate in having nearly completed the buildings for our new Snow Hill Laboratories at Dartford, Kent.

Under the pressure of the great and sudden emergency we speedily equipped these new laboratories, and are now occupying them, and will soon be once again in full working order.

When the main structure for our new works was completed, but before fitting the interior, we had a formal opening of the building, which was attended by many prominent professional and business men.

On that occasion, speaking in response to wishes of prosperity to the firm, proposed by the Vicar of Dartford, Mr. Burroughs said:—

All he could say was that they had tried to conduct their business on such a basis as would please their customers, and on such a basis as would satisfy the medical profession that they were endeavouring to supply a good article at a fair price. They felt well repaid for all their trouble in the expressions of opinion they had heard that evening, and especially from Dr. Clarke. Their business was conducted on correct principles, and the reason why they desire to share part of their profits with their employés was because they deserved it. They had been faithful and attentive, preventing waste and endeavouring to utilise everything to the best possible advantage. Such employés deserved to have a share in the profits. They would be very glad to extend this system for mutual benefit, and also the eight, hours system. They believed that human beings were not intended to work all the time God gave them, and they also believed that the earth was intended to be a foretaste of Heaven therefore those who worked had a right to rest and enjoyment.

Mr. Wellcome said:—

In respect to their business, which had been so flatteringly referred to by the various speakers that day, what had been said was very deeply appreciated by both members of the firm. Many had expressed the opinion before this that their firm had grown up like a mushroom, and could not be substantial, growing so rapidly; but the expressions uttered to-day partly corrected this, and the fullest evidence had been given to the world of the stability of their business. Theirs was not a mushroom growth, but, though rapidly progressive, it was the result of untiring toil and thought, and every detail in the improvement of chemical products had been carefully studied. They had made it a point never to issue to the world experiments, but their articles were studied and tested thoroughly before being issued, and little things which many thought grew like the beautiful flowers had cost them months of study and toil in preparation. He told them this to show that the firm took a deep interest in their business, and that its prosperity was due to something more than superficial advertising and printer's ink, which many thought the sole element in making a business, although it was true they had not neglected printer's ink. Application, toil, and thought were necessary to the institution of any business, but it was only few amongst many that ever succeeded; and the launching of a business was like the launching of a great ship—one never knew whether there would be success or failure until it had braved the stormy billows, and it was holding the helm through such days that tried men's souls. He ventured to say that no business had been established in London with more trials or obstacles, but these they had met in a quiet, sturdy manner, and the firm were proud of their success. A success it was, and a substantial success, and he thought they might congratulate themselves, and take as sincere the kind and hearty expressions of the several speakers. They were beginning a new era in the occupation of these works; with these increased facilities he hoped for even greater success. He would tell them one of the main secrets of their success—they had put their hearts, souls, and whole affection into this business, and co-operated with their employés, and had won sympathy from them in every step by showing sympathy, and in this way had mutually reaped benefit. The relationship between the employés and firm had been so cordial that they rarely knew of such a thing as an employé asking for an increase of pay. That was one of the strongest evidences of satisfaction. The employés were always paid liberally, and always stood by the firm. As the firm prospered, they were united in the fullest desire to share their prosperity with their employés, and the result of this sympathy was that they were as members of a family, and the employés felt that they were one with them, and not only gave mechanical work, but also intelligent thought. If employés are treated simply as machines mechanical work only can be drawn from them. As to the manner of participating in the firm's success, he was in sympathy with any reasonable plan, either higher payment or sharing of profits. He would now request the Chairman to ask the firm's general manager to speak for the employés that day—not to flatter the firm, but to give an expression of the real sympathy and feeling felt by the employés towards the members of the firm and the business.

Mr. Sudlow, the firm's general manager, said:—

He was not only glad to occupy his present position, but was very proud to be an employé of the firm. After all they had heard, they would say that he was quite right, and was working for the right firm. He heartily agreed with all that had been said as to the very cordial feeling existing between employer and employed in that house. He had had previous experience of business life, but had never known principals take such a warm interest in the welfare of their employés as Messrs. Burroughs, Wellcome and Co. He had only one regret, after the hearty manner in which the firm had been welcomed here today by the speakers of Dartford, and by the company as inhabitants of the town, which was that he did not belong to the staff working in Dartford, but would have to return to the Snow Hill Buildings, in London. He only wished he could take all their pleasant faces back with him. They had heard the vicar of the town say that he was obliged to leave before he could ask the meeting to give three cheers for the firm; he, as one of the employés, would ask that great meeting for leave to lead cheers for the future success of the firm.

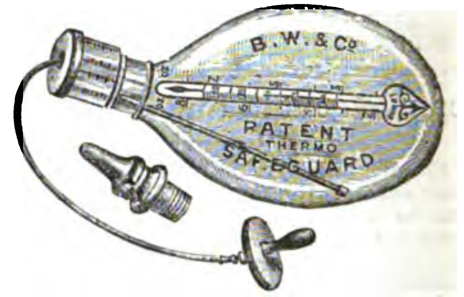
This new beehive of Pharmacy we intend to make the most complete manufacturing laboratory in Europe. We are sparing neither care nor expense in fitting it with the latest known improvements in machinery and apparatus, and in the development of entirely new and unique patterns suited to our requirements.

We shall ever labour to Improve and Advance—*Improve and Advance*—and with the faithful and devoted assistance of our employés, and the co-operation of all interested in the progress of pharmacy and medicine, we hope to make the coming year an abundantly fruitful one in benefits to the world and to our firm.

NOVELTIES AND IMPROVEMENTS.

The Thermo-Safeguard Feeding Bottle (B. W. & Co).—As a Practical and Scientific Invention for protecting the lives of infants, nothing, except Fairchild's discovery of the pure Zymine Peptonising agents, has of late years approached in importance the Thermo-Safeguard Feeding Bottle.

One of the greatest dangers in the artificial feeding of young infants has been the irregularity and uncertainty of temperature. By the most intelligent nurses the temperature could only be determined approximately, while, in most cases, the life of the child has been endangered by allowing stupid and ignorant servants to guess the temperature, and only too fatal have been the results. Artificial feeding of young infants is, under the most favourable circumstances, attended with considerable risk, but when the laws of nature are defied, then the risk becomes one of great hazard.



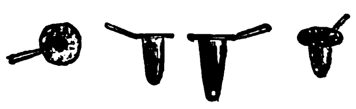
The temperature should be carefully regulated to correspond with the normal temperature of the mother's milk as it flows from the breast. The delicate organs of a young infant can no more stand the shocks of temperature possible to an adult than it can lift the load of an ox.

The Thermo-Safeguard Feeding Bottle has a thermometer imbedded in the glass in such a manner as to correctly and distinctly indicate the temperature of the contents.

This invention has been received with the highest favour by the leading minds in the medical profession, and although but quite recently perfected has proved a great success. It has a special adaptability in the proces of peptonising milk with the Zymine Peptonising Powders (Fairchild). That they may come within the reach of all we have fixed the prices at about the same as those charged for ordinary feeding bottles, viz., retailing at 1/-, 1/6, and 2/6.

Vaporoles.—These consist of beautiful little silken sacs enclosing very friable glass capsules, which contain the various well-known medicaments used for inhalation, and introduced into the Throat Hospital Pharmacopœia by Sir Morell Mackenzie. The glass capsule is surrounded with absorbent cotton, and when crushed may be dropped into a steam inhaler, the water bottle of the Vereker Chloride of Ammonium Inhaler, or inhaled dry by holding in the palm of the hand or in a handkerchief, according to the accompanying directions. Some vaporoles are specially suited for fumigating purposes.

Artificial Antiseptic Ear Drum.—One of the most important inventions of the year in the way of medical appliances is the Artificial Antiseptic Ear Drum designed by Dr. Ward Cousins, and made the subject of a paper read by this gentleman at the Leeds meeting of the British Medical Association.



These drums consist of delicate little Welsh-hat shaped antiseptic fibrous skeleton drums of a texture sufficiently close to act as substitute for the natural drum in cases of perforation, or to protect the natural membrane when in a sensitive or inflamed condition. Antiseptically they are of great service in conditions of the middle ear attended with suppuration.

In cases of deafness through perforation they come as a special boon. An important feature is the ease with which these drums may be inserted and removed. The artificial ear drum is entirely the conception of Dr. Ward Cousins, from whom we acquired all rights. But to enable us to produce them at a reasonable price we have devised an automatic machine which turns them out with great rapidity and at a very nominal cost. Three dozen drums are put up in neat paper boxes to retail at 1/ per box.

THE SO-CALLED MUSSÆNDA COFFEE OF RÉUNION.*

[*Communication from the Research Laboratory of the Pharmaceutical Society.*]

BY PROFESSOR W. R. DUNSTAN.

A short time ago, Mr. Thiselton Dyer, the Director of Kew Gardens, suggested to me the desirability of making a chemical examination of a supposed substitute for coffee, concerning which a good deal has of late been heard in France. It has been stated, on the authority of M. Lapeyrère, a pharmacist residing in the island of Réunion, that the seeds of a plant abundant in the island, which he calls *Mussænda borbonica*, known to the natives as "wild orange," closely resemble coffee berries, not only in appearance, but also in their chemical constituents, so that they may be regarded as a formidable rival to coffee. This announcement appears to have caused some scare in the coffee trade, and it is said that many inquiries for the seeds have been made. M. Lapeyrère's paper on the subject is printed in the *Bulletin Bimensuel de la Société Nationale d'Acclimatation de France* for 1888, pp. 285-300. It contains an account of the botanical characters of the plant, which are stated to differ from those of the known representatives of *Mussænda*, and the plant is therefore adjudged by M. Lapeyrère to be a new species. The results of a chemical analysis of the unroasted seeds are recorded, from which it appears that they contain from 0·3 to 0·5 per cent. of caffeine.

An examination of the seeds at Kew revealed the fact that the plant in question is really a member of the natural order *Loganiaceæ*, named *Gærtnera vaginata*, and not a new species of *Mussænda*, which belongs to the *Rubiaceæ*. In a despatch to the Foreign Office, Mr. St. John, the British Consul in Réunion, corrects some misstatements regarding the plant which have been made in connection with its proposed employment as a substitute for coffee. Mr. St. John points out that the shrub is not plentiful in the island, that it yields fewer berries than the coffee shrub, the fruit growing only at the end of the branches. He further asserts that the *Gærtnera* seeds are less fragrant than coffee, and would probably be more expensive.

These facts do not, however, affect the interest and importance attaching to the discovery of a new source of caffeine, and a possible substitute for coffee. M. Lapeyrère's statement that the seeds contain caffeine is not so remarkable when made in reference to a plant belonging to the natural order *Rubiaceæ*. In view, however, of the fact brought to light at Kew that the plant belongs to an entirely different natural order, *Loganiaceæ*, the statement becomes not only remarkable but improbable. A special search was therefore made, not only for caffeine but also for theobromine and other compounds belonging to the same family. In the first instance 150 grains of the very hard seeds were powdered, mixed with half their weight of magnesia, and made into a paste with water. This paste was dried and reduced to powder. Having been packed in a continuous extraction apparatus the powder, which would now contain caffeine in the free state, was successively exhausted with boiling chloroform, boiling alcohol, and finally with boiling water. The residues left by the evaporation of these solvents were examined for caffeine. The residue left by the evaporation of the chloroform, consisting largely of fat and resin, was extracted with dilute hydrochloric acid, and the acid liquid was tested with a solution of iodine and with Mayer's solution, in both cases with a negative result. Another part of the same liquid was oxidized with nitric acid, and the residue mixed first with a little ammonia and then with potash, but neither a red nor a violet coloration was observed, so that caffeine and theobromine were certainly absent. The alcoholic and aqueous residues were similarly dealt with, but here, again, no trace of caffeine or of any similar substance could be detected. Since a plant belonging to the *Loganiaceæ* might be expected to contain strychnine or brucine, each residue was tested for these alkaloids, but neither was found. In fact, at no stage of the inquiry was there found any evidence of the existence of an alkaloid in these seeds, unless, indeed, there is included the doubtful indications, afforded by the alcoholic residue, of the presence of choline or of a substance resembling it. The seeds contain, besides much proteid and a small quantity of sugar, a fat which seems to be similar in some respects to the fat contained in *Strychnos Nux-vomica*, but owing to our supply of the *Gærtnera* seeds having failed, it could not be examined minutely. It may be remarked, in conclusion, that the seeds bear only a slight superficial resemblance to coffee berries. They are flatter and are further distinguished by carrying on both surfaces a series of deeply marked radiating lines.

It had been intended to publish the facts in reference to the botanical nature of "*Mussænda* coffee," in the first instance in the November number of the *Bulletin* of information which is issued by the Kew Department. The notice was, however, crowded out of this publication at the last moment, and under these circumstances Mr. Thiselton Dyer generously placed at my disposal, for the purpose of this communication, the information which will now subsequently appear in the December number of the Kew *Bulletin*.

[*The discussion on this paper is printed on p.* 389.]

STERCULIA GUM: ITS SIMILARITIES AND DISSIMILARITIES TO TRAGACANTH.*

OCCURRENCE OF PARARABIN IN STERCULIA GUMS.

BY J. H. MAIDEN, F.L.S., F.C.S.,

Curator of the Technological Museum, Sydney.

The existence of a gum on species of *Sterculia* has long been known. It has been recorded from India, Africa and Australia, but, with the exception of Flückiger's research in regard to an African species, and some general experiments with the India *S. urens*, nothing appears to be known in regard to them. The object of the present paper is to record some experiments and observations on the gums of Australian and also of an Indian species, in the course of which the author has discovered that they are composed essentially of *pararabin*, and also to show the incorrectness of the idea that they are similar to tragacanth, except in some superficial characteristics.

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* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, November 13.

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The author cannot at present see any commercial future before gum of the Australian species; the same conclusion has long since been arrived at in regard to those produced by India ones; in regard to an African species we have the experiments of Flückiger (*infra*).

INDIAN.

(Thirty-one species are described in the 'Flora of British India.')

Many Indian species yield gums, but that of *S. urens*, Roxb., is best known. It is obtained from cracks and incisions in the bark, and is mixed with that of *S. villosa*, and *Cochlospermum*, and sold under the name of "kalila" or "katira" (Brandis). It is used in India for making sweetmeats (*Cat. Kew Museums*). It exudes spontaneously during the hot season, and occurs in large, light-brown, transparent tough masses. Immersed in water these swell like a jelly, and do not dissolve but by protracted boiling. The solution is not adhesive, and is destitute of the thickness of solutions of ordinary gum. The uses of the gum are very limited; the want of adhesiveness renders it unsuitable for the arts, while its difficult solubility renders it inferior to most other gums for medicinal purposes (O'Shaughnessy, 'Dispens.'). From time to time samples have been sent to Europe for valuation, but hitherto no use has been found for it, and consequently it has no appreciable value in the markets. The only purpose for which it has hitherto been considered available is as an adulterant of tragacanth, but hardly as a substitute. Some samples either of this, or a very similar gum, have appeared in the London and Liverpool markets, and sold at a low price as false tragacanth and hog gum (Cooke, 'Gums and Resins of India,' where further particulars are given). Dr. Dymock (*Pharm. Journ.*, [3], viii., 161) says, "Placed in water it forms a firm, colourless, tasteless jelly, but on the addition of a large quantity [not unless heated, J. H. M.] it dissolves; the solution is precipitated by acetate of lead. It is used as a substitute for tragacanth, and is issued from the Government stores." It would be interesting to know to what use the gum is put after issue, but the same author's 'Materia Medica of Western India' throws no light on the subject.

Following are two extracts from a 'Descriptive Catalogue of the Gums and Resins in the Technological Museum,' which is nearly ready for the press.

Cochlospermum Gossypium, D. C. Kuteera or False Tragacanth. *Sample I.*—Received from Kew. A translucent, horny-looking, shrivelled gum, in irregular pieces as large as walnuts. It is of a dull dirty whitish, yellowish or brownish colour, and attached to it are fragments of bark, some of it lace-bark (? sterculiaceous). To say that it is tragacanthoid describes its lustre. It is without taste. It might be used (if that *be* a use) as an adulterant, but not as a substitute for low-grade tragacanth, for it has not the adhesiveness of the latter gum. Mr. Baden-Powell (quoted by Cooke) states that it is used in shoe-making in India. If it has any adhesiveness at all in India, it would be worth while to inquire whether it is employed as a substitute for tragacanth in cementing the "wrappers" of Indian cigars. Waring ('Pharm of India') speaks of it as an article of very minor importance. From India (N. W. P). *Sample II.*—A beautiful selected translucent sample, resembling chalcedony. On tasting it, it was found to be quite acid, and on smelling, the bottle was found to be strongly charged with acetic acid.* As far as the samples in the Museum go, it appears to hold good that the paler the specimen, the more acidulous it is. From Calcutta. *S. urens*, Roxb.—Received from the Government of India. I cannot at present detect any difference in appearance between this gum and that of *Cochlospermum gossypium*. I have even transposed the labels, and then have failed to separate the gums, except by guess-work. Some of the pieces taste slightly sour, as mentioned under cochlospermum. Digested in water it swells up and dissolves but slightly. It appears, however, to make a bulkier jelly than cochlospermum, but this difference may be only apparent, owing to the specimens not having been judiciously chosen. Guibourt discusses the subject (Cooke, 'Gums and Resins of India,' p. 30; *Pharm. Journ.*, xv., 58), and arrives at the conclusion that the two trees produce identical gums. Its chemical deportment is the same as that of *S. rupestris*, and the experiments related under the head of that gum (as also the description of its behaviour in water) apply here exactly.

Dr. Thomson says the gum of *S. urens* has been used by calico-printers (*sic*), and in his 'System of Chemistry,' makes this particular gum a sub-division of the gums, as precipitable by a solution of silica (Gmelin).

There can be little doubt but that the following gum is attributable to *S. urens*, and the excerpt is interesting as giving a further description, and as placing the objections to its use in another form. The gum had been purchased by a calico-printer in ignorance. "It was in large brown-coloured and wrinkled translucent pieces, having a certain degree of softness; so that they could not be pounded in a mortar. When put into water they did not dissolve, but gradually imbibed the water and swelled out into a jelly, so nearly colourless that its presence at the bottom of the vessel containing water was not perceptible till the water was agitated by moving the vessel. When boiled for some hours with water this jelly completely dissolved. But the water was not mucilaginous, like a solution of gum-arabic, nor had it the least adhesive property. . . Thus this substance, though resembling gum in its appearance, possessed none of the properties of that substance, and could not be employed to thicken acids or colours intended to be printed on cloth. . . There is reason to suspect that it came from India" (Thomson, 'Chemistry of Organic Bodies, Vegetables,' p. 676).

Following are the other oriental species yielding gum, as far as known to the author:—

S. campanulata, Wall. "Exudes a gum resembling tragacanth" (Kurz).

S. ornata, Wall. "Exudes gum" (Kurz).

S. fœtida, Linn. "Exudes gum resembling tragacanth" (Kurz).

S. villosa, Roxb. "Gives a white pellucid gum which exudes copiously from cuts in the bark (Gamble, Brandis). This gum bears the same local name as the produce of *S. urens*.

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* This was long since pointed out by Guibourt ('Hist. des Drogues;' *Pharm. Journ.*, xv., 58).

S. ramosa and *S. piperifolia*, from Pegu, are said by Balfour ('Cyc. of India') to yield gum, but I cannot at present trace these names. It may be that they are synonyms.

AFRICAN.

(Seven species are described in the 'Flora of Tropical Africa.')

S. Barteri, Mast. (*op. cit.*, 219), is reported to have "resinous" bark, but this is probably an instance of the commonly loose way in which the words "gum" and "resin" are used. A "whitish gum" exudes from the follicles of an undetermined species.

S. Tragacantha, Lindl. Lindley calls this the "gum tragacanth of Sierra Leone." According to Lock (Spon's 'Encyc.'), it bears the closest resemblance to the produce of the Indian species of *Sterculia* just described, as is seen, indeed, from Dr. Flückiger's description. Lock states that it is formed in great quantity, and commonly finds its way into parcels of Senegal gum. If Flückiger's conclusions as to its utility are justifiable, it is singular that it has not come into use, but the present writer can find no further allusion to it anywhere.

The following notes on "African Tragacanth" from this species are abstracted from a paper by Dr. Flückiger (*Pharm. Journ.*, [2], x., 641).

The substance experimented upon consisted of "irregular, knobby, undulated, droppy, or stalactitic masses, more or less bubbly or cavernous, often exceeding an ounce in weight, of a pale yellowish hue or almost colourless, in small fragments, nearly transparent, but seen in mass somewhat opaque by reason of innumerable cracks, which also render it more brittle than true tragacanth. Each mass is, in fact, traversed by curved fissures answering to successive protrusions of gum. Fragments of bark are often adherent to the flat or inner side of the pieces.

"With twenty parts of water coarsely powdered African tragacanth forms, like common tragacanth, a thick, tasteless jelly; with forty parts of water the jelly becomes more fluid. Only a very small quantity of gum is really dissolved in the water; the filtered liquid is not precipitated either by neutral acetate of lead or by absolute alcohol,* but on addition of basic acetate of lead it becomes a little turbid. The jelly itself reddens litmus paper. Neither thin slices of the dry tragacanth nor the jelly exhibit any trace of cellular structure, or of starch, even when examined in polarized light by means of a microscope. In this respect the tragacanth of *Sterculia* differs from that of *Astragalus*. As a means of promoting the adhesiveness of pilular masses, I find the former, whether in the form of powder or mucilage, as advantageous as ordinary tragacanth.

"The fine powder on exposure for some days to a temperature of 212° F., loses 20·5 per cent. of its weight. The formula $C_{12}H_{22}O_{11}+5H_2O$ would exactly require 20·5 per cent. of water. . . . . Upon incineration, the dried powder leaves 7·8 per cent. of ash, of which the prevailing constituent is carbonate of calcium. . . . . ."

Dr. Flückiger then reports the result of an ultimate analysis of the gum, heated in a tube with cupric oxide in the usual manner. He declines to express an opinion as to the proximate constituents of the gum. I have referred to this portion of his experiments below, showing how near he was to the determination of its chief component. He sums up his opinion of its commercial value in the following words: "I infer that the African Sterculia tragacanth may be used both in pharmacy and in the arts, instead of the usual drug of Asia Minor."

AUSTRALIAN.

Bentham, 'B. Fl.,' 226, makes twelve species, divided into two sections, *Sterculia* and *Brachychiton*, Mueller, 'Cens.,' 15, erects these sections into distinct genera, adds a new species to each, and rejects *S. fœtida* as Australian.

Baron Mueller says (*teste* Blackett, *Chem. and Drug.*, Austral. ed., 1882, p. 100), "I have noticed gummous exudations from all the Brachychitons in Australia." The present writer has never heard of any from Australian species being described more fully than as being "like tragacanth."

S. diversifolia, G. Don, 'B. Fl.,' i., 229 (*Brachychiton populneum*. R. Br. in Muell. 'Cens.,' p. 15). Found in Victoria, New South Wales and Queensland. A "Kurrajong."

In the Clyde River district of New South Wales, a correspondent of the writer came across a tree about 1 foot in diameter and 30 feet high. About a bucketful of gum was found at its foot, on the ground, naturally exuded and partly viscid. Enormous tears of the gum had flowed down the stem and were adherent to it.

I have received a quantity of gum of this species from Baron von Mueller. It cannot be distinguished, by any physical characteristic, from the Indian gums *S. urens* and *Cochlospermum Gossypium* already described. It only differs from the gum of *S. rupestris* (*infra*) in being in rounded tears, whereas the latter was much broken, and splintered when received.

S. rupestris, Benth., 'B.Fl.,' i. 230 (*Brachychiton Delabechii*, F. v. M. in Muell. 'Cens.,' p. 15, *Syn. Delabechea rupestris*). Found in Queensland. A "Kurrajong." Called also "Bottle-tree" or "Gouty-stem."

Delabechia rupestris.—"When boiling water is poured over the shavings of this wood, a clear jelly, resembling tragacanth, is formed, and becomes a thick viscid mass; iodine stains it brown, but not a trace of starch is indicated" (Sir Thomas Mitchell's 'Journal of an Exped. into the Interior of Trop. Australia, &c.,' p. 155. These remarks are signed by J. L.—Dr. Lindley.

A specimen of the naturally exuded gum in the Technological Museum is remarkably like paraffin in appearance, and almost as free from colour. It is rather tough and horny, and breaks with a dull fracture. In the mouth I fail (except in the shape of the pieces) to detect any difference between it and tragacanth. It is in irregular pieces, full of angles and points, the result of the fusion of innumerable tears.

A mass swells up readily in water and then disintegrates. The insoluble portion has a granular appearance similar to that which pearl-sago of exceeding fineness assumes under similar circumstances.

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* The formation of a ppt. by this reagent is rendered almost impossible in such dilute solution.—J. H. M.

The jelly is of snowy or rather icy whiteness, freer from colour than the jelly yielded by the best isinglass, and of enormous bulk when the absorption of water is complete.

This gum and tragacanth present many points of difference. Their closest similarity is in outward appearance. *Sterculia* gum does not thicken water, except to a barely appreciable extent, and therefore could not have the economic uses to which the very viscid tragacanth is put. On treating the gums with cold water, a difference between them is the more bluish opalescent appearance of tragacanth, and the granular appearance of the mucilage afforded by *Sterculia*. But these gums may be at once distinguished by the canary-yellow colour yielded by adding caustic soda to mucilage of tragacanth and boiling, no coloration being observable in the case of *Sterculia* gum.

The author then repeated the whole of Giraud's experiments on tragacanth, as detailed in *Pharm. Journ.*, [3], v., 766; viii., 773, and he may at once state that he obtained with tragacanth all the general results recorded by that chemist. He then repeated the experiments, with substitution of *Sterculia* gum for tragacanth, and he presents his results in the form of comparative statements:—

Similarities.—Qualitative.

1. Horny texture.
2. They swell enormously in water.
3. The jellies redden litmus.
4. They dissolve on prolonged boiling in a large quantity of water.
5. They dissolve on boiling in dilute hydrochloric acid.

Quantitative.

6. They contain about 20 per cent. of water.

Dissimilarities.—Qualitative.

	Sterculia.	Tragacanth.
7. In cold water.	*a.* Colourless. *b.* Granular jelly. *c.* Adhesiveness absent or very small.	*a.* Opalescent. *b.* Smooth viscid mass. *c.* Adhesive.
8. Boiling in dilute alkali.	Insoluble.	Almost entirely dissolves.
9. Caustic soda and warming.	No change of colour.	Canary - yellow colour, which fades on cooling.
10. Boiling in dilute acid.	Soluble, forming arabin [J. H. M.].	Soluble, forming pectin [Giraud].
11. Alcohol added to liquid formed in (10).	Whitish precipitate. (See fuller statement).	Formation of floating glairy mass.

Most Indian specimens of *S. urens* smell a little of acetic acid; tragacanth never does, as far as the author's experience goes.

The author is responsible for all the results in which names are not given in brackets.

Explanatory Notes on some of the Results Recorded in the Foregoing Tables.

No. 14. "Some tragacanth was digested with fifty times its weight of water containing 1 per cent. of hydrochloric acid in a water-bath until dissolved; it was then filtered and excess of baryta water added. The precipitate, which formed slowly, was pectate of baryta. When of a suitable consistence, this was washed, suspended in water and treated with excess of hydrochloric or acetic acid, which left a precipitate of pure pectic acid. As the result of numerous determinations, it was found that by this method about 60 per cent. of pectic acid can be obtained from gum tragacanth" (*Pharm. Journ.*, [3], v., 766; vii., 773). On repeating these experiments with tragacanth the results were as indicated by Giraud. After some little time there was formed on addition of baryta water in excess, a whitish or opalescent precipitate of pectate of baryta, very similar in appearance to weak mucilage of tragacanth. The precipitation was complete in forty-eight hours. Sterculia gum substituted for tragacanth gave negative results.

Quantitative.

	Sterculia.	Tragacanth.
12. Specific gravity.	*S. urens*, 1·49. *S. diversifolia*, 1·472.	1·384 [Watts' 'Dict. and Encyc. Britt.'].
13. Soluble gum.	Arabin (chiefly). *S. urens*, 3·14 p.c. *S. diversifolia*, 9·88 p. c. *S. rupestris*, 6·9 p. c.	"A mixture of different bodies, and not a definite principle, like arabin." 8–10° per cent. [Giraud]. 7·7 p. c. (J. H. M.)
14. Insoluble gum.	Pararabin. *S. rupestris*, 63·42 p. c. *S. diversifolia*, 61·74 p. c. *S. urens*, 75·1 p. c.	"Pectic compound." 60 p. c. [Giraud].
15. Starch	None.	2–3 p.c. [Giraud].
16. Ash.	*S. rupestris*, 9·0 p. c. *S. diversifolia*, 8·195 p. c. *S. urens*,* 5·83 p.c. *S. tragacantha*, 7·8 p. c. [Flückiger]. *The author finds 5·46 p. c. of ash in *Cochlospermum Gossypium*.	3 p. c. [Giraud]. 3·24 p. c. (mean of some experiments by J. H. M.). The author believes in the general accuracy of Giraud's figures, but the difficulties of making an accurate determination are enormous. This explains the fact that no two observers obtain the same figures.

No. 11. Addition of alcohol to dilute acidulous solution.

Sterculia.—The liquid becomes cloudy throughout its whole bulk, behaving in much the same way that a weak solution of arabin would if similarly treated. It is, in fact, found to be arabin.

Tragacanth.—A glairy substance is formed, the transparency of the liquid being scarcely impaired

On standing this jelly-like body rises to the top of the liquid. This is pectin, according to Giraud.

Table Showing the Average Composition of Sterculia Gums.

	Rupestris.	Diversifolia.	Urens.
Soluble in cold water (chiefly arabin) .	6·9	9·88	8·14
Pararabin	63·42	61·74	75·1
Moisture	20·52	20·2	16·6
Ash	9·015	8·195	5·83
	99·855	100·015	100·67

The author's discovery of pararabin in *Sterculia* gum really confirms Flückiger's figures obtained by combustion of the gum of *S. Tragacantha* (*Pharm. Journ.*, [2], x., 642). His percentage results are practically identical with the generally accepted figures for arabin, *ergo*, for pararabin, and his experiments are additional evidence to show the general similarity of *Sterculia* gums. The adhesiveness of that of *S. Tragacantha* is very remarkable, and further information on the subject is desirable. It would be particularly interesting to know the percentage of arabin.

Pararabin, like metarabin, is of course a modification of arabin. While metarabin is converted into arabin by treatment with dilute *alkali*, pararabin is similarly converted by treatment with dilute *acid*. They both are insoluble, but swell up in cold water. A solution of pararabin in weak acid is precipitated by alkalis.

Pararabin is usually obtained from beet or carrot pulp. It constitutes the Chinese vegetable jelly (agai-agai), or Ceylon moss (*Gracilaria*), according to Reichardt (Watts' 'Dict.,' 3rd Supp., Pt. 1., p. 119; Roscoe and Schorlemmer, iii., 2, 571). The present writer took a sample of agar-agar, together with a *Gracilaria* found in Australian waters, and a sample of the Japanese "kanten," said to be obtained from a tea-weed (*Gelidium corneum*). He found them all to consist *mainly* of pararabin, but, unlike *Sterculia* gums, and like tragacanth, he found that caustic alkali produced a canary-yellow colour when boiled with them. He also observed (and in this respect these substances differ from both *Sterculia* gum and tragacanth), that when baric hydrate is added in the cold to a solution in weak hydrochloric acid, a canary-yellow colour was produced on standing for a few hours. He has not pursued the subject further in this paper, as being, to some extent, a digression.

[*The discussion on this paper is printed on p.* 390.]

CASTOR OIL ADULTERATION.*

BY MICHAEL CONROY, F.C.S.

It would be difficult to name a business where the art of adulteration is practised to the extent that it is in the oil trade. Castor oil, however, is one of the oils that is less subject to adulteration than perhaps any other that is imported, but there has recently been received in Liverpool from Calcutta more than one shipment, numbering several hundred cases bearing the usual marks, which has been found on examination to be adulterated with cocoanut oil to the extent of from 20 to 30 per cent.

Castor oil, owing to scarcity of seed, has recently advanced over 50 per cent. in value, and it is no doubt due to this cause that we find this somewhat novel sophistication. The choice of a substance like cocoanut oil seems very absurd, but we should remember that at the temperature of the Indian climate this oil would be quite liquid, and the fact that it would become solid on its arrival in England would probably not present itself to the native mind. It is this characteristic that first drew attention to the matter, for it was found that this particular lot of castor oil began to become semi-solid on standing a few days after landing.

As it is possible that some of this adulterated oil may find its way into pharmacy, I have thought it worth while to bring these facts forward, and to give the results of my experience as to the best means of detecting and estimating the adulterant.

The test given in the British Pharmacopœia is that it is "entirely soluble in one volume of absolute alcohol and in two volumes of rectified spirit." Now this test is quite useless for the detection of cocoanut oil or any other possible adulterant, because oils that are insoluble in both absolute alcohol and rectified spirit are soluble in a mixture of either with castor oil, and I have prepared samples of castor oil containing 10 to 20 per cent. of cocoanut oil which are as freely soluble in these solvents as is castor oil itself. On the other hand, I have never yet met with a sample of castor oil, one volume of which would dissolve in two volumes of rectified spirit of the Pharmacopœia strength, viz., specific gravity ·838, at 60° F. With the thermometer at 70° to 80° F. solution does take place, but not at 60° F. With spirit of specific gravity ·830, one volume of castor oil dissolves perfectly in two volumes at 60° F., so that it will be seen, that by either increasing the temperature, or by using spirit a few degrees stronger, solution does take place; but even with this alteration the test will only serve, as has been already shown, to detect adulterants outside of certain limits. Castor oil is also soluble in glacial acetic acid, while all other fixed oils, with the exception of croton oil, are insoluble. This test is given in some works, but I find the same objection to it that I have previously mentioned in connection with the Pharmacopœia test, for notwithstanding the fact that other oils *per se* are insoluble, they are rendered soluble when mixed with castor oil within certain limits.

The chief distinguishing features of castor oil are undoubtedly its high density and its insolubility in petroleum ether (benzolene) when compared with other fixed oils. We find it stated in text books that castor oil is insoluble in petroleum ether, of which, however, it has the peculiarity of dissolving its own volume. This statement is not correct, for I shall show you that castor oil is to a certain extent soluble; also, that under a certain temperature castor oil will not dissolve its own volume of petroleum ether.

This latter feature, I find, affords trustworthy proof of the presence or absence of any other fixed oils.

The following experiment was made with samples of East Indian, French and Italian castor oil, each giving practically the same result. The petroleum ether used had a specific gravity of ·7033 at 60° F.

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* Read at a meeting of the Liverpool Chemists' Association, November 7, 1889.

Twenty c.c. each of castor oil and petroleum ether were mixed by brisk agitation in a tall graduated tube and maintained at a temperature of 60° F.

The mixture never became clear, and on standing for about an hour, a layer of petroleum ether collected on the surface measuring 3 c.c. This, as we shall shortly see, has a very important bearing, and it should be borne in mind that the same experiment was tried on many samples from various sources, and that never in any instance at a temperature of 60° F. did a clear mixture result, and in all cases, a separation of petroleum ether took place on standing, amounting to practically the same volume. If on the other hand the mixture be made at a temperature of 70° F. the whole of the ether is dissolved, or if the mixture made at 60° F. be shaken and raised to 70° F. perfect solution takes place, but on cooling again to 60° F. the same amount of separation occurs.

Thus far we have seen the behaviour of petroleum ether with genuine castor oil, and we shall now see how it behaves with adulterated samples. For this purpose samples were made each containing 5 per cent. of one fixed oil, such as cotton-seed, cocoanut, etc.

These samples *in all cases* made a perfectly clear solution with an equal volume of petroleum ether at 60° F., and in no instance did any separation take place on standing.

We thus see that so small an amount as 5 per cent. of a fixed oil, other than castor oil, when present is sufficient to cause the whole of the petroleum ether to combine and form a perfectly clear solution, and I think that it has clearly been shown that the test is a reliable and a safe one.

So far I have only made use of this as a qualitative test, but I have hopes that by adopting certain precautions it can be made a quantitative one, for I find that if two volumes of petroleum ether be used instead of one, and thoroughly mixed by agitation at a temperature of 60° F., separation takes place in the adulterated as well as in the pure samples, and that the volume of the ethereal layer increases with the amount of adulterant present with a corresponding diminution in the lower castor oil layer.

To demonstrate this, I have here three tall, graduated tubes of 60 c.c. capacity.

No. 1 contains 20 c.c. of pure castor oil and 40 c.c. of petroleum ether.

No. 2.—20 c.c. of castor oil containing 10 per cent. of cocoanut oil and 40 c.c. of petroleum ether.

No. 3.—20 c.c. of castor oil containing 20 per cent. of cocoanut oil and 40 c.c. of petroleum ether.

These, on being well mixed by agitation and allowed to rest, separate into portions varying with the amount of cocoanut oil present in the samples, as shown in the following table:—

	Bottom or castor oil layer.	Petroleum ether layer.	Total measurement.
No. 1	36 c.c.	24 c.c.	60 cc.
No. 2	33½ „	26½ „	60 „
No. 3	30½ „	29½ „	60 „

I have already referred to the statement found in text-books to the effect that castor oil is insoluble in petroleum ether, and promised to demonstrate that such was not the case. No. 1 sample proves my contention, for I have already shown that in mixing 20 c.c. each of castor oil and petroleum ether, 37 c.c. of the castor oil mixture separates, whilst in this last experiment (No. 1 in table) only 36 c.c. of the castor oil mixture is left, showing that the extra 20 c.c. of petroleum ether has taken up some of the castor oil, and the decrease in Nos. 2 and 3 is undoubtedly due to the fact that the cocoanut oil is dissolved out by the petroleum ether. This can be demonstrated by drawing off the upper layer and driving off the petroleum ether, when the cocoanut oil containing some castor oil will be left.

It must be remembered in reading this table that the lower stratum is a mixture of castor oil and petroleum ether in nearly equal portions, and that the diminution in bulk in Nos. 2 and 3 is due not only to the abstraction of the cocoanut oil by the petroleum ether, but also to the fact that there is that much less castor oil in the sample to combine with the ether, so that the lower portion will show a decrease in volume from these two causes and the upper one a corresponding increase.

I have not tried this experiment with a sample containing more than 20 per cent. of cocoanut oil, because with this percentage of adulteration the separation of the two layers is very slow. This is due to the peculiar solvent action already referred to in connection with the alcohol test, where a solvent has the power, in combination with a substance which it freely dissolves, to take up a third substance which, without the aid of the second, it could not dissolve. Therefore a sample containing much more than 20 per cent. of cocoanut oil or other adulterant would in conjunction with the petroleum ether carry the castor oil into solution.

As a quantitative test, my experience of this method is only of a few days standing and I do not wish too speak too dogmatically upon it, but I do think that if carefully carried out at a temperature of 60° F. it is capable of yielding very trustworthy results.

I have alluded to the high density of castor oil as being one of its distinctive characteristics, and in this instance, where the adulterant is cocoanut oil, it is possible to arrive at the percentage of adulterant present by the specific gravity process quite as accurately as by either the saponification equivalent or the iodine absorption test, and with far greater facility.

The specific gravity of castor oil at a temperature of 60° F. is ·964. I have never found any higher, and the lowest that I have met with was a sample of French oil which gave ·9625 at the same temperature. There is a greater range than this given in text books but I much doubt their accuracy, and in my experience ·963 to ·964 is the correct density for genuine oil. When castor oil is adulterated with 10 per cent. and over of cocoanut oil, the latter separates when the temperature falls to 60° F., and it becomes necessary in such cases to take the density at a higher temperature. I have therefore taken a sample of castor oil possessing a density of ·964 at 60° F. and found its density to be ·949 at 100° F. A sample of cocoanut oil at the same temperature (100° F.) I found to be ·912. Both densities were taken by means of an accurate 1,000 grain bottle. From this it will be seen that the difference between the two densities is sufficient to enable one to arrive at a very accurate estimation, by a very simple calculation, of the amount of cocoanut oil present.

In the first place it is of course necessary to ascertain the presence of cocoanut oil, and this can be done by heating the sample under examination in a small porcelain dish, when the distinctive odour of cocoanut oil can readily be ascertained. By this plan the presence of even 1 per cent. can be detected, and 5 per cent. is quite distinctive to anyone possessing an ordinary sense of smell.

I have heard within the last few days that some castor oil has reached Glasgow, which, on examination, was found to be adulterated with cotton-seed oil.

The adulterant is probably what is known as "blown" cotton-seed oil, which is made by blowing warm air through the oil. Great heat is thereby developed, and the oil increases in density and viscosity.

The presence of this oil can be detected by my modification of the nitrate of silver test, which is applied as follows:—

1. Make a test solution containing five parts of silver nitrate and one part of nitric acid (specific gravity 1·42) in one hundred parts of rectified spirit (specific gravity ·838).

2. Pour about 100 grains of the oil under examination into a dry test tube, about half-an-inch in diameter, add to it 10 grain measures of the above test solution, and place the tube in *boiling* water for five minutes.

Castor oil assumes a pale yellow colour, but the presence of cotton-seed oil causes it to become deep red.

In conclusion, I would just add that the quantitative petroleum ether test is capable of much further development, but being tied for time I have not had an opportunity of fully working it out.

PERFUME OF THE ROSE.

In an elaborate article on this subject in the *Bulletin* of the French Botanical Society M. R. Blondel states that the odour of the rose is chiefly developed in the group *Centifoliæ*, and especially in *R. centifolia*, Mill. The group *Caninæ* possess a similar perfume, which is, however, generally much more feeble. The hybrids produced by crossing tea-roses (*R. fragrans*, Riv.) and Bengalese roses (*R. semperflorens*, Curt.) with *R. centifolia* give a great variety of odours; while the noisette roses (hybrids of *R. moschata* and *semperflorens*) are generally scentless. In the group *Banksiæ*, *R. Banksia alba* possesses a very pronounced odour of violets, while *R. Banksia lutea* has no marked perfume. The group *Cinnamomeæ*, with one or two exceptions, do not possess a strong odour, and the *Pimpinellifoliæ* are likewise nearly scentless. In the group *Villosæ* the flowers have but little perfume, but the leaves are glandular, and in *R. villosa*, L., emit a terebinthaceous odour. The section *Rubiginosæ* (sweet-briars) are also remarkable only on account of the peculiar perfume emitted by the leaves of several species. In the petals of the fragrant species the essential oil resides in the cells of the upper and under epiderm; its presence may be easily detected by the use of osmic acid.

M. F. Crépin confirms the statement that the odour contained in the glands of the sweet-briar, *R. rubiginosa*, L., and of the species nearly allied to it, is totally different from that of the other species of the genus.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 16, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SALE OF POISONS BY UNQUALIFIED PERSONS.

THE action brought by the authority of the Council of the Pharmaceutical Society, and at the instigation of Mr. BRAXTON HICKS, the Coroner for one of the divisions of the County of London, was heard last Tuesday before Judge HOLROYD at the Wandsworth County Court, and a report of the case will be found on page 397. The circumstances which led to this action have already been stated in this Journal and as the decision given is that the provisions of the 1st and 15th sections of the Pharmacy Act apply to all sales of poison by unqualified persons, whether masters or servants, it will be obvious that additional caution must be exercised by chemists in the sale of poisons so as to avoid the liability of their apprentices or unqualified assistants to proceedings of a similar nature. Some inconvenience will no doubt be experienced in certain instances from the adoption of these necessary precautions, chiefly in the case of those who do not employ a legally qualified assistant. In the event of their absence at any time from their business, the only alternative will be to prohibit the sale, dispensing or compounding of any scheduled poison during their absence. With those who have besides apprentices a legally qualified assistant the inconvenience will be less; but it will be essential even then that every sale, dispensing or compounding of scheduled poisons shall be conducted under the immediate supervision of a legally qualified person, either the master or his assistant. These precautions are suggested as being at least advisable under existing conditions. The interpretation of the Pharmacy Act by Judge HOLROYD may become the subject of consideration by a higher court, and it was even suggested by the judge that such a proceeding was desirable; but until his decision has thus been modified or reversed it must be taken as an interpretation of the law. It must also be remembered that although this case is regarded as raising a new point, and as being the first action taking by the Pharmaceutical Society in that direction, such a view of the matter is not strictly correct. There have been similar cases, but some of them have not come into court because the penalties incurred have been paid on application, and consequently there could not be any publication of the fact. Moreover, it must be pointed out that the point raised in the case brought before Judge Holroyd is not by any means a novel one, for it was incidentally the subject of a very precise expression of opinion by Lord Chancellor Selborne in the judgment delivered by him in the case of the London and Provincial Supply Association, and that opinion was distinctly in accordance with the decision of Judge Holroyd. In dealing with the main argument urged in the appeal on behalf of the Pharmaceutical Society, that the object of the Pharmacy Act would be defeated unless a corporation as well as an individual were included, the Lord Chancellor held that this argument could not be sustained, because in the 1st and 15th sections the act of selling, the act of compounding, and every other act there mentioned is struck at, whether done by the principal to whom a business belongs, or by the person whom he employs to carry on the business. Whatever uncertainty there might be in this respect as to the words "keeping open shop," he held there was none as to the word "sell," nor any ground for extending to sale, as mentioned in the 1st and 15th sections, the special construction of the 17th section. Finally he added that regard to the mischief which the Act was intended to prevent, necessarily led to the same conclusion, "that he who sells, whether he be the principal or the person delegated to conduct and manage the sales, is struck at by the 15th section, because otherwise a very wide door would be open to all the things which the Act is intended to prohibit."

This authoritative interpretation of the provisions of the Pharmacy Act in regard to the sale of poisons dates back to the year 1880, but it is an important coincidence that the decision given by Judge Holroyd last Tuesday was literally couched in the very same words that were made use of by Lord Chancellor Selborne, "the person who sells, whether he be the master or servant, is struck at by the 15th section." It will therefore be seen that, apart from this recent decision, there is strong antecedent reason for the recommendation we have offered as to the sale, dispensing or compounding of scheduled poisons. Other opinions, pointing in the same direction, though perhaps less explicit, might be referred to as having been expressed in the course of the debate in the House of Lords upon the Pharmacy Act Amendment Bill. In Trafford's case a very similar view of the Act was taken by Justices Grove and Lopes, although that was a prosecution under the 17th section. The question was, who was the seller, the woman who handed over the article, the unregistered proprietor of the shop where it was sold, or the registered chemist living at some distance, whose name and address was on the label? Justice Grove held in this case that the seller did not mean the registered chemist who lived at some distance from the shop, because he could not carry on the business or comply with the provisions of the statute, but the seller was, in his opinion, the person who actually conducted the business of sale and of the shop, though he by no means said that his should necessarily be the hand to sell the poison. Here the conduct or control of a sale of poison by a registered person was held to cover the actual handing over by the hand of an unregistered person, and the judgment delivered to that effect may serve to mitigate the anxiety that will be felt as a consequence of the recent decision. But obviously the supervision or conduct of the sale of poisons must be really active, and not merely figurative, in order to make the handing over lawful according to the provisions of the Pharmacy Act. It requires the presence of the legally qualified person while every sale is made and his actual participation in its conduct.

A good deal of misconception has arisen in regard to what is a lawful sale of poison from attaching too much significance to the idea that the qualification of the principal of a business is the all important requisite. No doubt the qualification and chief responsibility of the principal were objects which the founders of the Pharmaceutical Society considered of the highest importance. But it must be remembered that with this opinion was associated the desire to establish another grade of qualification for assistants. That was the original aim of the Society. It has, however, been only partially realized. By the passing of the Pharmacy Act, 1868, only one of those grades of qualification was recognized, and that was the lower grade that had been designed to apply to assistants. In point of fact the higher qualification that was contemplated as suitable for principals has been cast to the winds, except as a matter of voluntary action, so that it scarcely counts as being of much value from a practical point of view. There is therefore the less reason for insisting upon the present legal qualification as being sufficient for all purposes. That might have been more justly contended for if the higher grade of qualification had been adopted in the Pharmacy Act, though even that would have been only a partial carrying out of the original objects of the Society. The present action taken by the Council may be regarded as a step in the direction of protecting the interests of legally qualified persons and while in that light it should meet with approval and support, it should be remembered that since it rests with the Council to take the initiative for enforcing the interpretation of the law which has proved acceptable to legal authorities there need not be any apprehension that this will be done without adequate regard for the interests of the body it represents.

We wish to draw attention to the official announcement on our front page, from which it appears that there is now a vacancy for one worker in the Research Laboratory. In this Laboratory the Pharmaceutical Society provides, free of expense, opportunities for pharmaceutical chemists and other qualified persons to assist in or to pursue on their own account investigations in chemical pharmacology.

In a communication to the Medical Society last week, Sir Joseph Lister gave in some detail his present views as to the best material for the impregnation of antiseptic dressings. It will be remembered that about five years ago he introduced what was known as the sero-albuminated gauze, the active ingredient of which was prepared by dissolving mercuric chloride in blood serum. Subsequently, the double salt of mercury and ammonium was found to give with blood serum a compound that was more powerfully antiseptic and at the same time less irritating, but this was open to the objection that it was too soluble and was washed out by the discharge. At the suggestion of Mr. Martindale experiments were then made with cyanide of mercury and this in its turn gave way to a compound described in Watts's 'Dictionary' as a double cyanide of mercury and zinc. The material now used for impregnating gauze is a mixture of this double cyanide with starch and potassium sulphate, and as this product, though strongly inhibitory, is not germicidal, the gauze before being used is moistened with a 1 in 4000 solution of mercuric chloride to destroy any germs that it may be carrying. A further communication is promised, giving details as to the approved method of preparing the new dressing, and when this has appeared, it is proposed to make further reference to the subject.

* * *

We are pleased to be able to say that the Conversazione of the Chemists' Assistants' Association, which was held at the Portman Rooms, Baker Street, on Thursday evening, was of a highly successful character. The exhibits far surpassed in excellence and variety those of previous years, and judging by the number of members, patrons and visitors present, this popular reunion seems to lose none of its ancient prestige. Some four hundred attended.

* * *

It may be useful to point out that section 26 of the Revenue Act, 1889, prohibits the sale of methylated spirits between the hours of 10 o'clock on Saturday evening and 8 o'clock on the following Monday morning. We understand that a notice to that effect is to be served forthwith on every retailer of methylated spirits.

* * *

We are informed that a meeting of the Chemists and Druggists of Northumberland and Durham will be held in the County Hotel, Newcastle, on Wednesday evening, November 20, at 8 o'clock, to receive the report of the Committee appointed, on February 13th, to ascertain the mode of working of the Patent Medicine Act, and to decide upon future action.

* * *

A meeting of the Midland Counties Chemists' Association will be held at Mason's College, Edmund Street, Birmingham, on Tuesday evening next, at 8.30, when a paper will be read by Mr. R. A. Cripps, and Mr. Liverseege will demonstrate a method of ascertaining the amount of Carbonic Acid Gas in the Air of the Lecture Room.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Thursday, the 21st inst., when a paper on "Oleate of Mercury," by Mr. R. C. Harrison, will be read.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, November 13, 1889.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The second ordinary meeting of the session was held on Wednesday, the 13th inst., the chair being taken by Mr. Michael Carteighe, the President, at 8 o'clock.

The first paper, which was a contribution from the Research Laboratory, was on—

THE SO-CALLED MUSSÆNDA COFFEE OF RÉUNION.

BY PROF. DUNSTAN.

The paper is printed at p. 381, and gave rise to the following discussion.

The **PRESIDENT** said this paper was rather unsatisfactory for the purpose of discussion, the results being purely negative, but such results involved a considerable amount of labour and skill, and if anyone would like to ask for further information Prof. Dunstan would be happy to afford it. It was perhaps one of the advantages of a Research Laboratory that substances of this kind, which were stated to have properties of great commercial value, could be quickly examined and the results promptly published.

Mr. **HOLMES** said it might appear rather curious at first sight that a French pharmacien should mistake a member of the natural order Loganiaceæ for one of the Rubiaceæ, but this mistake had plainly arisen from want of good knowledge of systematic botany, which he was afraid had been rather neglected of late years, in comparision with morphology and biology. The real point of distinction between the two orders was that in the Rubiaceæ the ovary was inferior, while in the Loganiaceæ it was superior. M. Lapeyrère, in his communication published in the *Bulletin de la Société d' Acclimatation*, had figured the ovary of his *Mussænda borbonica* as superior, which showed that he did not understand that the genus *Mussænda*, as belonging to the Rubiaceæ, should have an inferior ovary. The *Gærtnera vaginata* bore a strong resemblance in texture and shape of the leaves and in colour and arrangement of the flowers to *Mussænda*; but in the latter genus the seeds are minute, whilst in the plant figured by M. Lapeyrère they were large and only one in each cell of the ovary. The opposite character of the leaves and the presence of interpetiolar stipules in both natural orders might also have further misled him. The mistake made by M. Lapeyrère was one therefore that might easily arise in the absence of good books of reference or of an imperfect practical knowledge of botany.

Mr. **GREENISH** asked if these berries had been treated in a similar way to coffee, roasted and ground, and, if so, did they yield a substance which would be at all suitable as a substitute for coffee.

Mr. **CHRISTY** said there were plenty of very excellent substitutes for coffee, but as the law now stood they could not be used as coffee. Any drink made from a new seed must be called by a new name, and that was what the public would not accept. If this were introduced, although it might have the taste and smell of coffee, if it were declared by the Pharmaceutical Society not to be coffee, it could not be sold as such.

Mr. **LOMAS** thought it rather strange that this French chemist should state that the berries contained caffeine if they absolutely contained none.

Professor **DUNSTAN** said they were stated to contain caffeine, and were put forward on that ground. Mr. St. John, the British Consul, tried them, and said they were much less fragrant than coffee. They seemed to present no advantage over ground date stones and other coffee substitutes.

The **President** remarked that probably all berries when roasted were more or less aromatic. He must say he sympathized with the public on this question; he believed in coffee, and did not believe in any of the things which were substituted for it. He also believed in the physiological action of coffee, and could tell what it was without analysis. There was no doubt it was advantageous that the public taste should gravitate towards good things, and in the case of coffee, until a few years ago English people, as a rule, knew nothing about it. That which was sold as coffee was a mixture which was not coffee, but he would not say what it was. Those who had once enjoyed the luxury of real coffee, properly made, would naturally rebel against having anything substituted for it. He concluded by proposing a vote of thanks to Professor Dunstan, which was carried unanimously.

The next paper, of which an abstract was read by Mr. Holmes, was on—

STERCULIA GUM: ITS SIMILARITIES AND DISSIMILARITIES TO TRAGACANTH.

BY J. H. MAIDEN, F.L.S.

The paper is printed at p. 381, and gave rise to the following discussion:—

Mr. **Greenish** asked if Mr. Holmes had examined this gum as one would gum tragacanth for the starch grains contained in it? He remarked on its having been boiled, and no starch being observed; but it was easy to take thin slices of gum tragacanth and detect starch grains, some partially empty and some in a sound condition. Tragacanth gum was understood to have its origin in a conversion of the starch of the plant.

Mr. **Christy** said, with reference to a remark by Mr. Holmes, that if it were possible to turn these non-adhesive gums into adhesive ones it would be very important, that he had only that week had placed in his hands a substance and was asked what it was. He replied that it was fine shellac, and was then asked to put a small piece in his mouth, which he did, when it melted at once. He was then shown some Indian gums which had been transformed into this curious substance. He was assured the price was very little above that of Indian gum. How the transformation was effected he did not yet know, but hoped soon to discover.

Professor **Dunstan** said one point of great interest about these gums was the strong smell of acetic acid. It was not the smell of vinegar or weak acetic acid, but of strong acid, so that one would almost imagine that glacial acetic acid had been added to the contents of the bottle. He supposed that was not the case, but it was worth investigating.

Mr. **Moss** asked if it was stated in the paper how the gum appeared. Was it necessary to make incisions in the stem, or did it exude naturally?

Mr. **Gerrard** agreed with Professor Dunstan that the presence of acetic acid was very interesting. Did the author say anything about testing for saccharine bodies. The question put by Mr. Greenish as to the presence of starch might explain the matter, the starch being converted into sugar, and by the action of a ferment into acetic acid; but it would seem as if the exposure of acetic acid would volatilize it, and its continued presence, therefore, would seem to show that it had some other source.

Mr. **Holmes** said most gums were obtained partly from incisions and partly from exudations, the presence of the latter leading to incisions being made in order to get more gum. He thought Mr. Maiden said he had tested for starch and found none, but he should be pleased to let Mr. Greenish have a specimen for examination. He thought there was no possibility of acetic acid having been used in the preparation, and imagined it was a natural product. He could not say whether the gum had the same smell when it first exuded from the tree but he would make inquiries. The gum had no taste of sugar now, but he should be glad to give a specimen to anyone who would like to test it.

The **President**, in proposing a vote of thanks to Mr. Maiden, said it was very pleasant to have such a paper from a fellow countryman in Sydney who took an interest in pharmacology. The Society was only too happy to give the publicity it deserved to sterling work and he hoped they might have further communications of a similar kind.

Mr. **Holmes** then called attention to a specimen of a plant sent over from Bechuanaland, which had been presented by Messrs. Hearon, Squire, and Francis. It was said to be used by the natives, and was called guap. In the growing state the natives chewed it to allay thirst, and it was also said to be a remedy for piles, but as to these alleged properties botanic authorities at the Cape could say nothing. It was said to be shipped in small quantity to America for use in some patent medicine. It was evidently sent over here on speculation. The plants of the genus to which it belonged bore a strong resemblance to the cactus group in having a fleshy stem, which was often angular and prickly, and in bearing flowers, which sprang from the stems at irregular intervals. He took the specimen to Kew for comparison and identification, and Mr. N. E. Brown, who had recently been working at this group of plants, found that it did not correspond with any known species, and had kindly consented to be present that evening to give information concerning it.

Mr. N. E. **Brown** said he could not say much about this plant, but there were some things very singular about it. He easily recognized it as belonging to the peculiar section named Trichocaulon, of the genus Stapelia, which he had been investigating for some years, but he also found that it belonged to neither of the two species previously known. The plant was a dwarf-growing succulent, 8 inches to a foot high, with thick, fleshy, cylindrical stems, covered with spines on the angles. The two species previously known were principally natives of the west coast, and some ten years ago, Sir Henry Barclay, when Governor of the Cape, paid a good deal of attention to them, and sent a few of them to Kew. But they were very rare, because the Hottentots and Bushmen ate them whenever they were found, stripping off the skin and eating the central part raw. He had never been able to get a plant so as to taste it himself in the fresh state, but he had tried other members of the genus. When raw the plant was slimy and had a peculiar bitter flavour, which to him was not agreeable. When steeped in brandy the plant imparted a bitter flavour to it, and he thought made it more beneficial as an occasional restorative. In the western parts this plant was now becoming rare, and he found that Thunberg, when he wrote about it a hundred years ago, said the Hottentots and bushmen ate it. The name guap was apparently applied to more than one species. There were some other species belonging to the same group, but not the same genus, which he was told by Sir W. Barclay were also eaten by the Hottentots, and were called "quaqua"; whether there was any connection of name in different dialects he could not say. The Kaffirs did not eat them, but Mrs. Barber, of Kimberley, wrote to say that the stapelias were dying out, because they were not only eaten by the Hottentots, but also by sheep and goats, which were much reared in the midland districts. It was evident that wherever this plant came from there must be a considerable quantity, or it could not be exported as it was stated to be. He remembered Sir H. Barclay saying he had one species from Griqualand, but he believed it died before it reached England. He should make a description of this plant as well as he could from the specimen sent and probably publish it in the Journal.

The **President** in proposing a vote of thanks to Mr. Brown said it was very gratifying to find that the officials at Kew were so ready to reciprocate kind offices in these matters.

Mr. **Holmes** then drew attention to some other donations to the Museum; the first being specimens of plants mounted, sent by Dr. J. T. Easmin, native of the west coast of Africa, who had taken his degree in England, and being interested in botany, had collected and sent over specimens of plants used in medicine by the natives. One which he had taken great trouble to investigate was a species of *Strophanthus*, having very long and twisted petals; also the *S. hispidus*, in which the petals were much shorter. He believed the one with the long petals was that one which yielded the smooth strophanthus seeds of commerce. Some of the same sort had been sent to Kew, but they had not yet received a name. Another plant, a species of *Paulo-Wilhelmia*, was used for poisoning fish; it was new to science, and had not yet been described, but he had been told that it would shortly be described and figured in the *Botanical Magazine*. Another plant belonged to the genus *Tephrosa*, which yielded a number of plants that were used for the same purpose in different countries. Another apparently belonged to the Leguminosæ, but had not yet been identified; it was said to be used by slaves in a decoction for committing suicide. Another was used for the relief of asthma, and this belonged to the same natural order (Asclepiadaceæ) as the *Tylophora asthmatica*, which was used in India for a similar purpose. There was also a collection sent by Messrs. Hearon, Squire and Francis, of various West African roots, of which the names and uses are as follows:—Rhimor, an infusion of which is supposed to have the power of clearing turbid urine, and of remedying morbid states of the alimentary canal. This is African heart root, *Sarcocephalus esculentus*. Ayra, an infusion of which is used for eruptions, and to purify the blood. Gbeyrihigbe, considered a great antidysenteric; is said to cure rheumatism when the root bark is scraped and ground with guinea grains, and applied to the painful parts. Zaelam, the leaf and root of which are used as purgatives. Dedee, a root used as a drastic purgative in bilious fevers, etc. Tarayharay, said to cure dysentery, the whole root being boiled. Agbana, the root-bark of which is employed in bilious fever, and is applied locally to reduce tumours and swellings. This is the finger root of Sierra Leone, probably a species of *Xylopia*. Cotopar, a root said to cure gonorrhœa, and is supposed to prevent syphilis. This is the African *Pareira Brava*, imported into London a few years ago. Ahay; the bark of this root is boiled with fresh lime and administered in acute hæmorrhagic dysentery; also in sunstroke, piles, and in kidney complaints. Gbaclalar; this bark is an anthelmintic and is said to have great effect on ascaris lumbricoidea. An unnamed pod of seed, used for the same purpose as *Strophanthus hispidus*, was from *Kickxia africana*. There were also specimens of the bark of *Rhamnus Purshiana*, sent by Mr. Hartford, of New York, accompanied by specimens of what he considered to be the plant yielding it, but which was in fact another closely allied species, described under the name of *Rhamnus Californica*, or *R. oleæfolia*, from its resemblance of its leaf to that of the olive. Mr. Hartford wrote, "I had a talk to-day with Mr. Howard, the Secretary of the Southern Oregon Co., and he told me that on their property in Coos Co., Oregon, there was very little bark left now. It appears they cut down the trees or strip them where they stand and leave them to rot. In a few years this method will tell a tale. Very little cascara bark was got in California this year, nearly all came from Southern Oregon. Some fair quality came from Washington territory." This would indicate that the bark of more than one species was collected as cascara sagrada. *R. Californica* grew in the same regions of the United States and formed a large shrub or small tree of about the same height. It was stated in the *Pharmaceutical Journal*, ([3], xvii., p. 823) that the bark was of a brown colour externally and a bright yellow internally, and of an intensely bitter taste, which was persistent, but having no marked odour. The peculiar, strong and somewhat rancid odour possessed by cascara sagrada was well known, and this ought to form a distinguishing feature. The President of the Philadelphia College of Pharmacy, Mr. C. Bullock, had sent over a log of the *Pinus australis*, showing incisions and boxes made in the trunk to collect the turpentine, and also one of the tree yielding Canada balsam, showing the vesicles in the bark containing the balsam. The Curator then read the following extract from Mr. Bullock's letter:—"I have now the pleasure of sending specimens of 1st, the balsam fir of Canada, showing the vesicles containing the balsam. The specimens are from the province of Quebec, Canada. 2nd, a log of pine from the turpentine-collecting district of North Carolina, showing the chipping for exudation, and the 'boxing' for collecting and retaining it. The specimen has been utilized two years for collection of turpentine. I have had the upper end of the log cut in three directions and polished, to show the grain of the wood. The wood is a valuable one to builders, and is used largely for flooring. For this use it is cut into boards of from 4 to 6 inches in width. The lower end of the log is left as cut off in the woods to show about the height of the 'boxing' from the ground. The tree is the common long-leaf turpentine (*Pinus australis*, of Michaux), but generally known here as *Pinus palustris*. 3rd, Specimens of the fruit and leaves of the *Sophora speciosa*, from Texas, collected near San Antonio. The fruit is said to contain an alkaloid having narcotic properties. The examination of the fruit has not, so far, been very satisfactory, and deserves more attention." There were also specimens of the lignum aloes (the aloes of Scripture). In the East, several different woods (classed as lignum aloes) were used for funeral pyres. These specimens had been sent by Mr. Prebble, of Bombay; also microscopical slides to illustrate them, which he hoped to deal with on another occasion. The same liberal contributor to the Museum had also sent a further donation of Indian medicinal plants and other objects of interest. Specimens of uranium ore, both the best and second qualities from the mine lately discovered in Cornwall, had been sent by Messrs. A. and C. Bennett; also other minerals, including titanium, tin, zinc, arsenical and other ores. Mr. Kay, of Stockport, had sent an interesting specimen of salt pseudomorph, which had been found in cutting the Manchester Ship Canal. The last specimen to which he would call attention was one of genuine cubebs, and of oil distilled from it. The plant was cultivated in Java, and was sent by Professor Von Eeder, of Haarlem. Of late years true cubebs had been scarce in commerce, and of inferior quality.

The **President** said the Society's Museum was a very valuable one, in some respects without a rival, and the desire of the Council was that it should maintain its reputation as being a typical museum of all products having any relation to pharmacy or medicine. He proposed a vote of thanks to the donors of these numerous specimens, which was agreed to unanimously.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 6th inst., at No. 11, Harcourt Street, Dublin, the President, Mr. Charles Evans, in the chair.

The other members of the Council present were Messrs. Doran, Beggs, McCormack, W. F. Wells, Junr., Whitla, J. Montgomery, McNaught, Baxter and Professor Tichborne.

A letter was received from Mr. Richard W. Pring, of Belfast, expressing his regret that he could not withdraw his resignation as a member of the Council.

The President: I am sure we all regret that Mr. Pring could not see his way to reconsider his determination.

On the motion of Mr. Beggs, seconded by Mr. Wells, the standing orders were suspended in order that the election of members might now be taken.

On the motion of Mr. Wells, seconded by Professor Tichborne, Dr. Rodolph A. C. Burnes, of 83, Queen's Street, Dublin, was elected a member of the Society; and

On the motion of Mr. Wells, seconded by Mr. Hayes, Mr. Hugh Montgomery, of the Meath Medical Hall, Kells, was elected a member of the Society.

Mr. Wells moved that Dr. Burnes be elected a member of the Council in the room of Mr. Pring. Dr. Burnes kept an open pharmacy and intended to carry on the business, so that he was practically one of themselves. He had lately taken very high degrees in medicine in Trinity College, and would be a very useful member of the Council.

Mr. Beggs seconded the motion, which was carried unanimously.

Election of Officers.

The next business on the paper was the election of officers of the Society.

Mr. Wells: I have great pleasure in again proposing that Mr. Charles Evans be elected President for the ensuing year. We have had but a short experience of him, but I am sure I express the opinion of every member of the Council when I say that we are well satisfied with the way in which he has done his work.

Mr. Whitla: It gives me great pleasure indeed to second the motion. It is not necessary for me to add anything save that it is the opinion of the licentiates of our Society that we have been most fortunate in our choice of a President; and I am sure the prospects of the Society will not in any way suffer by his re-election.

Professor Tichborne: I beg to put the motion that Mr. Charles Evans be re-elected our President. I need not add anything in expression of the general feeling of pleasure that we have in re-electing him.

The motion passed by acclamation.

The President: Allow me to thank you for this expression of your confidence. I feel how inadequate I am to fill the responsible position to which you have called me; but I rely on your assistance in everything that may come before us.

Professor Tichborne: Allow me the privilege of proposing our Vice-President. We all feel that Mr. Wells has been a most efficient member of our Society, none more so. He has shown an energy which can only come from a real interest in the work of the Society. He also seems to be in accord with the general feeling of the Society, which I think is a very important point. I have no doubt always expressed the opinion that the office of Vice-President should be filled by one of our country members, and in future I should like to see the North and South alternately represented, but at present the old members of the Council residing in the North have declined this honour. As to the President, I believe he should be always resident in Dublin; but as regards the office of Vice-President we have fallen on good times, for we have a most excellent man for the office in Mr. Wells, and I have great pleasure in proposing him.

Mr. Beggs: It is to me a very pleasing duty to second the proposition of Professor Tichborne. Mr. Wells has taken a deep interest in pharmacy almost from the institution of the Society, and we all know that he is in perfect accord with the members of the pharmaceutical profession generally. His conduct for years has been most consistent, and I am sure his judgment will be most useful on the intricate questions that may arise during his year of office.

The motion was carried by acclamation.

The President: I do not think you could have made a better choice than Mr. Wells, and I am personally obliged to you for appointing one who is likely to be of so much assistance to me. I have great pleasure in endorsing everything that Professor Tichborne and Mr. Beggs have said of Mr. Wells.

The Vice-President: I feel deeply the honour which you have conferred upon me. I look upon it as a very high honour to be elected Vice-President of this Society. Having regard to the duties that belong to the office, were I to consult my own wishes I would not accept it; but when you have unanimously elected me it would be a poor return on my part to shrink from the difficulties that may have to be encountered. It is the more pleasing when I find that my action has been approved of by almost the whole of the pharmaceutical chemists of Ireland, and knowing therefore that I have done what has pleased them I have no difficulty in taking office, feeling assured that I shall have the support of the members of the Council in whatever may come before us. My task will be almost an easy one when we have such a President as Mr. Evans, and I am sure that from the attention that he will give to his office, I shall be seldom called on to take the chair. I sincerely thank you for the honour you have done me; and I trust that at the end of my year of office you will not have reason to regret having placed confidence in me.

Professor Tichborne: I have great pleasure in proposing that Mr. Hodgson be elected Treasurer for the ensuing year.

Mr. Doran: I have great pleasure in seconding the motion. We could not have a better man.

The President: It is a great pleasure to me that Mr. Hodgson is still with us. He did send in his resignation, but at a time of great difficulty he consented to stay with us, and I hope that for many years to come we shall have the advantage of his advice.

The motion passed by acclamation.

On the motion of Mr. Beggs, seconded by Mr. Baxter, the outgoing auditors, Messrs. Simpson and Hayes, were re-elected.

The Vice-President moved that the following gentlement constitute the Law Committee for the ensuing year:—Messrs. Beggs, Grindley, McCormack, Merrin, Professor Tichborne, McNaught and J. Montgomery.

Mr. Whitla seconded the motion, which was unanimously agreed to.

Mr. Whitla moved that Messrs. Beggs, Hayes, McCormack, Simpson and McNaught be the Committee for the examination of certificates for the ensuing year.

Seconded by Mr. Baxter and agreed to.

Mr. Baxter moved that Dr. H. C. Tweedy, F.R.C.S., be reappointed examiner for the Preliminary Examination; Mr. Harry Carter Draper, F.C.S., Examiner in Pharmaceutical and General Chemistry; and Dr. William Whitla, in Materia Medica and Botany. It was most important that the Society should have such examiners as would maintain its educational status and keep its students abreast of the times; and the work already done by the gentlemen named had been thoroughly approved of.

Mr. Whitla seconded the motion, which passed unanimously.

The Vice-President mentioned that the term of office of Dr. Evans as one of the Examiners would not expire until next January; therefore it was not necessary to re-elect him now.

A letter was read from Mr. Patrick Kelly asking that the hundred hours of laboratory work (for chemistry) at present required to be certified in the case of a candidate for the license should be reduced to fifty or sixty.

The writer stated that such a lengthened course was not required by any other licensing body in the United Kingdom. There was only one school in Dublin at which students could get it: but attendance at it was required during the daytime, and therefore students who had to be at business during the day could not avail themselves of it. If the amalgamated schools should give night lectures it would be at the cost of from eight to ten guineas for the hundred hours, and would involve the necessity for candidates from the country stopping in Dublin for six months instead of three, which meant an excessive expense to them.

The President: I would like to hear an expression of opinion from members on this matter.

Mr. McCormack said he did not know how the rule requiring the hundred hours could possibly be changed. It had been already discussed, and had received the sanction of the Privy Council, and he did not see how they could go over the same ground again.

Mr. Beggs: The one hundred hours' rule was only passed a short time ago, and I do not think it has been sufficiently tried yet.

Mr. Baxter: I have considerable sympathy with Mr. Kelly. I think one hundred hours an extreme amount of laboratory work to require. But we must take into account that the examination papers are much more difficult now than they used to be.

Professor Tichborne said the rule pressed hardly on the country candidates, on whom it imposed great expense and trouble. It did not so much affect those who were resident in Dublin. Of course it meant higher fees to the traders.

The Vice-President said he thought it would be premature to change this rule so soon. It only came into force last July, and if they attempted to do away with it now the Privy Council would think that they did not know their own minds. The subject was very well threshed out at the discussions which took place at the Council, and the opinion of the members then seemed to be that candidates were not well enough prepared in chemistry. Things were rather upset at present. The night schools had been given up; but if an enterprising professor were to start a night school he thought he would get plenty of students. Of course more would have to be paid, but it would be a pity for the sake of a few pounds not to have the candidates well prepared. He thought it would be better to let this matter rest for a little.

Mr. Doran said that if a man showed himself capable of passing at an examination, even though he had only had fifty or twenty-five hours study, he did not see why he should not be allowed to pass.

The Vice-President: If you did that it would amount to going back to the old times when we had no curriculum at all.

Mr. Doran: I do not see why a man should not be allowed to pass either the Preliminary or the final examination if he shows that he is fit to do so. A man might learn chemistry by private study without attending any school.

Mr. McNaught remarked that there were a considerable number of small towns in Ireland with populations of not more than from 4000 to 5000, in which there were good science classes.

The President: Mr. McCormack has a motion on the paper that the Society should establish a night school of chemistry. Would you appoint a special committee to look into both matters? We know that our candidates are not now in a position to obtain the hundred hours study, no matter how desirous they may be to get it. It is a great hardship on candidates to be obliged to pay double fees.

Mr. McCormack was permitted to move his resolution, which appeared farther down in the *agenda* paper, and which was "That a night school of chemistry be established in connection with the Pharmaceutical Society." About a fortnight ago he heard that the Ledwich and the Carmichael School were about to discontinue their night lectures. If the Society's candidates had no places where they could take out their lectures they would drop off. If the Council could not see their way to establishing a school of chemistry he was afraid they would have to give up the rule requiring the hundred hours work. It might be referred to a committee to inquire as to the cost of establishing a school.

The Vice-President said he would second the proposal for a reference of the subject to a committee.

Professor Tichborne: The Committee should meet early and report to the next meeting of the Council, so as, if possible, to have the matter arranged before the winter session begins.

On the motion of Mr. McCormack, seconded by Mr. Whitla, it was resolved that Mr. Kelly's letter and Mr. McCormack's notice of motion be referred to the following Committee:—Dr. Tichborne, and Messrs. Grindley, Beggs, Hayes, Hodgson, Merrin and Simpson.

The following letter, dated September 9, from Mr. Greenwood Pim, Secretary to the College of Physicians and College of Surgeons conjoint examinations, was read:—"Dear Sir,—Replying to your favour of the 6th instant, I was under the impression that the service alluded to in your first letter was the three months with a licentiate apothecary, etc., formerly accepted. That mentioned in page 7 of the New Regulations is, as you will observe, service for three years as apprentice, or one year as paid assistant, which is very different from the three months instruction formerly. This accounts for my not mentioning the matter in mine of August 12.—Yours, etc., Greenwood Pim."

The Vice-President: By this letter we find that a year's service as paid assistant to a pharmaceutical chemist will be taken.

The President: Or three years' apprenticeship.

A letter was received from Mr. Robert Wall enclosing a certificate of practical pharmacy in lieu of indentures, which he desired should be returned to him.

The Registrar was directed to write to Mr. Wall stating that the certificate he had sent was not sufficiently specific.

The President said the next item on the *agenda* paper was a letter from "an anonymous correspondent, stating himself to be a licentiate, complaining of breaches of the Poisons and Pharmacy Act." He (the President) had had this anonymous letter mentioned in the paper in order to take the opinion of the Council as to whether it should be read or not.

Professor Tichborne: I move that it be marked "not read," so as to let it go to the world that we do not consider anonymous letters.

The letter was marked accordingly.

A letter from Mr. James I. Watterson, of Belfast, stating that owing to the recent changes in the Society he did not feel inclined to go in again for the examination, as no protection was afforded to chemists; and asking that half the fee which he had paid should be refunded.

Mr. Beggs: There is no precedent for the return of fee. We will give him a second examination free.

The Registrar was directed to inform Mr. Watterson that no exception could be made in his case to the regulations.

A letter was read from Dr. Montgomery stating that it was not his intention to renew his subscription to the Society.

The President: We all regret Dr. Montgomery's withdrawal from the Society.

A letter was read from Mr. A. J. Paterson resigning membership of the Society.

A prospectus from Mr. F. J. Hanbury, of an illustrated monograph of the British Hieracra, was submitted to the Council.

Donations were announced from the Smithsonian Institution of Part I. of their Annual Report for 1886; from the Alumni Association, Philadelphia College of Pharmacy, of their 25th Annual Report; and from the Mason Science College of their Calendar for 1889–90.

On the motion of Mr. McCormack, seconded by Mr. Beggs, thanks were voted to the donors.

A report from the Certificates Committee was adopted.

A report from the Law Committee was postponed until the next meeting of the Council.

The report of the Examiners upon the October Preliminary and Licence examinations was laid on the table.

The President: You will see that 50 per cent. of the candidates at the Preliminary examination failed.

The Vice-President moved that the following licentiates be admitted members of the Society:—Messrs. William Hanna, Main Street, Bangor; Charles Marshall, Hamilton Street, Belfast; and John Anderson, 47, Market Square, Lisburn.

The President seconded the motion.

Mr. Whitla moved that Mr. Edward P. Murray, licentiate of Clones, be re-elected a member of the Society. Mr. Murray was a member, but ceased to subscribe because he did not approve of the action of the Council some time ago. He desired to rejoin because he had every confidence in the present Council.

The Vice-President seconded the motion.

On the motion of Mr. Baxter seconded by Mr. Doran, Mr. W. J. H. Madden, licentiate, of Melrose Terrace, Belfast, was proposed as a member of the Society.

On the motion of Mr. McCormack, seconded by Mr. Wells, Mr. T. W. Robinson, of 112, Upper Georges Street, Kingstown, was proposed as a member of the Society.

The Council then adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The seventh general meeting of the fortieth session was held at the Royal Institution on Thursday evening, Nov. 7, the President, Mr. A. H. Samuel, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed and the following donations announced: The *Pharmaceutical Journal*, from the Society; the *Canadian Pharmaceutical Journal*, from the publisher, and the *Pharmaceutical Record of New York*, from the publisher.

A vote of thanks having been accorded to the respective donors,

Mr. J. S. Ward said he believed a law had recently been passed prohibiting the sale of methylated spirit between a certain hour on Saturday night and Monday morning; he was not, however, certain of the exact hours proscribed, and he should be glad to have further information on the point.

Dr. Symes said that some time ago one of the excise officers intimated to him the proposed prohibition of the sale of methylated spirit between 10 p.m. on Saturday and 8 a.m. on Monday. He had not, however, had any notice from the excise that this had passed into law, and he was under the impression that it had not yet come into force.

Mr. J. Bain said it had already come into operation and that he had received a notice of it from the supervisor of the Inland Revenue.

Mr. T. F. Abraham said his firm had not received any information of the change in the law, and he considered it strange that all holders of the licence had not received a notice, seeing that some had.

The President now called upon Mr. M. Conroy, F.C.S., to read his paper on "Castor Oil Adulteration," which will be found printed on page 385.

In the discussion that followed, the President, Messrs. Bain, Parkinson, Symes and Ward took part, and a vote of thanks, proposed by Mr. R. Parkinson and seconded by Dr. Symes, was very heartily accorded to Mr. Conroy for his paper.

The President now called upon Dr. Symes to read his paper on—

ESSENCE OF SENNA PODS.

BY CHARLES SYMES, PH.D.

Nowadays when, like the Athenians of old, we are constantly looking for something new, it is rather gratifying to recognize the reintroduction of a drug which can claim antiquity as one of its virtues.

Not only were senna pods known but their properties were recognized a century or two ago; but so far as I can gather they have not been popular at any period until quite recently.

Dr. Keith, after giving them an extended trial, recommended them to Dr. Macfarlane, who on gaining experience of their utility as an aperient contributed a note on the subject, which was published in the *Lancet* of July 27 last. Soon after this a parcel which had lain on our shelves undisturbed for nearly twelve months was brought into use on a few ounces of a concentrated infusion being applied for.

This small quantity was prepared by the evaporation of an infusion in the way mentioned subsequently by Mr. E. H. Salmon, in the *Pharmaceutical Journal* of October 12, p. 281. This produced a dark liquid, possessing scarcely any odour or taste, and in no way reminding one of its relation to senna leaves.

I should perhaps have agreed with Mr. Salmon that it was tasteless; but recently a customer mentioned that after taking "tasteless castor oil," "tasteless cod liver oil," and "tasteless cascara sagrada" he had come to the conclusion that a chemist's notion of the meaning of "tasteless" was a rather extraordinary one and differed widely from that of the public generally.

This was fairly efficient as an aperient, but as it scarcely came up to expectations a larger quantity was prepared to meet a growing demand, in what I regard as a more rational manner.

Mr. Groves long since determined that the activity of senna leaves depended on the presence of a compound of cathartic acid with calcium and magnesium, and that this was injured by continued heating.

The active agent being cathartin in senna pods also, it was evident that to obtain the best results extraction by pressure, as advocated by Mr. E. W. Bell in the *Chemist and Druggist*, October 26, p. 609, must be adopted. Mr. Bell's proposal is in fact all that could be desired, but experience on several batches convinced me that he does not completely exhaust the leaves, and that the resultant fluid extract is not a true valoid. In other words, the 16 ounces of finished essence does not in my experience represent the full activity of the pound of pods from which it is prepared. No doubt the evaporation method tends to produce the more nearly tasteless preparation, but this will depend to some extent on whether the pods are old and brown or new and green.

Nearly all the supply at present is fairly old, for the demand until recently has been exceedingly small, but that it has grown considerably will be evident from the fact that the stock offering on the London market on October 10 was from fifteen to twenty bales, whereas a fortnight later, as far as could be ascertained, this had all been bought up, and there was not a bale remaining in first hands.

If the pods have been well preserved they contain a small quantity of oleo-resin and a little wax, which are readily extracted by ether (as sample now shown). Dr. James wrote in 1752: "The fruit or follicles of the senna tree are less active than the leaves," and this is supported by some opinions at the present day; but Mr. Salmon found those he examined to contain 2½ per cent. of cathartin as compared with 2 per cent. only in the leaves, but he does not say if this substance was purified further than by precipitation with alcohol; if not it may contain some little mucilaginous and albuminous matter.

Two samples of pods examined by myself contained 0·72 and 0·80 per cent. of purified cathartic acid respectively, obtained by precipitating a fluid extract with an equal bulk of absolute alcohol; the liquid filtered from the precipitated mucilage and salts was mixed with more alcohol as long as a precipitate was produced. This precipitate was washed with alcohol, dissolved in a little water freed from albumen by a few drops of hydrochloric acid, and the filtrate completely precipitated by the addition of more hydrochloric acid. The impure cathartic acid thus obtained was purified by dissolving in 60 per cent. alcohol, and precipitating by ether. My object, however, has not been to make an exhaustive inquiry into the relative merits of senna leaves and pods, but to propound on a knowledge of what appears to me the best lines a rational formula for the fluid extract or essence. Although hydraulic pressure is undoubtedly the best for the purpose, a good screw press answers fairly well, and the "Enterprise Press" still better for this particular drug. Operating then on 1 pound of pods the form I should suggest is as follows:—

Senna pods, slightly bruised.	
Rectified spirit	5 ounces.
Distilled water	12 ounces.

Press the pods well down in the containing vessel, and pour on them the mixed spirit and water; in twelve hours reverse the position of the pods, and allow to stand a further period of twelve hours. Subject to strong pressure, set aside the liquid in a bottle, break up the marc, and pour thereon the following, previously mixed:—

Glycerine	1 ounce.
Liquid ammonia	20 minims.
Distilled water	19 ounces.

Allow to stand four hours, press strongly, strain and evaporate the liquid so obtained until, when well mixed with the first liquid and filtered, 16 fluid ounces will be produced. The addition of one drop of each of oil of carraway and ess. oil of almonds, with two drops of essence of lemons, makes it really palatable.

The medium adult dose is 1 fluid drachm.

At the close a discussion ensued in which Messrs. M. Conroy, T. F. Abraham, H. Wyatt and J. S. Ward took part, and a vote of thanks, proposed by Mr. M. Conroy and seconded by Mr. T. F. Abraham, was heartily accorded to Dr. Symes for his paper.

The President now called upon Mr. F. A. Brown to exhibit his "Extemporized Pinhole Camera."

This was made out of an empty Le Page's liquid glue box—a hole was bored in each end of the box and covered with a piece of tin, and in the exact centre of each piece of tin a very minute hole was pierced. The box was now divided at the middle, thus making a double camera. In order to fix the plates at proper focal distances Mr. Brown fastened some pieces of ribbed paper to the sides of the box. The object in devising the apparatus was to show that photographic negatives can be taken with a camera without a lense, and as evidence of the success of the experiment Mr. Brown showed several negatives he had taken and explained that the smaller the hole through the tin the better the result.

The President in proposing a vote of thanks to Mr. Brown said it had been a very interesting communication, and they were deeply indebted to him, for he had also on several occasions sent papers to be read before the Association, and he took this opportunity of thanking him in person. This was seconded by Dr. Symes and carried with applause.

The President now moved that owing to the lateness of the hour the "Discussion on The Pharmacy Act in its Relation to Unregistered Assistants" be adjourned.

This was seconded by Mr. M. Conroy and unanimously resolved.

The meeting now terminated.

UNQUALIFIED ASSISTANTS AND THE SALE OF POISONS.

Meeting in Sheffield.

On Wednesday evening a meeting of persons in Sheffield who are concerned in the sale of scheduled poisons, convened by the Sheffield Pharmaceutical and Chemical Society, was held in the Society's lecture hall. The object of the gathering was to discuss the question, "Who is the Seller of a Poison under the Pharmacy Act?" Apparently nearly all present were connected with the Society. The President of the convening body, Mr. A. R. Fox, was elected to preside, and among those present were Mr. Newsholme, Mr. Learoyd, Mr. Bradwall, Mr. Preston, Mr. Archer, Mr. Ellinor, Mr. R. Watts, and a few other of the leading chemists in the town.

The Chairman explained the circumstances out of which the question arose, and read a telegram announcing that in the action brought by the Pharmaceutical Society of Great Britain at the instance of a coroner, against an unqualified assistant for selling a poison, a decision had been given that the word "sell" in the 15th section of the Pharmacy Act refers to the actual seller.

A letter was then read by the Secretary to the Society (Mr. Morrison) from Mr. J. M. Furness (an ex-president of the Society), in which he wrote:—"The subject you are to discuss is very important, and although the assembly you will have can scarcely approach it without bias, yet it is to be hoped that the opposition to such illogical innovations as are proposed may be none the less effective on this account. The personal qualification and active supervision of the proprietor of each establishment dealing in dangerous and poisonous drugs is the very best protection the public can have."

Mr. A. H. Allen, the borough analyst, in the course of a letter said:—"I hold that the intention of the law is that every sale of deadly poison should be properly recorded, so that in the event of necessity the purchaser can be discovered. I think the Act should be very strictly complied with as regards requiring the name and address of the purchaser, the alleged purpose for which the poison is wanted, and the introduction of a stranger should be rigidly insisted on, unless he practically introduce himself by means of his card. On the other hand, I cannot see that it matters by whose hands the poison is handed over the counter. If the view be insisted on that the sale of poison can only be made by a registered pharmacist, the result will be that in many country places the sales of poison will not be recorded at all, or in order to evade the Act something else will be sold and the poison be given away. It should be made to the interest of pharmacists to comply with the law instead of setting them to think how they can evade it."

Mr. Learoyd opened the debate by moving the following resolution:—"That this meeting cordially approves of the recent interpretation of the 15th clause of the Pharmacy Act, 1868, and is prepared to support the Pharmaceutical Council in prompt action in all cases of its infringement." He began by saying he had the greatest sympathy with all the members of the trade whether qualified or not; and he proceeded to speak of the time when there were no compulsory examinations, and when apprentices were apprentices and not students. But he pointed out that, years ago, they were led to expect compulsory examinations, so that the present state of affairs in the trade was not altogether a surprise. He next showed how the Pharmacy Act was passed in the interests of the public, and remarked that the Act had been a success in the direction at which it was aimed. He touched upon the establishment of stores, and the irritation they had caused among chemists, and then dealt with the real question at issue, viz., the interpretation of section 15 of the Pharmacy Act. He supported the interpretation of the Pharmaceutical Society, and said its general adoption would have a most beneficial effect upon pharmacists throughout Great Britain. That interpretation meant that the pharmacist of yesterday should stand in one position and the pharmacist of to-morrow in another position. This was about the first gathering in the provinces to discuss the question of whether the interpretation by the Pharmaceutical Society was proper or not? whether the Act meant that the person who actually handed over a poison to the buyer was responsible, whether he was an assistant, apprentice or substitute, or his qualified employer. He confessed he had a sympathy with the old assistants who were not qualified under the Act, and yet who discharged their duties faithfully and well, but on the other hand they had carefully to consider the object of the Act. He confessed that he did not think it was intended that the master or principal of an establishment should only be the person to hand over and sell a poison, yet he was convinced that the new interpretation would benefit the pharmacists and tend to enhance their position.

Mr. G. Ellinor formally seconded the motion.

Mr. Preston said he had no sympathy with those who being registered pharmacists broke the law wilfully or ignorantly, or with those who, not being registered, by subterfuges few or many, evaded the law; yet they were bound as reasonable men to look at the question from a broad and sympathetic point of view. The position in which they now stood was that the Council of the Society declared the reading of section 15 to have been wrong during the last twenty-one years. It seemed strange to him that they should go on so long before they found out that the words "any person" in that section meant any person who was not registered under the Pharmacy Act. The law of prescript was that if for a certain number of years there had been agreement upon a certain line that became the reading of the law Such being the case in regard to the 15th section, he thought they would be wrong in saying now that either the Pharmaceutical Society or anyone else was right in interpreting "any person" to be anyone who was not registered. He inferred that the phrase about "any person who shall keep open shop" in the Act referred not so much to any person in a registered man's shop as to any person who might sell poisons in the open air. It had no reference to registered people keeping open shop who employed servants, and were responsible for their conduct at their establishment. That this was the true reading he had only to point to section 17, which stated that the person on whose behalf any sales were made by any apprentice or servant should be deemed to be the seller. Therefore he held that the seller, whether he was apprentice or servant, registered or unregistered, was none other than the registered proprietor of the establishment. He expressed surprise at the result of the recent prosecution. He went on to refer to what is known as the widow's clause, and said under it a registered employé gave virtue to an unregistered widow, administrator, or trustee. He could come to no other conclusion than that the seller was the proprietor of the establishment, who was the responsible person. If he looked at the question from a selfish point of view he must naturally feel glad at this latest interpretation of section 15, but he desired to look upon it from a general standpoint. He was afraid if the decision were taken to a higher court it would be reversed.

Mr. J. H. Bradwall supported Mr. Preston's arguments. He pointed to the matter of label, and said the presumption was and had been all these years that it should contain the name and address of seller. Surely it was never intended by the framers of the Act that when a poison was sold it should bear the name and address of the man who actually handed it over the counter. The law evidently meant the proprietor of the establishment. Then as to the book of registry, the Act distinctly stated that it should be kept by the seller, who naturally was the keeper of the shop.

Mr. Hartley, who said he was an unqualified assistant, contended that the case which came before Justices Grove and Lopes showed the Act meant the proprietor of the shop, and not simply the person who handed the poison over the counter.

Mr. Archer agreed with the arguments of Messrs. Preston and Bradwall.

Mr. Humphrey doubted whether it was originally intended the Act should have the interpretation now given to it by the Society. The qualified assistants (and he was one) would benefit by it, but he should liked to have heard something said as to how the decision would affect the small pharmacists who could not afford to keep a qualified assistant.

Mr. R. Watts expressed approval of the proposed resolution.

Mr. Newsholme also supported it. He referred to the charter of incorporation which was obtained in 1843, and said at that time those who joined the Society were recommended to pass examinations. The whole intention of the Pharmacy Act was qualification, and it was not intended that the principal only should be qualified. He contended that the qualification of the seller of poisons was contemplated, and pointed out two Scotch cases as showing that the seller meant the person who actually sold the poison. Of course it should be understood that an unqualified assistant could hand over a poison if his qualified master was standing by and took the responsibility. He wished to make it clear that the Council of the Pharmaceutical Society did not interpret the Act; it left that to the judges and the magistrates, and simply desired to carry out the law. With regard to labels on poisons he argued that the name of the proprietor of the shop was put on for the purpose of tracing. Assistants, even if qualified, did not always remain at a shop. As to the widows' clause, it stipulated that there should be a qualified man to protect the public. The aim of the Act was that poisons should be sold by educated people, and an educated man might often prevent a case of suicide.

Mr. Preston inquired whether the Scotch decisions mentioned had not been reversed?

Mr. Newsholme replied that so far as he knew they had not been.

Mr. Marshall thought there was some doubt as to the 17th section, but still he agreed with the latest interpretation of the 15th.

Mr. Ellinor expressed the opinion that it was originally intended the hander over of a poison should be qualified, and the great mischief was they had not fully acted up to the Act in the past.

Mr. Eardley agreed with the resolution. He said the Act was passed not for the benefit of the chemists and druggists, but for the benefit of the general public. It, however, struck him as strange that for twenty-one years they had gone on without there being prosecutions of unregistered persons who actually sold poisons. But the stricter the law was made the better it would be for qualified chemists.

Mr. Learoyd then replied on the discussion. He said undoubtedly the Act had been framed in the interests of the public, and they had to ask themselves whether they ought not to carry out the meaning of the Act, and whether they would be carrying the responsibility placed upon them if they delegated to unqualified persons the responsibility of selling poisons.

Mr. Preston then formally moved the following amendment: "That whilst the meeting desires to express its sympathy with the Pharmaceutical Council in its present trying ordeal, it thinks the recent interpretation of section 15 is out of harmony with the plain language of section 17."

Mr. Bradwall seconded the amendment.

On a show of hands being twice taken the Chairman announced that the voting was equal, but he gave his casting vote in favour of the resolution, which was accordingly carried.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the session was held on Thursday evening, Nov. 7, in the Association's rooms, Commercial Street. There was a good attendance.

Owing to the unavoidable absence of the President the chair was taken by Mr. T. C. Henderson.

After the minutes of the last meeting had been read and confirmed, and some other business transacted, the Chairman called on Mr. W. G. Lamont to open the discussion on "Ought the Curriculum Bill to become Law?"

In his opening remarks Mr. Lamont said that ever since the passing of the Pharmacy Acts the Pharmaceutical Society had kept what might be termed a skeleton in the cupboard in the shape of a higher education Bill. In the year 1880 this skeleton was taken out, clothed in flesh, and placed before the profession in the shape of this much discussed "Curriculum Bill," and although there had been slight changes made in it since then, yet the framework was still the same. After reading the various clauses of the Bill Mr. Lamont discussed each of them, and in a very able manner advocated the merits of the Bill, and enumerated the various advantages which all connected with pharmacy would acquire should it become law. Speaking on the various points which the opposers of the Bill had from time to time brought forward he said that one of the most prominent was the expense to which students would be put by having to attend, for at least six months, a recognized course of lectures. He did not think that this would really be the case when the whole thing was fully considered. He had only to ask them to examine the various pass lists of the Pharmaceutical Society and see the numbers of failures that were therein recorded, and although nothing was said in these lists how often any man failed, yet it was a well known fact that even out of these passes many only got through after repeated attempts. What was the cause of these numerous failures? Simply imperfect training. Quoting the words of Mr. Gilmour in his inaugural address, who said that in his experience five cases out of every six candidates who were successful had attended some course of training, he asked, would it not be better, and perhaps cheaper, if there was a recognized path to tread? Moreover he was confident that if this Bill became law the passes, instead of being a miserable 40 per cent., would go up to 80 or 90 per cent., as in Germany, and that in after years the students themselves would appreciate the advantages of this curriculum. Education was a thing which they could not have too much of, and therefore they ought not to oppose this Bill, which would ensure the higher education of the members of the profession. On concluding Mr. Lamont was greeted with a hearty round of applause for the able manner in which he had advocated his side of the discussion.

Mr. Skinnner, who had the negative side, then laid his views before the members. His main points were that the present examination was quite a sufficient test for a man's ability to keep open shop as a chemist and druggist. That those who thirsted for the higher education had the privilege of going in for the Major, which ought to satisfy their ambition. The compulsory course of training, he said, would entail great hardship on country students. It was all very well for assistants situated in large centres to attend these lectures, but how was any person situated in the far off country districts to manage to do so. It meant struggling on for years at the present rate of pay before a sufficient sum could be saved to enable one to give up employment even for six months, and the result would be that only moneyed persons would be able to afford to allow their sons to become chemists. The passing of the Bill, moreover, would only mean a large increase of stores, doctors' shops, etc., and would never prove a protective measure in any way. What chemists wanted was a new Pharmacy Act—an Act whereby their interests would be protected from the many usurpers that now existed, and not until the passing of such a measure should the Pharmaceutical Society speak of imposing any curriculum. Mr. Skinner also spoke at some length on the rejection of the clause providing that branch shops should be managed by qualified assistants only; that clause, he said, ought to have been retained, and unless some decided action was taken on this point the Bill would prove the ruin of the trade.

On the conclusion of the debate some considerable discussion took place, in which the Chairman, Messrs. Lindsay, Lee, Petrie, Mair, and others joined, and a vote having been taken, it was found that the negative side had gained the day by the narrow majority of four.

The Chairman having intimated the next meeting the proceedings then closed.

Parliamentary and Law Proceedings.

ACTION UNDER THE PHARMACY ACT.

On Tuesday last the action of the Pharmaceutical Society of Great Britain *v.* Wheeldon came before His Honour Judge Holroyd at the Wandsworth County Court. The action was brought to recover a penalty from the defendant for selling a poison, he not being a registered chemist and druggist.

The Pharmaceutical Society was represented by the solicitor, Mr. Flux; Mr. Rawlinson, barrister, appearing for the defendant.

Mr. Flux, in opening the case, said, This, your honour, is an action brought to recover a penalty under the Pharmacy Act of 1868. I think the Pharmacy Register is in Court; it is sent by the Home Office to the various County Courts, and if you have the book in your hand I can refer you to the various passages. The Act commences with a recital that it is expedient that persons dealing in poisons should have a competent knowledge of their business, and then it proceeds in clause 1 with these words: "From and after the 31st day of December, 1868, it shall be unlawful for any person to sell"—the word "sell" is the one on which I have to rely to-day—"or keep open shop, unless such person shall be a pharmaceutical chemist or a chemist and druggist within the meaning of the Act, and be registered under this Act." Then there are clauses which define poisons, and I have to prove that this defendant has sold a poison within the meaning of the Act. Then at section 13 there is a provision as to the making and keeping of a register, and that the register shall be evidence that the persons therein specified are registered according to the provisions of the Pharmacy Act. So that the production of the register will carry me so far as to prove that this defendant's name is not upon it, and, therefore, that he is not a duly qualified person within the first section. Then section 15 creates the particular offence in respect of which this action is brought. "From and after the 31st day of December, 1868, any person who shall sell, or keep an open shop, for the retailing," and so forth, "not being a registered pharmaceutical chemist," etc., "shall for every such offence be liable to pay a penalty or sum of £5, and the same may be sued for, recovered, and dealt with in manner provided by the Pharmacy Act for the recovery of penalties under that Act." I rely upon the register.

His Honour: You say the name not being on the register shows that he is not a registered person under section 1.

Mr. Flux: I do. Then section 15 says that the penalty incurred may be sued for in manner defined by an earlier Act; and my case is that I am suing in accordance with that Act, as I can easily show, if the learned Counsel puts me to that. I will assume for the moment that I need not trouble the Court so far. This particular case has arisen consequent on a death which led to an inquest; and the learned Coroner for this Division of London having laid the facts before the Council of the Pharmaceutical Society, that Society has—

Mr. Rawlinson: I do not want what the Council has said.

Mr. Flux: That Council is charged by the Act of Parliament with the bringing of such actions. I am going no further than saying that that Council has in the exercise of its discretion duly authorised the bringing of this action. The facts shortly stated are these: The defendant on a Sunday evening was left apparently in sole charge of a shop at which poisons scheduled under this Act of Parliament were for sale. A female attended at the shop to make a purchase and saw the defendant. Then in accordance with the requirements of the statute the defendant and the purchaser signed or initialled a poison book which was kept at the shop as required by the Act. The purchaser obtained the article for which she had asked, of course paid for it, and in the course of that same night was found in a very sad state, and within some forty-eight hours she became a corpse. The poison book is I believe in court, and your honour will find upon the face of that book the signature of the deceased person, which will be identified, and the signature of the defendant, which will also be identified, and I shall submit that that will be evidence that the defendant did in fact conduct the sale. Then I have medical witnesses who will prove that the article purchased was a well-known article, Battle's Vermin Killer; that it is universally known to contain strychnine in dangerous proportions, and that the deceased told her medical man that she had taken the article which she had purchased. The medical man will prove that the *post mortem* appearances and all the symptoms were consistent with, and only with, poisoning by strychnine. I submit to your honour upon that I shall be entitled, in the interests of the public, for whose protection this Act has been passed, to have judgment for the sum of £5 for which the action is brought.

Mr. Flux then called upon Mr. Foster to produce his poison book.

Mr. Rawlinson: I do not know whether my friend wishes to go into all these details. The poison book is here, and it is undoubtedly signed by the defendant. The complaint which is alleged against us is that we have committed an offence under section 15, and it is really upon that that I shall have to address you. This Act has been in operation since 1868, and there has never been such an action as this brought before. It is suggested that this section means that no chemist in any part of England who happens to sell poisons, as every chemist does, shall be allowed to leave his shop for five minutes on any occasion, or, if he does so, no poison is to be sold in the interval.

His Honour: Not so; if he has a properly qualified person there he may leave the shop as much as he likes.

Mr. Flux: If the learned counsel admits the facts stated in my opening I shall not have to prove them.

Mr. Rawlinson: You had better prove them. I will admit that this is our poison book, and that we sold this preparation called Battle's Vermin Killer.

Mr. Flux: May I ask the learned gentleman what he means by "our poison book?"

His Honour: He means the poison book of the chemist. Let us go to the point at once. The question turns on the 15th section. It is admitted that the defendant did sell the Battle's Vermin Killer. He is not duly qualified, that is, he is not registered.

Mr. Rawlinson: No, he is not registered.

Mr. Flux: Does the learned gentleman admit that Battle's Vermin Killer contains strychnine?

Mr. Rawlinson: I have no means of knowing that. If you have any evidence that it contains strychnine it may as well be proved.

Mr. Flux: Mrs. Housdon will prove the handwriting of the deceased.

Mr. Rawlinson: That is admitted.

Mr. Flux: I can call medical evidence to prove that Battle's Vermin Killer contains strychnine. It is proved on public documents that strychnine is a poison within the meaning of the Act of Parliament. I rely upon section 2 of the Act. I will read the whole section, if you please: "The several articles named or described in the Schedule A shall be deemed to be poisons within the meaning of this Act."

His Honour: Now let us look at Schedule A: "Strychnine and all poisonous vegetable alkaloids and their salts."

Mr. Rawlinson: If you prove that this is strychnine I will admit that strychnine is a poison.

His Honour: The point is that this preparation contains poison.

Mr. Flux: I will call the medical man who attended the deceased.

Mr. George Frederick Burroughs sworn, examined by Mr. Flux.

Do you know the article called Battle's Vermin Killer?—I do.

Do you know the contents of that article?—Strychnine.

Do you know the other ingredients?—Indigo blue, colouring matter.

What is the active principle of it?—That is strychnine.

His Honour: It is nux vomica, is it not?—Strychnine is manufactured from nux vomica.

Mr. Flux: That is the active principle of Battle's Vermin Killer?—Yes.

Cross-examined by Mr. Rawlinson.

What percentage is there in Battle's Vermin Killer?—I am not chemist enough to know.

You have never analysed this?—No.

You came here to swear to a totally different matter, as to the death of the deceased, and not as to the component parts of Battle's Vermin Killer?—Yes. I gathered there was some strychnine in it.

You have no idea as to the amount?—No.

Re-examined by Mr. Flux.

Have you any doubt that a packet of vermin killer, as such packets are sold, contains abundant strychnine for the destruction of life?—I could not say.

Have you known instances of death resulting from the use of Battle's Vermin Killer?—Yes.

Did you perform a post mortem examination?

Mr. Rawlinson: I object to the post mortem of this lady being in evidence.

His Honour: Have you any doubt that this Battle's Vermin Killer contains strychnine?—No doubt.

Have you any doubt that strychnine is a deadly poison?—No doubt.

What quantity of strychnine would kill a person?—A grain would do it.

Mr. Flux: Did you attend Sarah Godwin Housdon as a medical man.

Mr. Rawlinson: I object. I have nothing to do with this. The question is whether or not we sold poison.

His Honour: The question is whether strychnine is a poison, and whether it is contained in Battle's Vermin Killer.

Mr. Flux: Does the learned gentleman admit having sold Battle's Vermin Killer to the person whose signature appears in his own poison book? The signature is that of Sarah Godwin Housdon. I ask this gentleman whether he was the medical attendant of Sarah Godwin Housdon.

Mr. Rawlinson: I submit it is irrelevant. It does not arise out of my cross-examination.

His Honour: They have admitted that the defendant has sold Battle's Vermin Killer, that he is not a chemist, and that strychnine is a poison. Then this medical gentleman comes here and says that Battle's Vermin Killer does contain this poison, strychnine.

Mr. Flux: That is all I want. I will not call any other witness.

Mr. Rawlinson: I used the expression "not a chemist." I am told I ought to say he is not a properly qualified man. He has not passed the Minor examination which qualifies him within the meaning of this Act, but he is a chemist. The point I want to put before you is this, that the employer of this man is a properly qualified chemist, and that his other assistant, who keeps the poison book, is also a properly qualified chemist.

Mr. Flux: This offence was committed at a shop which purports to have been owned by a duly qualified chemist.

Mr. Rawlinson: Before I deal with the authorities on the point I wish to point out what you are asked to do in this case. You are asked to translate these words, "it shall be unlawful for any person to sell, or keep open shop for retailing, dispensing, or compounding poisons, or to assume or use the title chemist and druggist, or chemist or druggist, or dispensing chemist or druggist, in any part of Great Britain, unless"—and so on, in this way, that though the chemist who keeps the shop, who gets all the profits of the shop, and whose name is above the door, is a properly qualified chemist, and therefore makes up the very article which is sold, or at all events knows what the ingredients are, yet if his servant is not also a properly qualified chemist he is liable to a penalty for selling poisons. This Act was passed in 1868, and I know of no sort of action brought under this section by the Pharmaceutical Society before. It has been the invariable custom for a chemist who is conducting a big business to leave an assistant to retail over the counter poisons. Such a sale is on account of the principal who keeps the shop. I submit that those words "any person to sell or keep open shop" were never meant to apply to the servant who sells the article, but were meant to apply to the person who keeps the shop, and who really is selling the poison in question. I emphasize that point, because I say for more than twenty years that Act has been in operation, and no proceedings have been taken under that section. It would be a very serious matter indeed if your honour now holds for the first time that this section is to apply in that way. I should like to add one further word. This is an action for a penalty, and I submit to your Honour that the statute must be clear and the words express to show that the person acting in this way is liable to the penalty. There is no doubt that the Act might be very much clearer. It says, "For any person to sell or keep open shop for retailing, dispensing or compounding poisons, or to assume or use the title chemist and druggist." They are all offences, I submit, *ejusdem generis* with carrying on a shop without a properly qualified manager. The object of the Act is this, that there shall be some properly qualified person in charge of the shop who knows what poison there is in the different articles he is selling, and it was never meant to apply, and certainly has never been made to apply, to any unfortunate apprentice who sells in the absence of his master some six-pennyworth of vermin killer. There is no authority directly on the point; but there is one case reported in the House of Lords in which there is an *obiter dictum* of Lord Selborne's on a totally different state of facts.

His Honour: It was held there that a corporation was not a person, and therefore did not come within the Act. There they kept a qualified person to sell poisons, though of course the corporation was not registered as chemists and druggists. In the court below it was held that the corporation was liable to the penalty; that was reversed by the court above, and the House of Lords approved of the decision of the Court of Appeal. They held there the simple point that the corporation was not a person.

Mr. Rawlinson: The object of course there was to prove that the person who employed a qualified person was not liable if the person who sold was duly qualified. There are various remarks of Lord Selborne at the end of his judgment which show that he had in his mind the case where there was a qualified employer and an unqualified employé. In construing the section which he is there dealing with, section 16, he says: There is "a special provision for the case of individuals carrying on that kind of business who may die, and whose executors or trustees, not being themselves qualified, might desire to carry it on after their deaths. It is true that the legislature has, in that case required, for the benefit of the public, this safeguard that there shall be an assistant duly qualified; but the legislature shows that, having that case in view, it was not thought necessarily inconsistent with the object or policy of the Act that the principals or proprietors of the business, the persons deriving profit from it, to whom those actually selling the drugs would be responsible should be unqualified persons, provided that there was in the business a duly qualified assistant. It by no means follows that all the drugs would necessarily be sold by that duly qualified assistant; or that he might not be, as in this case, under the general superintendence of a manager not himself duly qualified; all that is left open. It is, at least, not thought indispensable that the persons carrying on such a business should themselves, without exception, be duly qualified." Therefore, it by no means follows that the drug would necessarily be sold by that person. He assumes there that no offence would be committed. This is an entirely new point. He assumes there that under section 16, if the business were conducted by a duly qualified chemist, certain work might be done by an unqualified assistant, who might sell these things, provided there was proper management of the shop at the time. Then again there is the case of Templeman *v.* Trafford in the 8th Queen's Bench Division. That is under the other section. Referring to section 15 Mr. Justice Grove says this: "Light is thrown on the construction of that section by section 15, which enacts that any person selling or keeping open shop for retailing, dispensing, or compounding of poisons, not being a duly registered person, shall be subject to certain penalties. The word 'sell' there is in one sense contra-distinguished from the words 'keep open shop,' and so possibly may apply to sales which are not in open shop." That is Mr. Justice Grove's reading of the section. He never suggested for a moment that the word "sell" within the meaning of that section was to apply to people who had properly qualified persons over them, but he suggested that it was meant to apply to persons who made sales outside the open shop. I say the Act being a penal Act should specify the offence clearly and definitely; and that is not done by this Act. Further I say, as a very strong corroboration of my reading of the Act, this penalty has never been enforced for twenty years. The Pharmaceutical Society is not idle in its work, it enforces such penalties as it is entitled to, but it has never attempted to enforce this one.

Mr. Flux: I do not know what authority my friend has for saying this. We have a contest here to-day, but there have been cases which have not come into court.

Mr. Rawlinson: The authority which my friend relies upon in the House of Lords is very much qualified, if not entirely taken away, by the end of Lord Selborne's judgment, where he clearly anticipates such a state of things where there is a properly qualified assistant, though the actual sale is conducted by an apprentice. I do not know whether your honour sees the terrible result that might ensue from a decision against my client.

His Honour: No, I do not see it. The Act says he must not sell poisons unless properly qualified. I do not see where the hardship is.

Mr. Rawlinson: It would be a great hardship on many chemists in country places. No doubt in some small towns chemists have no assistants or apprentices at all. The Act is meant to meet the evil of selling poisons made up by persons who do not know what they are selling. Here you have simply the case of a boy left to do the sale over the counter. The thing is made up before that, and all the proper formalities are gone through. Section 17 is hedged round with formalities as to what you are to do; you are to take the name and address of the purchaser, and put the article up in a certain bottle with a certain label. There is no suggestion that these formalities were not carried out here.

Mr. Flux: Oh, yes.

Mr. Rawlinson: There has not been up to this moment any suggestion of any offence committed by us under the 17th section. It is not pleaded, and my friend cannot, therefore, now raise that point.

Mr. Flux: I will tell you what it is if you wish.

His Honour: Section 17 is not before me at all. It is section 15.

Mr. Rawlinson: I say section 17 is hedged round with formalities, but up to the present time there has been no suggestion that we have in any way infringed that section. The public are protected by that section, and if we had offended against it that would be another matter. This is a made-up article well known to the proprietor of the shop, who would have sold it in the same way had he been there himself. He would have sold it at once, taking the person's name and address in the same way. I do ask your honour to hold that this is not an offence which was meant to be struck at by the Act. What was meant to be struck at was the danger of making up articles with poison in them by an unqualified person. That is the offence which is aimed at by the Act, and not merely selling made up articles across the counter. The 15th section is simply against persons who have the management of a shop, and who sell in the way of getting profit for what they sell.

His Honour: This is an action brought to recover a penalty of £5 under the 15th section of the Pharmacy Act of 1868. That Act says that any person who sells poison not being a duly registered pharmaceutical chemist, or chemist and druggist, shall be liable to a penalty of £5. That means that the person who sells, whether he be master or servant, is struck at by the 15th section. I think, therefore, there must be judgment for the plaintiffs for £5. As this is the first case on the point I hope it will go to a higher court.

Mr. Flux: We shall be well pleased to afford all proper facilities for doing that.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Gorse Seeds.

Sir,—I notice in a recent issue of the *Pharmaceutical Journal* the sad experience of Mr. George Welborn after making a meal off about eighty seeds of the *Ulex Europœus.* It is well known that many of the seeds of the Leguminosæ, especially all the genus *Cytisus*, are highly poisonous. Several cases are reported of long and dangerous illness after taking decoctions of the bark and the seeds of the common laburnum, both producing severe vomiting and great prostration. The seeds of the common broom have produced similar results.

Moral: In your walks abroad take your luncheon with you, or trust to the bread and cheese of the modest wayside inn.

Norwich. Octavius Corder.

Esbach's Test Solution for Albumen.—The following reply to a request for a formula for the above solution has been received from Mr. R. H. Cripps. Similar answers have been received from Mr. C. Arthur, Mr. E. A. Onyon and T. M.

Picric acid	10 grams.
Citric acid	20 grams.
Distilled water to	1 litre.

Dissolve the picric acid in about half the water (hot), add the citric acid, make up to a litre with cold water and filter, if necessary.

Erratum.—In the list published last week, on p. 380, of officers of the British Pharmaceutical Conference elected at the recent meeting in Newcastle, the "Other Members of the Executive Committee" were incorrectly given. The names should have been:—R. H. Davies, D. B. Dott, A. W. Gerrard, J. R. Green, E. M. Holmes, W. Kirkby, N. H. Martin, F. Ransom and G. S. Taylor.

Inquirer.—A copy of the regulations of the Boards of Examiners may be obtained on application to the Secretary, 17, Bloomsbury Square.

Communications, Letters, etc., have been received from Messrs. Pflugge, Nicholls, Arthur, Salmon, Dalglish, Wood, Milne, J. H.

NOTE ON NARCEINE.

BY P. C. PLUGGE, PH.D., M.D.

Of Groningen, Netherlands.

Dott's paper on "Narceine and Its Salts,"* has directed my attention to an earlier paper of Merck's on "Chemically Pure Narceine."† Merck, after describing some experiments concludes: "This behaviour stands in contradiction to the assumption hitherto current that narceine is a very weak base," and farther on: "chemically pure narceine, contrary to previous statements, possesses a faintly alkaline reaction." Being convinced of the correctness of both rejected assumptions, I feel obliged to defend my opinion, which is more in harmony with Dott's.

To Dott's remark "that Merck, like many other German chemists, ignores the work done by English and French chemists," I can add, that Merck seems to be equally ignorant of the work done by a Dutch chemist, even after the publication of the results of his work in a wide-spread German journal. However, my paper on opium alkaloids seems also to be unknown to Mr. Dott. Otherwise this author would probably have strengthened his refutation of Merck's conclusions in respect to the strength of the base narceine with some of the results of my investigations on opium alkaloids.

I entirely agree with Dott that the tendency to form basic salts is no proof of strength; and in my opinion the somewhat strange experiment of Merck with narceine, moistened with acetic acid, etc., is of no value in settling this question.

Referring for further particulars to my circumstantial exposition in the *Archiv der Pharmacie*,‡ I will here shortly repeat the data on the strength of which I have divided the opium alkaloids into strong and weak bases, and have classed the narceine with the last-named group.

I. Differing from all other alkaloids, also from morphine, codeine and thebaine, the three weak opium bases, narcotine, papaverine, and narceine, have no blue-colouring action upon a solution of red litmus, nor any power of neutralizing acids. Therefore, the acid in the solutions of salts of those alkaloids can be estimated with alkali-lye and litmus tincture, as well as in solutions of free acids.

This is demonstrated by the following experiments:—

A. Experiment with $\frac{1}{10}$ Normal Solutions.

1. Forty c.c. diluted hydrochloric acid are neutralized by 41·7 c.c. NaOH solution.

2. Forty c.c. diluted hydrochloric acid, after saturation with *narcotine*, are neutralized by 41·5 c.c. NaOH solution.

3. Forty c.c. diluted hydrochloric acid, after saturation with *papaverine*, are neutralized by 42·2 c.c. NaOH solution.

4. Forty c.c. diluted hydrochloric acid, after saturation with *narceine*, are neutralized by 42·0 c.c. NaOH solution.

B. Experiments with $\frac{1}{10}$ Normal Solutions.

5. Ten c.c. diluted sulphuric acid are neutralized by 9·65 c.c. NaOH solution.

6. Ten c.c. diluted sulphuric acid, after dissolving 268 mgrm. *narcotine*, are neutralized by 9·65 c.c. NaOH solution.

7. Ten c.c. diluted sulphuric acid, after dissolving 300 mgrm. *papaverine*, are neutralized by 9·7 c.c. NaOH solution.

8. Ten c.c. diluted sulphuric acid, after dissolving 300 mgrm. *narceine*, are neutralized by 9·7 c.c. NaOH solution.

C. Experiments with other Alkaloids and $\frac{1}{10}$ Normal Solutions.

9. Ten c.c. diluted sulphuric acid are neutralized by 9·65 c.c. NaOH solution.

10. Ten c.c. diluted sulphuric acid, after dissolving 250 mgrm. *morphine*, are neutralized by 1·7 c.c. NaOH solution.

11. Ten c.c. diluted sulphuric acid, after dissolving 299 mgrm. *codeine*, are neutralized by 0·6 c.c. NaOH solution.

12. Ten c.c. diluted sulphuric acid, after dissolving 308 mgrm. *cinchonine*, are neutralized by 4·6 c.c. NaOH solution.

13. Ten c.c. diluted sulphuric acid, after dissolving 300 mgrm. *chinine*, are neutralized by 6·0 c.c. NaOH solution.

14. Ten c.c. diluted sulphuric acid, after dissolving 200 mgrm. *strychnine*, are neutralized by 3·9 c.c. NaOH solution.

While the weak bases possess no neutralizing power at all, the alkaloids named *sub*. C. neutralize a corresponding part of the strong acid, as well as the NaOH solution.

Morphine.—$C_{17}H_{19}NO_3 + H_2O = 303$, consequently 250 mgrm. morphine = 7·69 c.c. NaOH solution. Therefore in experiment 10 C. I must have a quantity of uncombined acid corresponding with 1·69 c.c. NaOH solution; really 1·7 c.c. more used.

In a second series of experiments a fixed quantity of the alkaloid salt, with a definite quantity of acid, was dissolved in water; this solution being coloured by litmus tincture, NaOH solution was added until a distinct blue colour had appeared. From the quantity of NaOH solution (9·65 c.c. = 0·0365 gram HCl) the amount of acid was calculated. While the weak opium-bases have no neutralizing power on acids, and no influence on the colour of litmus, the quantity of acid found by titration with NaOH must be the same as that calculated from the formula.

1. *Hydrochlorate of narcotine* containing 7·718 per cent. HCl.

Taken 400 mgrm. with 30·87 mgrm. HCl, dissolved in about 30 c.c. water. This solution needed for neutralization 8·4 c.c. soda solution = 30·66 mgrm. HCl.

2. *Hydrochlorate of narceine* containing 6·9076 per cent. HCl.

Taken 368 mgrm. with 25·32 mgrm. HCl, dissolved in 50 c.c. water; used 6·8 c.c. soda solution = 25·72 mgrm. HCl.

3. *Hydrochlorate of papaverine* containing 9·809 per cent. HCl.

Taken 400 mgrm. with 39·24 mgrm. HCl. Used 10·4 c.c. soda solution = 39·34 mgrm. HCl.

All other alkaloids show very different results. Out of several experiments I will quote here only one:

4. *Nitrate of strychnine* containing 15·87 per cent. HNO_3.

Taken 326 mgrm. with 51·73 mgrm. HNO_3, dissolved in 40 c.c. water. While this quantity of uncombined nitric acid would require nearly 8 c.c. of the soda solution, in the proof the first drop of the natron-lye already caused a deep blue colour.

II. Another ground for my division of opium bases into *strong* and *weak* ones is the phenomena shown by its salts with respect to the alkali salts of organic acids.

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* *Pharm. Journ.*, [3], xx., 335 (Oct. 26, 1889).

† *Ibid*, [3], xix., 1035 (June 22, 1889).

‡ *Archiv d. Pharmacie*, xxiv. (1886), 993; xxv. (1887), 45, 49, 421, 793 and 805.

The strong bases (morphine, codeine and thebaine) are not precipitated by the solutions of the alkali salts of organic acids (acetates, oxalates, tartrates, benzoates, etc.), but from the solutions of narcotine, papaverine and narceine salts the pure alkaloid is precipitated, while these weak bases (R) do not combine with the weak acid:

$$RHCl + CH_3COONa = NaCl + CH_3COOH + R.$$

III. The weak bases, narcotine, papaverine and narceine are also precipitated from the solutions of their salts by the solutions of pure $NaHCO_3$, while the strong bases, morphine and codeine, remain in the solutions.

IV. Treated in solution with alkali chromates, ferro- and ferricyanides of potash, narceine appears to belong to the weak opium alkaloids.

The fact that narcotine, papaverine and narceine can be separated from the acid as well as from the alkaline solution, by shaking these solutions with benzol, chloroform, etc., after the method of Dragendorff, while the three other opium alkaloids, morphine, codeine and thebaine, can be isolated only by shaking the alkaline solution, places narceine in the group of weak bases.

Concerning the adulteration of commercial narceine maintained by Laborde, I, in accordance with Mr. Dott, think it highly improbable that narceine would be sent out so contaminated, even with the opium alkaloids, morphine and codeine, most widely differing from narceine.

Moreover, several experiments on animals with the different opium bases make it very difficult for me to understand how the activity of the alkaloid could be weakened by the presence of morphine and codeine.

To conclude, I am of opinion that both Merck's impugning the generally acknowledged weakness of narceine and Laborde's assertion concerning the impurity and consequent inconstant therapeutical action of this alkaloid are not founded in truth.

The commercial hydrochlorate of narceine I used for my experiments was procured from E. Merck in Darmstadt in 1886. A careful investigation showed me that this salt was pure. After combustion the platinum double salt gave 14·548 per cent. Pt, while the formula $(C_{23}H_{29}NO_9, HCl)_2PtCl_4$ contains 14·563 per cent. Pt, and Hesse found 14·52 per cent. Pt. An adulteration with morphine or codeine, whose platinum double salts contain 19·966 resp. 19·048 per cent. Pt, would, therefore, have been highly perceptible by largely influencing the residual quantity of platinum.

THE PARIS UNIVERSAL EXHIBITION.

(Concluded from page 324.)

New Caledonia.—The most conspicuous objects in this collection are the specimens of nickel and copper minerals and a large nickel dish about eighteen inches in diameter. There are also some fine kauri, araucaria and other resins, dark-blackish "beche de mer," and turmeric powder. Several species of dammara are given as the sources of kauri resin in New Caledonia. These are *D. Cornui*, Raoul, the "Metea" or stunted kauri pine; *lanceolata*, Lindl., the "Berairou," "Bora," or red kauri; *D. Moorei*, Lindl., or "Duou;" *D. ovata*, Moore, or "Ninourai;" the white kauri, *D. lanceolata* and *D. ovata* being the chief sources. Plants of all these are exhibited in the portion of the French Colonial Exhibition devoted to living plants. Sandal wood, the produce of *Santalum austro-caledonicum*, from Dumbea, and essential oils derived from this sandal wood tree, from the "santal musqué," (*Beilschmiedea odorata*); the oils of vetivert, of citronelle, and of *Melaleuca viridiflora* (a species closely allied to cajeput, and considered by some botanists to be a mere variety of *Melaleuca Leucadendron*), are also exhibited.

Norway.—In this Court there is another interesting series of cultivations of ferments having industrial importance, exhibited by Ringmer and Co., of Christiania. Among them may be seen the *Oidium lactis*, *Torula rosea*, *Penicillium glaucum*, *Monilla ætherica*, *Saccharomyces cerevisiæ* and *S. Pasteurianus*, or "wild yeast." There are also exhibits of cod liver oil by Jensen and Co., and several other houses less known in this country. The "Commission Norvégienne" exhibits a collection of natural medicinal cod liver oils, bleached by steam and clarified by cold. Glue extracted from the heads and entrails of the fish is shown as a material that might advantageously replace ordinary glue for some purposes and especially in the paper industry.

Réunion.—This colony contributes a most interesting collection. One of the most noticeable features in the exhibit is the abundance of very fine vanilla, in bundles. Of this product there are no less than thirty-three distinct exhibits, which seems to indicate that the cultivation of this valuable plant is still being carried on successfully in the island. Then there is also mace in rich red and yellow tints, together with nutmegs, cloves, and clove stalks. Liberian coffee is shown, as well as "café Leroy," a small berry from *Coffea Laurina*, and another berry from "*Mussænda borbonica*," brought forward by M. Lapeyrère, pharmacist, of St. Denis, as a new substitute for coffee, which it resembles in appearance, though smaller. Some cinchona bark is exhibited, although the cultivation experiment can hardly be profitable under present conditions; and among other articles noticed were cocoa, haricots (red, white, black and green), sago flour, honey in wine bottles, sugar, alcohol, rum, wines and essential oils of *Geranium roseum*, *Andropogon muricatus* (vetivert), patchouli and *Panicum altissimum*. Lastly, there is in the gallery a most interesting collection of native drugs, in bottles, carefully labelled with full particulars as to their sources and uses, contributed by M. Julien Potier, the Director of the Réunion Botanic Gardens, at St. Denis.

San Salvador.—In this Court but few medicinal products were visible. The information given concerning them in the official catalogue is not very satisfactory, the botany especially being particularly weak. Thus copalchi bark (*Croton pseudochina*) is referred to the Loganiaceæ. Amongst the drugs exhibited are guaco (*Mikania guaco* and other species), used as an antidote for snake bites, four or five drops of the juice of the roots being the dose for an adult. It is also employed as a sudorific and diuretic in diseases of the bladder and in intermittent fevers. A plant named "graciola," of which the botanical name is given as

Gratiola "*abortiva*," is said to be employed to prevent abortion and to restrain uterine hæmorrhage and chronic diarrhœa. The sarsaparilla shown has a quadrangular stem and appears to be identical with that of Guatemala. The balsam of *Liquidambar styraciflua* (attributed to "*Styrax officinalis*") is said to be much employed in Salvador in veterinary medicine. *Cassia fistula*, contrayerva, *Lippia dulcis*, vanillin, guaiacum, tamarinds, *Spigelia anthelmia*, and cedron seeds are amongst the better known drugs used in San Salvador. Two plants, named respectively copapayo ("*Arum fluvialis*") and nance (*Malpighia punicifolia*) were not noticed in other collections; the former is stated to be used in rheumatism and the latter in dysentery and other intestinal complaints. There is also mechoacan root, employed by the natives as a purgative in the form of powder, tincture and extract, but considered less efficacious than jalap. It is referred to *Convolvulus Mechoacan*.

Senegal.—This country exhibits many products of pharmaceutical interest, but they are neither well arranged nor carefully labelled. Thus there is gum (of *Acacia Verek*), castor oil seeds, sesamum seed, arachis pods, isinglass, a collection of medicinal plants in small bundles, used by the natives, copal, caoutchouc and beeswax. In the part of the grounds devoted to plants Senegal is represented by specimens of the gum arabic trees, *Acacia arabica*, Willd., *A. tomentosa*, Benth., *A. nilotica*, Benth., *A. indica*, Benth., *A. krausseana*, Benth., and by the oil or fat-bearing trees, *Bassia Parkii*, Don., *Carapa touloucouna*, G. and B., and *Telfairia pedata*, Hook. The African or Gambia kino tree, *Pterocarpus erinaceus*, is also exhibited. Another interesting plant is *Sarcocephalus esculentus*, Afz., the root of which is used as a tonic in many parts of Africa.

South African Republic.—Only two or three articles in this court call for notice. These are a gray bark represented as useful for tanning purposes; "wild indigo;" but probably not from *Baptisia tinctoria*; "witgat root," said to be used as a substitute for coffee; a tea substitute; and small lump of "india-rubber," without any indication as to the plant from which it is derived. There are also some dried apricots and pears, but these are not very tempting in appearance.

Switzerland.—In this Court, which contains a number of specialties, are to be seen Norwegian tar, starch and artificial gums, wax, honey and honey wine.

Tahiti shows kava kava, coprah and arrowroot from *Tacca pinnatifida*, starch of *Artocarpus incisa* and *Inocarpus edulis* and *Mannihot Aipi*.

Tunis.—Undoubtedly the highest and most general interest will be bestowed in this court upon the beautiful models of ruins still existing on the site of the once powerful city of Carthage and the large collection of relics that have been discovered during the excavation by which the ruins were laid bare. But only one article appears among these which is of special interest to pharmacists, and that is a fine metal mortar, about fifteen inches high and twelve inches in diameter at the top. In the exhibits of products, however, the court presents considerable resemblance to the Algerian court. Calamine is shown in variety. There are numerous vegetable drugs, among which may be mentioned calumba root, valerian root, ceterach rhizome and stem, sarsaparilla, *Inula dysenterica*, orris root, couch grass root, mallow root, ginger, liquorice, squill, euphorbium stems; belladonna, aconite, stramonium, mandragora, conium, henbane, verbena, tussilago and senna leaves; rosemary, centaury, fumitory, origanum, *Thymus Serphyllum*, chamomiles, tansy flowers and herb, laurel berries, fenugreek, colocynth, *Cassia fistula*, angelica; coriander, fennel, caraway and cumin fruit, and harmel and nigella seeds, galls, orange peel and pomegranate bark. Tunis appears to be also developing an industry in essential oils, those shown being the oils of lavender, eucalyptus globulus, thyme, marjoram and rosemary. For the table the country contributes olive oil, cayenne pepper, maccaroni, honey, sorghum sugar, dates, sweet and bitter almonds, spanish nuts and carob beans. Cork and sponges are also shown. One of the drugs pertaining rather to ancient than to modern pharmacy is shown in this Court, viz., *Cytinus hypocistis*, a root parasite of the cistus, which possesses powerfully astringent properties. Many of the above products are not to be looked upon as articles of export, but rather as indicating the drugs used in the country.

United States.—In this court, as illustrating the attention now being paid to the growth of *Sorghum saccharatum* as a sugar material, may be seen upwards of fifty varieties of sorghum seed, white, yellow, brown and black. There is also some good looking honey.

Venezuela.—In this Court there were several objects of pharmaceutical interest in the form of roots, resins, barks, seeds, etc., but no information was obtainable concerning them. Carapa fruits (*Carapa guianensis*), common also to British Guiana and to Western Tropical Africa, were represented. The bitter oil of these seeds, which is used as an insecticide, has been frequently mentioned in Exhibition reports. Under the name of "resine de chaparro," a product having a fragrant odour like that of *Humiria balsamifera*, or perhaps more closely resembling that of ladanum, was exhibited. *Palo santo*, an aromatic bark, apparently derived from a species of *Croton*, cucharo bark, the fruits of *Thevetia neriifolia*, a white copal resin, and fruits of the "balsam of tolu tree," but more resembling those of *Myrospermum frutescens*, attracted attention. Fine large tonka beans, well covered with crystalline powder, jequirity seeds, sarsaparilla, coca, and a few other well known drugs were also noticed. A very curious product exhibited in the Venezuela Court is the wax (*in situ*) of *Coccus Axin*. It was shown in small pellets rather larger in size than an ordinary pea, usually containing inside the skin of the insect producing it. The wax itself is white and easily breaks up into thin lamellæ. In the fresh state it is said to be of a yellowish tint, moderately soft, and to possess a slightly rancid odour. It melts at 35° C., is soluble in strong boiling alcohol, and in ether, chloroform, benzin and oil of turpentine is easily saponified, and absorbs oxygen with remarkable avidity, becomes hard, brownish and insoluble in alcohol and ether. The specimens in the Exhibition were, however, dirty white, not brown, although hard and somewhat brittle. The insect is found also in Mexico (in Uruapam, Yucatan, Tlacotalpan, etc.), living on the *Spondias Mombim*, *S. rubra* and *Xanthoxylon Pentanome* and *X. clava-Herculis*. In commerce in Central America the wax is met with in masses of about 350 grams wrapped up in maize leaves. It is used in erysipelas, and as a resolvent and vulnerary. It is applied externally in rupture and in metrorrhagia and other uterine affections in the form of a plaster. In the arts it is employed to make lacquer for metals, and it is stated to remarkably brighten colours mixed with it. The melted wax heated to 250°-350° F. for an hour, becomes tough and flexible, and is no longer soluble in turpentine. From its peculiar properties it seems worthy of further chemical investigation.

OIL OF MAIZE.*

BY CHARLES EDWARD BOWERS, PH.G.

To extract the oil from the seed, corn was taken in the different stages of its growth to ascertain at what age it contains the largest amount of oil. The corn was carefully dried, after which it was removed from the cob, reduced to a coarse powder, and percolated with petroleum ether to remove the oil. The youngest specimen tried contained 1 per cent. of its weight of oil. The amount gradually increased with the age of the corn until the maximum was reached in that which was allowed to fully ripen and dry upon the stalks. The amount yielded by such corn was 3·16 per cent.

The oil is said to reside entirely in the embryo or germ of the corn, and to ascertain if such be the case a portion of the corn was carefully deprived of its embryo, coarsely powdered and percolated with petroleum ether; no oil was obtained. The germs, on the other hand, freed from all integuments and treated in the same manner yielded 22 per cent.

As obtained, the oil was of a pale yellow colour and had a somewhat thicker consistence than either cottonseed or olive oils. The odour was slight but peculiar; its taste not unpleasant, bland and oleaginous; its specific gravity ·917. It is a fixed oil, belonging to the group of non-drying, and is well adapted for lubricating purposes. It is soluble in all proportions in ether, bisulphide of carbon, chloroform, and benzin; very sparingly soluble in 95 per cent. alcohol, forming a milky mixture when shaken with that body, which separates on standing into two layers, both of which are perfectly transparent. The oil readily saponifies with so weak an alkali as lime water, and with potassa or soda it forms a white soap. A thin layer of the oil exposed to the air for several weeks did not show any rancidity and to all appearances remained unchanged. In this respect it compares favourably with the oils of rape seed, olive, etc.

Upon strongly heating, the oil emits characteristic smoky, irritating and very disagreeable vapours, somewhat similar to those produced in the heating of cotton-seed oil. It therefore would not be tolerated as an adulterant to lard, because the odour developed upon heating would certainly betray its presence. Lard itself is decomposed at high temperatures, but the odour produced is entirely distinct from that produced when oil of maize is associated with it.

It could not be used to adulterate olive oil, as it gives different results with all the tests for the identity of that body. With concentrated sulphuric acid it instantly darkens. Immersed in a freezing mixture of ice and salt, it did not deposit a granular substance, and remained nearly transparent, but became very notably thicker in consistence, so much so that it was scarcely mobile. The probability is that it consists largely of olein.

It is more easily absorbed by the skin than cottonseed or olive oils, and is an excellent vehicle for external applications. It also dissolves camphor with more facility than those oils.

Numerous preparations of the Pharmacopœia were made by substituting oil of maize where cotton-seed oil is directed, to ascertain whether it is capable of replacing that body. The results were very satisfactory in every case. In some instances its superiority over cotton-seed oil was very well marked. In the preparation of ammonia liniment this feature was most prominent. The oil readily saponified on the addition of the ammonia water, forming a smooth, creamy mixture, which did not become curd-like or separate on standing, as is frequently the case with the officinal liniment of ammonia. Examined at the expiration of two months, no changes could be observed, and it was apparently as perfect as when first made.

The oil could be adapted to table use as a dressing for salads, etc., and could readily take the place of those oils now used for such purposes. Taken internally in the dose of a fluid ounce, it gives no medicinal effects other than those possessed by olive oil.

It is said that this oil is already an article of commerce in some of the western States. It is a by-product in the manufacture of starch. Where corn is used as the source of that substance, it becomes an object to get rid of the oil-bearing germs, and this is done by the aid of machinery, which separates the starchy portion of the corn in one direction and the germs in another. The germs are then freed from adhering integuments as far as practicable and subjected to the action of steam, after which the oil is removed by the aid of hydraulic pressure.

VITTÆ OF UMBELLIFERÆ.

A careful description has recently been given by Herr A. Meyer of the vittæ, or receptacles for volatile oil, which are almost invariably found in the pericarp of ripe fruits of Umbelliferæ, and which give them their peculiar flavour and odour. These vittæ are clothed with a peculiar layer which is itself protected by a special cuticle-like membrane, which completely covers the outer surface of the epithele, the whole forming a sac enclosing the special secretion. In only a few species (*Coriandrum sativum*, *Lagoëcia cuminoides*) is this sac entirely unseptated; in a few others (*Heracleum sphondylium* and *caucasicum*, *Sison Amomum*, *Æthusa Cynapium*) it is imperfectly septated; in the great majority of umbellifers the sac and its investing layer are divided into a number of chambers. The layer itself consists of a peculiar substance, the exact nature of which is not yet determined; but it is neither a carbohydrate, a fatty oil, a resin, nor a caoutchouc-like substance, as is shown by its microchemical reactions. In some species, between the thick septa and the parietal layer is a ring of irregular thick-walled vacuoles. In *Conium maculatum*, where the vittæ are only rudimentary in the ripe fruit, the peculiar layer is wanting. In one species only where the vittæ are well-developed, *Johrenia græca*, is the aromatic secretion altogether wanting, and replaced by a solid substance. In *Astrantia major* and *Eryngium maritimum*, where the fruit is but slightly aromatic, the vittæ have no layer, but instead of it a fluid secretion. At a very early period in the formation of the vittæ, even in the flower-bud, substances of two different kinds are exuded from the walls of the epithelial cells into the vitta, viz., a watery fluid, and a volatile oil insoluble in water. The vittæ themselves always result from the enlargement of intercellular spaces, not from the absorption of cell-walls. The object of the layer above described is clearly to retain the secretion in the vitta and to prevent its flowing into the surrounding tissue. The anise oil contained in the vittæ of *Fœniculum officinale* and *Pimpinella Anisum*, and the carvol in those of *Anethum graveolens* and *Carum Carui*, are highly poisonous to birds.

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The Pharmaceutical Journal.

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THE MEDICINE STAMP ACT.

IN accordance with the notice which appeared in last week's Journal, a meeting was held last Wednesday in the County Hotel, Newcastle, to consider the subject of the Medicine Stamp Act as affecting the business of chemists. The chair was taken by Mr. B. S. PROCTOR, and the report of the Committee, which had been previously circulated in a printed form, was taken as read. The Chairman, in moving the adoption of the report, called attention in the first place to Dale's Plaster, and in answer to the statement of the Board of Inland Revenue that "there can be no doubt of its liability to stamp duty as a nostrum or proprietary medicine," declared that was not the case, since he doubted it, and in fact was not the only person who doubted it. In answer to the Board's statement that "the use of the possessive case, with the title or description of Dale's Plaster clearly puts the article forward as proprietary," Mr. PROCTOR declared that he knew many instances where the possessive case did not imply that. Lastly, in answer to the further statement that cases have been brought to the Board's notice in which persons "claimed the exclusive right and title to make these plasters," he asked why this argument should have been resorted to if the first was a good one. In his opinion it was simply because both arguments were bad. In Mr. PROCTOR's further remarks he drew attention to the points brought out in the report of the Committee, as proving in his opinion that the judgments of the Board of Inland Revenue as to liability to medicine stamp duty were uncertain and contradictory. He relied upon those illustrations as showing that the Inland Revenue authorities are unable clearly to define the law, but seem to be guided in their interpretation by expediency rather than by principle. On that ground he contended that the Medicine Stamp Duty ought to be abolished. The adoption of the report was then seconded by Mr. WEDDELL, and supported by Mr. RIDDELL, and carried.

Mr. WEDDELL then moved that since the Acts under which duty is charged involve unnecessary and vexatious interference with the conduct of the drug trade, and an unwise obstruction of the use of desirable information on the labels of medicines, Parliament should be petitioned for a repeal of them. Mr. HARRISON, in speaking on this motion, agreed that the law was in a most unsatisfactory condition, but though he did not think medicines pure and simple should be liable to stamp duty, he believed the public were agreed that so called "patent medicines" ought to be liable. As a practical man he was therefore inclined to take the Act, bad as it was, and seek to amend it in the direction laid down in the Act itself, by making the exemptions more extended and more clear than they are now. With that view he moved as an amendment "That steps be taken to secure exemption from medicine duty of preparations made according to the formulæ of any British or foreign pharmacopœia, and described and sold as such, and all medicines for which there is not claimed either exclusive right or secret process of manufacture." He believed that such an alteration of the Act would enable chemists to carry on their business with perfect impunity. His impression was that the proper body to approach with that object was the Pharmaceutical Society. Whatever it had done, or failed to do, it was entrusted with the protection of the interests of chemists and druggists, and if they did not act with a spirit of determination they could not blame that body for not taking action. This amendment, seconded by Mr. CLAGUE and supported by Mr. DODD and Mr. RIDDELL, was then carried by a large majority, and it was agreed that a memorial embodying the terms of the amendment should be drawn up and forwarded to the Council of the Pharmaceutical Society.

In this position of the matter it would be premature to offer any extended remarks upon the report of the Newcastle Committee, or the proceedings of the meeting, beyond saying that the suggestion put forward by Mr. HARRISON is on the face of it one of a much more practicable character than that urged by Mr. PROCTOR. We venture to think that Mr. PROCTOR's arguments for the total abolition of the medicine stamp duty would not go very far in convincing the Chancellor of the Exchequer that the demand was one to justify the sacrifice of more than £200,000 a year of imperial revenue. On previous occasions we have pointed out what we believe to be cogent reasons why pharmacists should not seek for the repeal of the stamp duty on patent medicines; but if it can be shown that the administration of the law does, by reason of vagueness or too great generality, interfere with the proper excercise of the pharmacist's business there would be a very good ground for endeavouring to obtain such an amendment of the Medicine Stamp Act as would remove any objection on that score. That appears to have been the idea embodied in Mr. HARRISON's remarks and in the amendment that he moved.

THE WEIGHTS AND MEASURES ACT.

The Weights and Measures Act passed during the last session to amend the law relating to weights and measures, and for other purposes connected therewith, will come into operation on the first of January next, and it will be useful to remind our readers of this fact, inasmuch as the stamping of balances and weighing machines will then become compulsory according to the provisions of that Act. Last March we called attention to the general features of this measure, when the Bill was still before Parliament, and it is now only necessary to point out that the Act provides that within twelve months of its becoming law every weighing instrument used for trade purposes shall be verified and stamped by an inspector of weights and measures with a stamp of verification. Any person who uses or has in his possession for trade purposes any weighing machine that is not stamped as the law requires will after that time be liable to a maximum penalty of two pounds, and in the case of a second offence to a penalty of five pounds. The term weighing machine used in the Act is comprehensive, and is intended to apply to every description of instrument used for weighing purposes. Authorized fees are to be charged by the inspectors for the verification and stamping of weighing machines as well as weights and measures, and appended to the Act is a schedule of these fees. In a recent report by the Board of Trade on its proceedings and business under the Weights and Measures Act, 1878, it is stated that the main object of the new Act is to carry out as far as may be possible suggestions that have been made in the Board's previous annual reports, as to the necessity of further legislation for the better prevention of fraud in retail trade. The local administration of the law is left, as hitherto, with the local authorities, but the Act gives the Board of Trade certain additional powers of control. It would appear that such an extension of the executive power of the Board was requisite to make up for the deficiencies on the part of local authorities, which had been found to obtain in previous experience. In the exercise of these extended powers the Board of Trade now proposes to issue very shortly model regulations, for the guidance of local authorities in issuing instructions to their inspectors, and it is stated that in the preparation of these model regulations under the New Act, the Standards Department of the Board of Trade has received much assistance from the local authorities. At the same time a desire is expressed to consult their wishes as far as possible, and it may therefore be inferred that a more hearty co-operation has already been established between the Board and the local authorities.

In the drawing up of the proposed model regulations it is intended that they should deal not only with the general duties of the inspectors, but should also state the modes in which the work of testing and stamping may be best carried out. This will be a useful arrangement for ensuring uniformity in the conduct of this work, and for removing any ground there may have been in some instances for complaint of the capricious action of inspectors of weights and measures. Another useful feature of the new Act which has a similar tendency is the provision requiring that an inspector who is a local officer appointed by the local authority shall pass a technical examination by the central department charged with the administration of the law. One of the objects of the contemplated model regulations will be to serve as an indication to the inspectors what their technical qualifications are to be. It is highly important that the persons entrusted with the duty of inspecting weights, measures and weighing machines under the Act should possess adequate practical knowledge for the proper performance of their duties. Hitherto sufficient attention has not been given to this requirement in the appointment of inspectors, and it is satisfactory to find that it will in future be duly provided for.

It is rather noteworthy that almost simultaneously with the decision by the judge of the Wandsworth County Court that the word "sells" in the fifteenth section of the Pharmacy Act must be construed to apply to the person who actually conducts the sale of a poison, a similar decision was given in Canada under the Ontario Pharmacy Act. In that case a registered druggist residing at Beaverton, Ontario, upon leaving town for a time left his daughter in charge of the business, with a caution not to sell any poison during his absence. It was proved, however, that a detective succeeded in purchasing from her some "pink root," which is an article enumerated in the schedule to the Act, and in consequence a fine was inflicted of twenty dollars and costs. It may be added that the language of the section under which the conviction took place is very similar to that of the 13th section of the British Pharmacy Act, the words being: "No person shall sell or keep open shop for retailing, dispensing or compounding poisons, or sell or attempt to sell any of the articles," etc. The intervention of the detective is probably explicable by another provision that half the penalty inflicted goes to the prosecutor.

* * *

This week we have to report the death of another Annuitant on the Benevolent Fund, Mr. John Rogers, who was a Member of the Pharmaceutical Society from 1842 to 1867, the date of his election, having died on the 15th inst. at the age of eighty years.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Thursday evening, November 28, when Mr. H. Helbing will read some "Practical Notes."

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, November 28, when Mr. H. W. K. Pears will read a paper on "Joule and his Work;" and Mr. A. E. Chaston will give a "Report on Materia Medica."

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The evening meeting of the Chemists' Assistants' Association, held on November 7, was devoted to the reading of short papers.

NOTE ON A SAMPLE OF DECOMPOSED CHLOROFORM.

BY A. CAMPBELL STARK.

The sample of decomposed chloroform exhibited has been kept in my laboratory for five months. During this time it has been continuously exposed to diffused, but not direct sunlight, and to a temperature ranging from 40° to 105° F. It is the product of very well known makers, and is guaranteed by them, although methylated, to answer all the requirements as to purity of the British Pharmacopœia.

The products of the decomposition of chloroform by oxidation are numerous and complex, but the principal are hydrochloric acid and chlorocarbonic acid, $COCl_2$. Free chlorine is also formed, and in the case of chloroform made from methyl alcohol an oily hydrocarbon is also produced. The sample of chloroform before you contains at least three of these compounds.

The fumes emitted are acid to test paper, and form NH_4Cl when placed in contact with ammonia. The washings of the chloroform give the well known chloride reaction with $AgNO_3$. They do not, however, bleach a feebly coloured solution of litmus, and the presence of free chlorine is therefore uncertain. Phosgene gas is decomposed by water into CO_2 and HCl, and on passing some of the fumes emitted by the decomposed chloroform into solution of calcium hydrate, a precipitate of carbonate was immediately produced. Phosgene gas is produced by the action of nascent oxygen upon chloroform (Roscoe and Schorlemmer); it is pungent and irritating to the respiratory organs, and the alarming dyspnœa produced by some samples of chloroform inhaled have been probably due to the presence of this gas.

On spontaneously evaporating 1 c.c. of the chloroform in a watch-glass drops of the oily hydrocarbon were left behind.

In November of last year, there appeared in *L'Union Pharmaceutique* an interesting and instructive paper on the "Decomposition of Chloroform," by Mons. M. H. Marty (see *L'Union Pharmaceutique*, Novembre, 1888, "L'alteration du chloroform, de ses causes des moyens de la prevenir d'y rémedier," par M. H. Marty). The author found pure chloroform to be extremely unstable under the influence of light, for pure chloroform (freed from all trace of chloral) would not remain unaffected more than two days in summer or five days in the winter when freely exposed to light. The same chloroform, however, when kept in the dark remained for more than fifteen months unaltered, although in contact with air. Pure chloroform kept in an atmosphere of pure and dry nitrogen, during sixteen months, was also quite unaltered. The author's experiments show that the decomposition of chloroform is due to the action of oxygen in the presence of sunlight. If to pure chloroform so small a proportion as ·1 per cent. of absolute alcohol be added, the chloroform, M. Marty states, does not decompose in the presence of light. Forty samples containing this percentage, were exposed by him to continuous sunlight during fifteen months, and not one was in the least degree affected. He does not mention the temperature at which his samples were kept, and as the specimen I exhibit presumably contains the B.P. proportion of 1 per cent. of alcohol the primary cause of its decomposition was probably the temperature to which it was exposed.

Such chloroform as this may be purified by the following series of processes:—

1. Twice wash with distilled water.
2. Heat with 1 per cent. of strong colourless H_2SO_4 and repeat, if necessary, until the H_2SO_4 comes down colourless.
3. Heat with solution of NaHO (of sp. gr. 1·33) in the proportion of 3 per cent. of the chloroform used, and distil.
4. Add to the distillate 5 per cent. of dried chloride of calcium, and redistil from a water-bath at a temperature of 60° to 61° C.

The above series of operations applied to 20 c.c. of the sample on the table yielded 15 c.c. of nearly pure chloroform (=75 per cent.).

Professor Regnauld gives the following as the characters of absolutely pure chloroform:—Colourless, perfectly limpid, very mobile; sweet fresh odour, which does not change during evaporation; density 1·5 at 15° C.; boiling point very near to 61° C.; placed on filtering paper does not leave any smell after the chloroform has evaporated; neutral to test paper; nitrosulphide of iron gives no coloration when a crystal of the salt is placed in the chloroform (absence of alcohol, ether and wood spirit); gives no reaction in the cold, or when heated with $AgNO_3$; does not colour when shaken with solution of caustic potash or H_2SO_4.

The specific gravity being taken to be 1·497 the above tests, with the exception of that with nitrosulphide of iron, are applicable to B.P. chloroform.

In view of the alarming symptoms that have followed the inhalation of many samples of chloroform it is evident that impurities, either original or from decomposition, are present more often than is generally supposed.

Of course such conditions as the exhibited sample were exposed to were abnormal, but it may be well to emphasize the point, so often insisted on, that the most favourable conditions for keeping chloroform with absolute safety, are to keep it in yellow glass bottles of not more than a litre capacity, and in a place of low and uniform temperature.

The President (Mr. Ellwood) said that in view of the extensive use to which chloroform is applied, it is very essential that it should be a carefully purified and stable preparation. He had often noticed that samples when tested were acid and reduced nitrate of silver, though he had not found any appreciable residue upon evaporation. Chloroform water when exposed to light gives an acid reaction, which he attributed to the oxygen dissolved in water; he had found this reaction in cases where distilled water was employed, though it required probably a month's exposure to develope the acidity.

Mr. Dymond said the sample submitted by Mr. Stark appeared to him to possess a strongly marked odour of chlorine, and he inquired if the author had specially tested for free chlorine.

Mr. A. H. Mason said that some fourteen or sixteen years ago he had worked upon chloroform, and found that chloroform made from methylated alcohol was quite equal to and often superior to that made from ordinary ethylic alcohol. The reason was that the chloro-derivatives of methylated alcohol, which accompanied the production of chloroform, were more volatile, and consequently more readily got rid of than the corresponding ethylic compounds were. He said the best part of Mr. Stark's paper had reference to the recovery of chloroform from a partially decomposed sample. Wholesale druggists and others who used chloroform in large quantities for various purposes preserved their residues, and they occasionally experienced a good deal of difficulty in recovering their chloroform from those residues. He said that "ketone chloroform" kept well under varying conditions of temperature,—and he alluded to the investigations which were now proceeding in consequence of the ill results that had attended the administration of a sample of chloroform that had emanated from Dresden.

Mr. W. Ll. Williams said the odour reminded him of the pungency which was observable in certain samples of butyl-chloral hydrate. He could confirm Mr. Mason's remarks respecting the greater volatility of chlorinated methyl compounds, for the fact had come under his own observation in the course of a series of experiments that he had had occasion to perform.

Mr. Stark, replying to Mr. Dymond, said he did not think free chlorine was present in the sample exhibited. The irritating odour was due, he thought, to phosgene gas. He quite agreed with Mr. Mason that chloroform made from methylated spirit was quite as pure as that from rectified. He had mentioned that it was made from methylated spirit, because the makers made a special point of their methylated chloroform being equal to the B.P. standard. All makers did not do this. He had exhibited this sample to-night because it was the only case he had met with of a chloroform that had decomposed when exposed to light, and he wished to hear the opinions of the other members of the Association.

LIME WATER.

BY T. A. ELLWOOD.

It has been pointed out several times, in papers appearing in the *Pharmaceutical Journal*, that lime water of commerce varies considerably in its strength; also in 1886 the Nottingham borough magistrates inflicted a penalty of £5 for having sold as lime water a solution containing less quantity than the Pharmacopœia requirements. How far is the pharmacist to blame? and what is the cause of an inferior quality?

To the first question I would answer: the pharmacist is entirely at fault, as it is very easy to obtain a B.P. preparation by following the B.P. directions. It is not, however, so easy to keep the solution of proper strength when constantly using from the bulk. But what does a qualification imply to the public, if not that they may rely upon the chemist to supply a genuine article of the legally required strength? By an occasional analysis, which is simplicity itself, it is easily ascertained whether the solution contains the required amount of lime, and if it does not it is no great loss to throw it away and prepare some more.

To the second question a more lengthy answer is required. It depends upon the purity of the lime used, the method of slaking it, and the amount of water used; the time allowed to stand before decantation from the insoluble portion; the method of keeping, and the bottle kept in.

The solubility of lime considerably decreases with rise of temperature; at boiling point scarcely half the amount is dissolved as at ordinary temperatures; why this should be the case has not yet been ascertained. It was suspected by Messrs. Shenstone and Cundall that this was due either to impurities or to the action of the lime upon the vessels used, which are usually of glass; they therefore tried an experiment, using a platinum tube instead of glass, and a very carefully prepared pure sample of calcium hydroxide. They came to the conclusion that their suspicion was wrong, and that no doubt remains on the point; calcium hydroxide is very decidedly less soluble in hot water than in cold; they were, however, unable to assign a reason for its diminished solubility.

The slaking of lime has a considerable influence upon its solubility in water; if carelessly done the result will in all probability be to make a lime water under strength. If, however, the B.P. method is adopted and the lime is good, not overburnt, there need be no fear of obtaining anything but a satisfactory solution; rather less water than is ordered by the Pharmacopœia to slake the lime is preferable.

Messrs. Nesbit and Maben have said they do not consider it necessary to have freshly slaked lime, providing the ordinary is well kept. My results lead me to conclude that freshly slaked lime is better, but that a solution of correct strength can be obtained from a carefully preserved sample if it does not contain carbonate and is less than a month old; beyond that age I find even if it contains no carbonate, its solubility decreases.

Some chemists prefer making their lime water direct from the lime (calcium oxide) itself, by simply pouring water upon it direct, and then bottling. There are several objections to this method. The lime is almost sure to contain some other soluble impurities, such as chlorides or sulphates, which in the case of calcium hydroxide are ordered to be washed away before making the lime-water. Such samples would therefore contain an excess of calcium, but not all of it in the required form, for either the chloride or sulphate would act upon oxalic acid the same as the hydrate. Further, calcium oxide possesses in a marked degree the property of forming supersaturated solutions, whereas calcium hydroxide does not. By adding lime to water small quantities at a time, and keeping a low temperature, a supersaturated solution may be made containing 20 grains in the pint, which is double the official strength.

It is a common custom in making lime water to simply add an indefinite amount of slaked lime to a bottle containing *ordinary* water, and then standing on one side until required for use, which perhaps may not be for several weeks. Such a method is very erroneous. First, ascertain whether the lime is free from chlorides by washing and testing washings with argentic nitrate; remembering also that the Pharmacopœia directs that slaked lime should be recently prepared. 2nd. Add the slaked lime to *distilled* water in definite proportions (1 to 100) and shake thoroughly for two or three minutes. 3. Adhere to directions, and decant or syphon after twenty-four hours, for the solution rather than improving will deteriorate by keeping.

Lime water should not be kept, as is very frequently the case, in the ordinary stoppered white rounds of the shop, as with the other alkalies it possesses a considerable solvent power for lead. It must be in bottles free from lead and in a cool place, and when, owing to absorption of carbonic acid, it is observed to deposit on the sides, it should be tested and only used providing it is equal to the required standard.

I append the results of a few selected analyses of commercial samples:—

No.	Vol. taken	Vol. of standard oxalic reqd.	Grains of OaO in pint.	Remarks.
1	420 c.c.	18 c.c.	10·5	
2	420 „	17·5 „	10·2	
3	280 „	16·8 „	14·7	Traces of chlorides.
4	420 „	5·6 „	3·26	
5	420 „	21·3 „	12·42	Magnesium present.
6	350 „	7 „	4	Traces of sulphates.

I understood that sample 3 was made direct from the quick lime, and hence, together with its impurities, we see the reason of so high a figure.

Nos. 1 and 2 were prepared strictly according to the B.P. No. 4 was taken direct from a white bottle on the shelves behind counter.

The reason of my working upon multiples of 70 c.c. is obvious, as it admits of an easy calculation of grains in pint, 1 m.g. in 70 c.c., corresponding to 1 grain in the gallon.

In conclusion I may remark, if pharmacists would use a little care and forethought in the preparation and preservation of their galenicals, they need never retail inferior articles.

Mr. Philp, who took the chair whilst Mr. Ellwood read his paper, remarked on the practical nature of Mr. Ellwood's paper. Lime water was a constant source of trouble on account of its extreme variability. Personally, he had found the B.P. process quite satisfactory. It was interesting to note that a water made direct from calcium oxide would contain more lime in solution than one made from the hydroxide, and thus yield a better result by volumetric estimation.

Mr. Ince said the gist of the whole matter was to implicitly follow the instructions of the Pharmacopœia, and a perfectly satisfactory article would be obtained.

Mr. Mason said if the only use to which lime water was put was to mix with linseed oil for burns a few grains more or less in the pint would be of no moment; but, as they well knew, it assumed at times a highly important position as a remedial agent, *e.g.*, in infantile diarrhœa, and it was very essential that in such cases an article of the highest strength and purity should be available.

Mr. Richards inquired if the samples reported upon by Mr. Ellwood were obtained from provincial as well as from London houses.

Mr. Dymond remarked that the results were interesting and extraordinary. That the length of time a sample of lime water was kept over lime should cause an alteration in the strength of the lime water, and that quick-lime should produce a different lime water to that yielded by slaked lime, both pointed to the formation of definite hydrates between lime and water, and at the same time showed how little we knew of those compounds and of the physical subject of solution.

Mr. Nosworthy asked if it was right to use ¼ ounce of slaked lime to the gallon of water, and inquired why lime water should be prepared from the lime obtained by burning marble.

Mr. Blackham said the point at issue was how best to preserve lime water.

Mr. T. A. Ellwood said: The examples I have quoted to-night were taken from between 80 and 90 analyses, conducted by myself on lime water obtained from different retail houses in the metropolis, and in reply to Mr. Richards, I think we may take them as typical of the country generally. The cheapness of lime water does not exempt it from the "Sale of Food and Drugs Act," and as Mr. Mason has just pointed out, the medical use of it for saponifications, or for internal administration, demands that it should be of definite strength. I know what difficulties the retail pharmacist has to encounter in the estimation of his preparations, and that is the apology I make for bringing forward this paper to-night. But I would point out that it is not necessary that he should have to constantly test this preparation; the main argument of my paper is, that if properly prepared and preserved it does not require it. Mr. Blackham has touched upon the right point, in asking "How is it to be preserved?" I would in reply say: Prepare it honestly, and then keep it in green-glass stoppered bottles; ordinary Winchesters do excellently, and do not expose it to strong light. The old method of preparing it, as Mr. Richards has inferred, is the general one in the country; simply pouring water on the oxide is to be discarded on scientific grounds, and on grounds of safety to ourselves, if we wish to escape a zealous inspector. Mr. Nosworthy has asked the best kind of lime to use, referring to that prepared from marble; this certainly is the purest kind we can easily obtain, and its supply is a special point with some wholesale houses; but then as to using a quarter the quantity, certainly I say it is wrong. If the lime is purer it does not imply that less should be used. The B.P. does not mention marble lime, and as I have previously remarked, we need not wish, in this instance, to depart from our "authoritative text book." The subject brought forward by Mr. Dymond is an interesting point chemically, and worthy of further investigation, but it does not pharmaceutically affect lime water.

METHYLATED SPIRIT.

BY C. J. STROTHER.

The author called attention to the fact that notices are being served on chemists in some districts with regard to the hour at which methylated spirit may be sold, and that by Act of Parliament there is a heavy fine for selling this article between the hours of 10 p.m. on Saturday and 8 a.m. on Monday. He thought that members of the Association would do well to keep the fact well in mind, as he believed the informer gets half the fine. This legislation seemed to present such serious complications, he might almost say "a perfect trap," that he thought it right to bring the matter before the Association.

INSECTS IN DRUGS AND PREPARATIONS USED IN PHARMACY.

BY C. J. STROTHER.

In connection with Mr. Davis's very able paper on "Bacteria," I mentioned Dohl's process of sterilization for milk, etc.

It has occurred to me that a method for preventing and destroying the insects and germs found in pharmaceutical preparations and drugs would form a very interesting subject for discussion.

We are all aware of their existence, but few of us study their habits, and I must confess to a creepy feeling when I see one of these "young gentlemen" crawling off the paper under my lens.

I will invite your attention to-night to two or three specimens that I have with me.

The first is a fair-looking sample of crushed linseed supplied about three weeks ago by one of the large wholesale firms, kept in a wooden cask with a wooden cover. Under the lens it is seen to be literally alive.

The next occurs in aconite root, and is a totally different-looking parasite.

Nux vomica and cantharides furnish the other specimens. With the last-named it is usual to put camphor, though with doubtful effect, but it is possible that washing hard substances in a solution of salicylic acid and quickly drying might protect them.

I should not have ventured to mention the subject, but the sample of crushed linseed now under the lens is in appearance, taste, touch and smell all that could be desired (to the naked eye), and the question naturally arises, what will be the effect of a poultice containing thousands of insects applied to an open wound, especially if the poultice is made with hot, instead of boiling, water.

Mr. Ellwood said an instance similar to the one brought forward by Mr. Strother, recently came under his notice. In that case the infested article was flour, and he found that the ordinary rule was simply to recharge the bin with a new sack of flour whenever the stock was low, by this means the insect was able to permeate the flour in a very short time. He thought the only remedy was to thoroughly clean out the receptacles for flour and linseed meal from time to time.

Mr. Richards said the best receptacle for linseed meal was a cask, and maintained that much linseed meal was injured by a process of fermentation brought about by heating. Referring to the use of camphor as a means for keeping articles free from insects and moths, he thought it was esteemed too highly for the purpose. The best material to employ was naphthalene.

Mr. Mason said the linseed meal exhibited seemed to be in a state of fermentation, which might be due to a want of proper care on the part of the grinder, whereby it became heated. The appearance of the sample under the lens reminded him very forcibly of a piece of ripe cheese. It was well known that flour was subject to the attacks of minute insects which involved the owners in heavy losses. He thought camphor was unquestionably useful for preserving skins, etc. It was used in America and in other places abroad in immense quantities. Porous paper upon which some carbolic acid had been dropped was very useful, and many dealers wrapped their skins in paper which they afterwards tarred to repel insects.

Mr. Blackham believed that most chemists knew of the regulation respecting the sale of methylated spirits. He said camphor was not a parasiticide; it was of use if employed freely in protecting ergot, cantharides and such drugs as are liable to be attacked by insects, but it was useless if once the insects had obtained a footing.

Mr. Stark thought that the destructive action of mercuric chloride on most bacteria was so well proved as to be beyond discussion. It might be well to point out in view of Mr. Richard's remarks that the large collection of butterflies in the natural history museums were preserved by dipping them in a saturated alcoholic solution of mercuric chloride. After that they were found to resist anything. Naphthalene was no doubt an excellent preservative, but the smell was most objectionable.

Photo-Chemical Action.

BY W. LLOYD WILLIAMS.

The numerous phenomena which occasion the pharmacist at one time or another inconvenience and annoyance have been more or less perfectly examined at disjointed intervals, but a collection of such phenomena as are more directly traceable to the influence of light, with some generalizations thereon, may not be altogether wanting in interest nor devoid of profit.

It has been stated with much truth and terseness that "the art of photography runs considerable danger of outstripping the science;" practical details for the production of gems of photographic art may be found in abundance, but the elucidation of the principles upon which the success of the operator depends has not kept pace with this artistic progress.

One might, though in a more restricted manner, apply the same simile to pharmacy. The tendency of the day seems to be for the rank and file to devote its attention to the development of elegant pharmacy and to neglect the examination of many constantly occurring phenomena which are as yet incapable of satisfactory explanation.

Every pharmacist knows that exposure to light in the case of many substances induces in those substances changes, not only of a chemical but also of a physical nature, and it is often a difficult matter to decide as to whether a particular manifestation is the result of physical or chemical activity, or of a combination of the two.

The transformation of crystalline sulphur into its amorphous and insoluble modification, and of white into red phosphorus, may be cited as instances of the physical changes brought about by solar influence; the combination of hydrogen and chlorine is sufficiently familiar as an example of chemical change, whilst the coloration which is characteristic of the decomposition of iodo-compounds is due in part to chemical metamorphosis and in part to physical disturbance.

As iron occupies a prominent position in the remedial *impedimenta* of the medical man, and many of its compounds are remarkable for their extreme sensitiveness to light, it forms a convenient centre for the observation of similarly affected substances. Ferric salts in the presence of reducing agents lose some of their oxygen or other negative radical, and if any substance capable of absorbing the negative radical when eliminated be also present, the decomposition is accelerated. Alcohol is such a reducing agent, and the products of oxidation, aldehyd and acetic acid, increase *pari passu* with the reduction of the ferric compound.

The reactions are much more vigorous and the results more pronounced when free exposure to light is insured, results which were demonstrated some years ago by Mr. Schacht in the case of a mixture which contained glycerine and tincture of perchloride of iron.

As organic compounds are, according to the general rule, more readily oxidised than their inorganic analogues, so to speak, it may be inferred that the organic derivatives of iron prove no exception to the rule; indeed, so regular is the decomposition under appropriate conditions that the oxalate and ammonio-citrate may be used for estimating the intensity of light.

The behaviour of the salts of silver is well known; but I refrain from making in a short paper any observations on a branch of my subject which in itself has assisted in laying the foundations of a science, has served to promote the progress of art, and has proved a healthy and harmless source of recreation to thousands of individuals.

Mercurial combinations are only a degree less actively influenced than their argentic relatives.

An aqueous solution of the bichloride, when exposed to the direct rays of the sun, precipitates calomel and evolves oxygen, and just as in the case of the iron salts a body capable of absorbing oxygen facilitates the decomposition, so here the same train of circumstances involves the same effects, and consequently the addition of tartaric acid to a solution of mercuric chloride, which came under my notice recently, was not in accordance with the canons of science from our present point of view.

The oxides of mercury are other compounds of that element which require careful preservation, and so do the iodides; mercurous oxide has an ill knack of changing into the higher oxide and the metal, and the unstable nature of the lower iodide served to help it out of the present Pharmacopœia.

Lead is not a metal whose compounds are very readily decomposed. Nevertheless if the moist iodide be freely exposed to air and sunlight, free iodine is soon developed and a mixture of oxide and carbonate of the metal remains.

The lower chloride of copper becomes changed from a pale coloured composition to a dirty violet or brownish black, resembling silver chloride somewhat.

Even the salts of gold and platinum are readily reduced.

Uranium compounds exhibit the same phenomenon, but they are of minor interest to the pharmacist.

The brownish colour which appears in long kept and slightly damp iodide of potassium is partly due to the action of sunlight, and ammonium iodide is even more susceptible to its influence.

Nitric acid, according to Seebeck, is decomposed by sunlight into oxygen and nitrous acid and is simultaneously coloured yellow.

The reddish discoloration of slightly impure carbolic acid is most easily produced in a light situation; the greenish colour which is seen in long stored decoction of aloes; the greenish tint assumed by both the tincture and the gum of guaiacum and the yellowish shade which often characterises santonin are all due to the same disturbing influence.

The foregoing examples do not include every instance of photo-chemical action which may present itself, but the connection between cause and effect may be readily traced from a closer interrogation of such phenomena as have been touched upon.

White light, as we all know, is not simple in its nature: it is the effect produced by the overlapping of a ribbon or band of colours, and by means of a prism a beam of white light may be revolved into its primitive constituents; red, orange, yellow, green, blue, indigo and violet rays.

The rays at the violet end of the spectrum are described in the language of the physicist as being more refrangible than the blue, green or yellow, and the red rays are the least refrangible.

The more refrangible rays, a group which includes rays that are not ordinarily visible, but which may be brought into line by the so-called fluorescent bodies, æsculin, quinine, etc., are sometimes characterized as photographic rays, and again they are described as chemical rays, a term which conveys the impression that they alone of all the rays composing the spectrum act chemically.

But their chemical action does not depend upon any special chemical or actinic property inherent in them and absent from the less refrangible parts of the spectrum; it is due rather to the circumstance that all easily decomposable compounds possess the power of absorbing the more refrangible rays. The compound acts as a trap which catches the more refrangible rays and allows the less refrangible to pass or become reflected; as a consequence the stopped rays have their arrested motion transformed into chemical action.

Every coloured ray has its own degree of potentiality, and Herschel said that the colours of flowers bleach most rapidly in those colours which are complementary to them; the red and yellow of the spectrum bleaches the blue of the violet petals, and the deep red shade of the poppy fades more easily under a blue glass than in white light, whilst all the rays from green to violet pale the yellow stain of saffron.

It may seem strange that many simple shades should prove more active than clear white light; but the explanation appears I think in the restraining influence which certain parts of the spectrum exert over others, when combined to yield white light.

Great as may be the influence of light in bringing about chemical change, it is highly probable that more is laid to its charge in this respect than a careful examination of the facts would justify.

There is little doubt that in many instances the traces of moisture and the presence of atmospheric air are indispensable links in the endless chain of decomposition.

I know of no experiments which have had for their object the avowed intention of demonstrating the necessary part which the above factors play, but such an investigation would well repay the one who has the means, the skill, and the patience to undertake it.

Pharmacists know how much more rapidly the discoloration of certain liquors and syrups of iron proceeds in bottles which are partly emptied, as compared with well-filled and tightly corked samples. Again, guaiacum does not become green unless it is in contact with air; hence, the disturbing influence of atmospheric oxygen is of the highest importance in such cases, surpassing perhaps that of light itself.

Still another factor must be considered, that of temperature. In many respects light and heat resemble each other; there is, however, one great difference between them: heat is capable of fulfilling the double office of decomposition and recombination; light, except in one instance, acts as a decomposing agent only.

The exception must be mentioned, for it has to do with the elaboration of complex molecules in the growth of plants which only goes on in the presence of sunlight.

That a certain elevation of temperature is necessary was proved by Amato, who found that a mixture of hydrogen and chlorine, when cooled to—12°, could be exposed to the sun's rays for hours without any combination taking place.

Exposure to warmth and light facilitates the decomposition of volatile oils; hence the necessity for preserving them in a cool, dark place.

A field is still open for an inquiry as to what coloured bottles are best suited for the preservation of many liquid and solid substances which we are obliged to keep, and a brief dip into the subject convinces me that there is much room for improvement.

Whether by accident or design a number of the bottles which we receive from abroad, the amber-tinted glass ones, are admirably suited for the protection they afford to their contents, and I am sure that the old-fashioned blue bottle is at times just the one that ought not to be employed.

The importance of the subject of photo-chemical action has not been overlooked by the pharmacists of a past generation, and though the means by which they arrived at their conclusions may not compare very favourably with the refinements of modern science, they were at least the outcome of two reliable witnesses, common sense and experience.

Mr. Ellwood said the more the behaviour of drugs and chemicals was studied the more pressing became the necessity to consider the influence of light in attempting to explain observed phenomena. Respecting the decomposition of potassium iodide, it had been established that the presence of carbon dioxide hastened the process, and was probably essential. He did not think the difference in colour which santonin underwent was to be attributed to light. He mentioned that rhubarb, aloes and bismuth preparations were all liable to be affected.

Mr. Philp, in referring to the example given by Mr. Williams of the decomposition of a solution of mercuric chloride with tartaric acid, mentioned that some time ago tartaric acid was recommended for addition to solutions of mercuric chloride for surgical dressings, the advantage claimed being that the precipitation of albumen was avoided and consequently absorption was not retarded; recently it has been stated, however, that these solutions were rendered useless by the reduction of the mercuric chloride to calomel.

Mr. Stark thought the Association was indebted to Mr. Williams for his able *résumé*. Little or nothing was known definitely of the action of light in producing photographic prints. It was by no means settled whether the colours were due to metallic silver or to various degrees of oxidation. The instability of most silver prints seemed to point to the latter view. He was unable to agree with the President in his statement that light was not the cause of santonin turning yellow. His own experiment pointed to an opposite conclusion. He thought that the action of light as a combining agent was as powerful almost as a decomposing agent. The formation of phosgene gas was an instance of this, for chlorine and carbon monoxide placed in sunlight quietly united to form $COCl_2$, and there were many other instances.

Mr. Richards said pharmacists were indebted to photographers for the elucidation of many points respecting light and its influences, and he alluded to a paper read some years ago before the British Pharmaceutical Conference by the late Mr. John Williams.

Mr. Mason said he could confirm from actual experience the suggestion that Mr. Williams had made that blue bottles did not protect their contents. In the bleaching of oils it might be thought that a white glass bottle would effect the desired object most readily, but as a matter of fact the dark blue Winchesters were infinitely superior for the purpose.

Mr. G. Roe said santonin was undoubtedly decomposed by light, and mentioned some anomalous reactions that he had observed in bismuth compounds.

Mr. Williams, in reply, said it was a commonly accepted fact that santonin did undergo decomposition when exposed to light, and the product photo-santonin differed in several important particulars from santonin which had not been exposed. It had been suggested that the appearance of free iodine in a decomposing sample of potassium iodide might be due to the temporary formation and speedy breaking up of potassium triodide KI_3. He was glad to find that his theoretical deductions had been practically confirmed by the observations of Messrs. Philp and Mason. Whilst acknowledging a certain degree of indebtedness to the followers of photography, he thought they could not claim credit for all the work that had been done in connection with the subject, and remarked that very great uncertainty existed as to the composition of the silver film which formed in the photographic process, though recent work pointed to the conclusion that it was an oxy-salt rather than the sub-chloride, bromide or iodide of which they had heard so much. The remark upon the want of combining effects in light was not his own, but he believed it was primarily a question of temperature.

In the absence of the author this paper was read by Mr. A. C. Stark:—

FERTILIZATION OF CYPRIPEDIUM CALCEOLUS.

BY WM. BAXTER, JUNR.

Opportunities having been given me of observing a fine half-wild growth of the above plant in my neighbourhood during the past two years, a note of results might be interesting, I thought.

As to the growth of one plant last April. From the first appearance of the bud above ground it looked remarkably healthy. In seven days it had grown 2 inches, in another seven days it was 4½ inches high, and the leaves were opening out. On the 21st day it was 7 inches high with leaves fully developed and flower bud visible. On the 28th day it was 8½ inches high, and on the 35th day the plant seemed to be fully developed and had grown to the height of 11¾ inches, this last rapid growth occurring during very favourable weather. The flower was now half open, and after coming to perfection lasted about three weeks.

The fertilization of this orchid, like some others of the same order, such as *Epipactis latifolia*, *Cephalanthera grandiflora*, and the Listeras, is highly interesting and somewhat complicated, and after careful observation in the matter one has to come to the conclusion that this, like *Epipactis latifolia* and others, to make up for imperfect fertilization has the power of reproducing itself in a more certain manner, viz., by increase of the root, for it certainly does increase rapidly when in favourable situations, even in Britain.

That the plant is entirely reproduced by insect agencies, as was inferred by Darwin and others, is very unlikely, for the difficulty of escape experienced by an insect that visits the flower, and also the fact that it is only those insects that encounter great difficulty that can remove the pollen—these points make it plain that fertilization by insects will not account for its increase, for although Darwin has beautifully described the entrance and exit of an insect to this flower, yet that same insect though traced has not been seen to enter the same plant or another. It takes for its motto "Once bit, twice shy." It remembers its struggles to get out and naturally avoids the plant.

Most of you are doubtless familiar with the flower which has a large labellum, whose edges are incurved on its upper surface, forming an orifice, and a tempting one to insects. This gives it the appearance of a slipper, and hence its common name, lady's-slipper, or as the Latin name implies, Venus's slipper. Now what takes place when a small bee enters the labellum, which is partly closed by the stigma? The bee enters easily, but the inflected edges of the labellum prevent it from returning that way unless it is a smallish insect; but in that case it would have taken no pollen with it wherewith to impregnate the stigma, for it would have been nowhere near the pollen. No; after vain efforts to return the same way the moderate sized bee very naturally turns his attention to other chances of egress, and this is generally found by one of the two small elastic orifices close to the anthers, and in escaping it must inevitably carry off some of the glutinous pollen (for in this genus the pollen grains are not in dry masses as is usual, but are coated all over with a viscid fluid).

This being done it is evident that unless that insect revisits the same flower or another the stigma cannot be fertilized. Deaths in the labellum are numerous, consisting of insects of too large a size to escape by the anther orifices and unable to crawl up the sides of the labellum, which are covered by reversed hairs, or else by small insects which are held with a tight grip by the very sticky pollen. There is no nectar, and hence it would seem as if the motive for a visit was curiosity, emphasized, my pharmaceutical tutor used to say, by the fact that all the corpses were of the female sex, but I fancy this was one of his regular little jokes to tickle up the interest of a class of students.

Insects experiencing the above difficulty and escaping generally very quickly desert the locality in which the plants grow.

That cross fertilization takes place is extremely improbable, owing to the above remembrance of prison life by the insect, and there seems to be no record of anyone having seen an insect *visit* a cypripedium *having pollen* attached to its back. When small insects up to the size of a little ant crawl right through the labellum and out at the anther orifices, they do not take the pollen off at all, for the distance between the part of the labellum on which they tread and the pollen masses is too great, being ⅛ to 3/16 of an inch.

Small bees and certain wasps are of the size to remove the pollen grains, but if you place one of such in the labellum and watch you will find that although they generally escape besmeared in pollen by the anther orifices, yet the insect will have gone through such a laborious work that it seems hard to believe that any insect would enter such a trap again. The plant spreads rapidly on the continent, and it seems as if it must be able to reproduce itself by the roots.

Cephalanthera grandiflora is fertilized in the bud state by the pollen grain emitting tubes into the stigma; but construction makes this unlikely in the case of *Cypripedium*.

The fertilization of orchids is a very engrossing study, but it is not always easy to get the time, specimens or opportunity to carefully watch events.

There was no discussion on the above on account of the lateness of the hour, and for the same reason the following paper was taken as read:—

NOTES OF A BOTANICAL RAMBLE IN CORNWALL AND SCILLY (July–August, 1889).

BY WILLIAM BAXTER, JUNR.

Though from previous visits well acquainted with the grand coast-line of Cornwall, with its interesting birds and minerals, caves, submarine cables, and lighthouses, I had not until this year penetrated far into its interior, containing as it does vast moors and elevated bog-lands, which from their dreary look d not attract the tourist, but which would well repay the true botanist to visit.

I do not here mean to particularize the habitats of some of the rarities, the botanist with any enthusiasm at all will find the plants easily enough, and will take only what he really wants and is proper. For showing me the habitat of many plants I am indebted to two naturalists, with one of whom I had long corresponded, but had not seen till this year. The other one, Francis Jose, a serpentine worker of Lizard Town, would, provided he felt confident of your being a true botanist, take you to the haunts of some rarities, and being also intimately acquainted with the geology and mineralogy of the Lizard district he becomes a very interesting companion to those, like myself, engaged in such studies. The insulated position of Cornwall, and the prevailing and terrific "sou' westers" produce a stunted vegetation, and hence the botanist is concerned on the outset with comparatively low-growing plants, and the air being moist bog-plants especially thrive there in a manner which must be seen to be believed. Occasionally, my two naturalist correspondents used to send me up quite large quantities of rare plants, and on remonstrating with them for their reckless gathering they used to laugh at me in words, and say that there were thousands and thousands of the same; that they grew very often in spots that were probably not visited by six people in the year, and that a little thinning did them good. This year I was able to see the truth of their remarks, and be quite sure that the plants would not suffer from their hands. The Lizard peninsula is especially rich in plants of Leguminosæ. Over forty species inhabit the district south of Helston and the Helford river, and the greatest quantity coincides with the outcrop of the beautiful serpentine rock, and over the same area the magnificent Cornish heath with its varieties is to be seen in perfection. Of the Leguminous plants the following are of note, *Genista tinctoria*, var. *humifusa*, is found in Kynance and *G. pilosa* near Lizard Town, all but one species of Lotus, *Ornithopus perpusillus* (common bird's foot), seven of the Vicia, including *V. Orobus*, *tetrasperma*, and *lutea*; but it is in Trifoliums that this district is so specially rich. I saw seventeen species within a radius of half-a-mile, including the following in abundance: *T. subterraneum*, *T. Molinenii*, *T. strictum* and the double-headed *T. Booconi*, also *Trigonella ornithopodioides* (the bird's foot trigonel). In the same district too I found abundance of the wild asparagus, for although every bit has been ruthlessly torn from Asparagus Island in Kynance Cove, yet I know where it grows in plenty, but he who obtains it will have qualified for election to the Alpine Club. I think the plant is tolerably safe in its present home. I was given to understand that it never berries in Cornwall. The rare *Allium Sphærocephalum* is to be found near Kynance, also two *Charæ baltica* and *fragifferum*. The juniper, rupture-wort, *Scilla autumnalis* also were come across, two immense plants of the former and abundance of both the latter.

Along the coast you find the beautiful carline thistle, the only yellow-bloomed one; the still finer sea holly, which is covered entirely with a glaucous or bluish-white bloom, and whose roots are made into a kind of sweatmeat, "candied eryngo-root;" *Polygonum Raii*, *Ruffia maritima*, *Potamageton pusillus*, *Hyoscyamus niger*, and many others.

Cornwall is remarkably rich in minute flowering plants, amongst which are *Sibthorpia Europæa*, *Campanula hederaceæ*, *Anagallis tenella* (the beautiful bog-pimpernel), *Centunculus minimus*, *Radiola millegrana*, *Illecebrum verticillatum*, which is very handsome, in large patches.

Juncus pygmeus is abundant here, which is its only habitat in Great Britain. *J. capitatus*, too, which was discovered here in 1872, is as plentiful. *Pinguicula lusitanica* is very common; also *P. vulgaris* and its var. *grandiflora*, which is generally stated only to be found in the south-west of Ireland; but as it seems to be located throughout the extreme west points of Europe, it is not surprising it is found in Cornwall.

Ferns are very abundant, especially the filmy (Wilsoni), *Asplenium lanceolatum* and *Marinium*, also *Ruta-Muraria* and *Ceterach*. *Osmundas* can be gathered of sizes ranging from 2 to 3 inches to 6 to 8 feet high, and happily they are too abundant and often inaccessible to be easily exterminated. The flora is undoubtedly a rich one. At Penzance two or three kinds of algæ are collected, principally *Porphyria lacinata* and *Ulva latisima*, which are sent to Swansea and London, where it is made into what is known as "laver bread," or eaten pickled in salt, and sometimes stewed and eaten with pepper, butter, lemon-juice, or vinegar, leeks and onions.

I am giving some attention to this, and if anyone present knows the exact process adopted in Swansea and Cardiff I should be glad to hear. To form an idea of what economic uses certain algæ can be put to, let me commend you to the report of the researches of Mr. Stanford, as published in *Pharmaceuticnl Journal* and elsewhere. A visit to the Scilly Isles cannot but interest a botanist, as the gardens of Tresco Abbey contain a splendid collection of subtropical plants all growing out in the open. There are hundreds of the American aloes, and I was fortunate to see twenty-five or so in bloom and as many feet high, and about 12 feet across. They take about twenty-five to thirty years before they bloom, the exhaustive process being a fatal one.

They ripen the best grapes and tomatoes under glass but without artificial heat. The African *Mesembryanthemum edule* over runs the rockwork, and in July the place is one blaze with scarlet *Crassula coccinea*. Hedges are mostly composed of *Escallonia macrantha*, a fine red blossoming dense shrub. Tree ferns grow out in the open, such as *Dicksonia antartica*, 25 feet; *Alsophila Rebeccæ*, 6 feet; *Cyathea dealbata*, 8 to 10 feet; *Lomaria Magellanica*, *Aspl. Nidus avis*, 2½ to 3 feet. Of palms you have *Corypha australis*, very high, *Chæmarops humilis*, 15 feet, *Taxodium sinense* and *Podocarpus andina* (Chili); acacias, wattles and aloes, bamboos and Cape bulbs (*Sparaxis Ixias*, etc.) are there in abundance. Of forest trees there are fine specimens of *Metrosideros robustus*, the Australian iron-bark tree, which has magnificent red terminal blooms, so that the top of the tree seems to be all a-flame, and hence it is called "the blazing bush." It is 35 to 40 feet high though. Other trees are *Picea nobilis*, *Pinus insignus* and *Cupressus macrocarpa*, 3 feet, and *C. lambertina*, 50 feet. Camellia trees are 25 to 30 feet high, and the largest specimen of *Eucalyptus globulus* in Europe I think is to be seen there. It is 60 feet high and 9 feet 6 inches in girth.

Other interesting plants are the Australian musk and prickly pear of the West Indies, cinnamon tree, *Tasmania aromatica*, which berries and ripens, and which is better known as the winter pepper-bush.

Berberis Darwinii with its familiar orange blossoms is 10 feet high. Magnolias, figs and myrtles grow to a great size. They cannot, however, grow roses.

They breed ostriches successfully, and there is plenty of fishing and shooting. The inhabitants grow immense quantities of gladioli, 30 to 40 acres I saw, and narcissi for the London, Birmingham and Manchester markets.

If you go to Scilly, stay two or three days, a shorter stay will only disappoint. The inevitable rough passage deters most people, but to good sailors the trip is a very enjoyable one. On the mainland there is capital fishing and shooting, and the novel sport of seal hunting at Gwithian, near St. Ives. Many sea birds, I am sorry to say, are ruthlessly destroyed, and the Cornish chough is almost extinct.

In the magnificent caves around the coast are to be found some very fine medusæ, starfish, molluscs and echinoderms. The holiday can be made as economical as you like, and I strongly recommend it to you.

The attention of the members was called by Mr. Richards to a fine specimen of caffeine tri-iodide kindly lent by Messrs. Hopkin and Williams. Some models of antiseptic nail brushes, recommended for medical men and hospital use; some cocaine masses of a peculiar shape, intended for obstetric use, and a simple bandage roller, were forwarded for exhibition by Messrs. Reynolds and Branson, Leeds.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, November 14, Mr. Joseph Ince, F.L.S., F.C.S., in the chair. The officers for the new session were elected, Messrs. A. O. Scrivener and A. Gunn acting as Scrutineers. They reported the result to be as follows:—Vice-Presidents, Messrs. Edmund White and Lewis Ough; Secretary and Treasurer, Mr. F. W. Short; Assistant Secretary, Mr. H. D. Fuge; other members of Executive Committee, Messrs. H. W. K. Pears, J. C. Umney, E. H. Cranstone and J. P. Barnes.

An introductory address was then delivered by Professor Green, M.A., B.Sc., F.L.S., who dealt chiefly with the most advantageous methods of study. After first referring to the objects of study, he explained the way to make the best use of the various means provided, such as lectures, text-books, etc., and concluded with advice on the subject of notes.

At the conclusion of the address a vote of thanks to Professor Green was proposed by the Chairman, seconded by Mr. Wyatt, and heartily endorsed by the meeting.

The thanks of the meeting have been also rendered to Mr. Ince for presiding, the meeting adjourned.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

A meeting of the Manchester Pharmaceutical Association was held on Wednesday, November 13, at the rooms of the Chemical Club, Victoria Hotel, Mr. F. Baden Benger in the chair. Before commencing the ordinary business it was unanimously resolved to send a vote of condolence to the family of the late Mr. Harold Woolley. The Committee appointed at the last meeting to consider the question of holding a social gathering recommended that the gathering should take the form of a smoking concert, to be held at the Grand Hotel on the night of November 26, invitations to be sent to every registered member of the trade in the district, whether members of the Association or not.

The committee's report and recommendation were adopted.

Mr. W. Elborne then read a paper on "Galenical Pharmacy." Pharmacy, he said, might be divided into three branches, chemical pharmacy, galenical pharmacy, and dispensing. The practice of retail pharmacy at present embraced chiefly galenical pharmacy and dispensing. Having briefly described the objects of the first group, Mr. Elborne proceeded to say that galenical pharmacy had for its scope the preparation of all medicinal and pharmacopœial preparations, together with the processes involved, the products being not of a definite chemical composition, but mixtures of active and inert principles. An attempt had recently been made to standardize the most potent of these products as regards the active principle they contain. Dispensing was the art of compounding medicines prescribed for the immediate use of the patient. Mr. Elborne divided the operations of galenical pharmacy into three groups, viz.:—(1) the mechanical disintegration and comminution of air-dry vegetable substances; (2) the disintegration and expression of fresh vegetable substances; and (3) the extraction of air-dry vegetable substances by means of solvents. Under these groups the essayist described the different methods and apparatus employed, and in the course of his remarks on group 3 he pointed out that vegetable products, being generally of a very heterogeneous composition, were only partially soluble in the various menstrua generally used in their extraction. He mentioned the principal menstrua (spirit, water, acetic acid and ether) and their applications. Principles which were soluble in one menstruum might not be soluble in others: for instance, although gums were insoluble in alcohol, yet a certain proportion of rectified spirit might be added to an aqueous solution of gum or vegetable albumen without entirely precipitating it, and, *vice versâ*, a certain proportion of water might be added to alcoholic solutions of resins and oils without rendering them turbid. Upon this account diluted alcohol (proof spirit), as yielding a more representative preparation, was an important menstruum in the extraction of many of the Pharmacopœial vegetable substances. Tinctures prepared with rectified spirit generally assumed a milky appearance on the addition of water, owing to the resinous substances being precipitated, upon which account, when prescribed in mixtures, mucilage of acacia was frequently ordered in conjunction with them for their suspension. Proof spirit tinctures, on the other hand, generally remained clear when mixed with water.

The following note was then read on—

TINCTURES AND THEIR SPECIFIC GRAVITIES.

BY J. C. HUSBAND.

There is a matter which I think should be brought to the notice of this meeting, and, indeed, to the notice of chemists generally.

I refer to a paper published in the *Analyst* of this month upon "Tinctures, their Specific Gravity and Extractive Matters." This is written by Mr. J. Spilsbury, a Fellow of the Chemical Society and a pharmaceutical chemist. Yet the errors are so apparent and could so easily have been prevented that one wonders it should have been published by a scientific man in a scientific journal.

In the first place he says that "The following summary of averages is based on estimations extending over a period of ten years." The tinctures were made under his personal supervision, and strictly in conformity with the formulæ of the British Pharmacopœia.

We have no time to go over the list *seriatim*; let us, however, try one or two of these ten years' averages. Take for instance tincture of stramonium, sp. gr. ·939, and tincture of opium, ·936.

Though tincture of stramonium contains only about one-tenth of the amount of extractive which we find in tinct. opii, yet the former is ·003 heavier.

Looking at the list we find for serpentary—made with proof spirit of ·920 gravity—comes out ·911, and that for lemon, which is also made with proof spirit, and which, moreover, contains nearly 9 per cent. of extractive matter, comes out ·893.

Are we to take those figures as the average of ten years' experience?

Another matter, and the most serious one, is that the "official" tincture of sumbul, "made strictly in conformity with the formula of British Pharmacopœia," should be of a sp. gr. of ·931; the same with tincture of cinnamon, whose gravity is ·828. It is now over four years since we got a new B.P., since the menstruum of these two tinctures was altered from proof spirit to rectified, and yet we have these old preparations brought out as official tinctures and the new ones completely ignored.

I have only brought forward this paper so that we may keep our eyes open and see that these figures do not creep into the pharmaceutical papers and be quoted for more than they are worth.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of this Association was held on Tuesday night at the Mason College, Mr. A. Southall presiding. The following notes were read:—

Note on Cajuput Oil.

BY R. A. CRIPPS.

Some time ago my attention was drawn to a sample of lin. crotonis which did not form a clear solution, but consisted of two layers, the upper and larger one being thin and limpid, the lower one oily. When warmed the liquid became homogeneous, but again separated into two layers on cooling. The cause was evidently not due to the croton oil, the same sample having on former occasions given a clear liniment; the spirit used was of B.P. strength; it was therefore clear that the cajuput oil was at fault. I therefore examined the oil and found its sp. gr. to be ·913. This being so much below that of any sample I had previously examined, I concluded that the oil was either adulterated or that the distillers of cajuput oil are in the habit of collecting the distillate in fractions, without subsequently mixing them, this being one of the earlier fractions. I have therefore examined a number of samples in the original bottles (old wine or spirit bottles) with the following results:—

(*a*)	2	samples of sp. gr.	·926
(*b*)	2	„ „	·9255
(*c*)	7	„ „	·925
(*d*)	11	„ „	·9245
(*e*)	28	„ „	·924
(*f*)	15	„ „	·9235
(*g*)	13	„ „	·923
(*h*)	2	„ „	·9225
(*i*)	9	„ „	·922
(*j*)	2	„ „	·921
(*k*)	2	„ „	·920
(*l*)	1	sample of sp. gr.	·913
(*m*)	1	„ „	·8945

Average of 95 samples of cajuput oil, ·9232.

Average of 93 samples of cajuput oil, excluding last two samples, ·9236.

The colour of the samples varied from pale brownish yellow to bluish green, the colour bearing no relation to the specific gravity. With the exception of the sample of sp. gr. ·913 all these oils came in four separate consignments, the members of each consignment varying in sp. gr. to the extent of from 3 to 7 in the third decimal place, not counting the last anomalous sample, although 85 out of the 95 samples ranged from ·922 to ·925. I think therefore we may consider it proved that the mixing of various fractions or batches of oil is performed very imperfectly or not at all. The anomalous sample "m" possessed a slightly peculiar odour, was of a pale bluish green colour, and failed to make a satisfactory croton liniment. I have not yet been able to further examine this oil, but intend submitting it to fractional distillation at an early date.

I may mention that it is important that the sp. gr. of cajuput oil be taken at exactly 15·5° C., in consequence of the high expansion equivalent of the oil (which I have found to be ·0009 for each degree centigrade between 13° C. and 23° C.) unless this equivalent be borne in mind.

In consequence of these results, together with the sp. gr. given by Mr. West (*Pharm. Journ.*, xix., p. 235), I should suggest that the Pharmacopœia contain amongst the tests of cajuput oil "sp. gr. from 922 to 926 at 15·5° C."

Oil of Rosemary.

BY R. A. CRIPPS.

In a recent number of the *Pharmaceutical Journal* attention has been drawn to the use of petroleum as an adulterant of cassia oil. There is very little doubt that this substance is largely used for the purpose of sophisticating essential oils, but I have not seen any published notice of its use in the case of oil of rosemary. Quite lately I have had occasion to examine five samples of this oil, four of which proved to be adulterated, two with petroleum and two with alcohol. The quantity of each at my disposal was very small, or I could have made a more extended examination of them. I need scarcely remind you that the petroleum used consists necessarily of the heavier portions, consequently it may be detected, and approximately estimated, by exposing the oil to the heat of a water bath in an open dish until the odour of rosemary is practically lost, the residue consisting of petroleum and a slight resinous portion which is always left by the oil. Alcohol may be detected by agitating the oil with a particle of magenta; if pure no colour is imparted to the oil, but if adulterated the dye dissolves, the colour being deeper the greater the quantity of alcohol present.

Having detected these impurities as mentioned, I took the solubility of each oil in rectified spirit, ·838.

1.	Pure oil	1 in 5
2.	Adulterated oil (petroleum) . about	1 in 20
3.	„ „ „ „	1 in 30
4.	„ „ (alcohol)	1 in 4½
5.	„ „ „	1 in 3½

Sample No. 2 was distinctly fluorescent, and both 2 and 3 were of full yellow colour.

A short discussion followed, and a vote of thanks was passed to Mr. Cripps for his paper.

Mr. Liverseege then demonstrated a method of ascertaining the amount of carbonic acid in the atmosphere, and the meeting terminated.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of the twelfth session was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, November 13, at 9·15 p.m. Mr. A. Russell Bennet, President, in the chair.

The minutes of last meeting having been read and approved the evening was devoted to the reading and discussing of notes arranged by Mr. George Coull, B.Sc. The first was a—

Note on Aqua Destillata.

BY GEORGE COULL, B.SC.

In the new edition of the British Pharmacopœia, two new tests are given for the purity of distilled water. "It is not affected by . . . . . or a mixture of starch mucilage and oxide of potassium. It gives only a faint yellow coloration when a solution of potassio-mercuric iodide is added to three or four ounces."

The latter test is Nessler's well-known test for ammonia, the former is presumably a test for nitrites which it entirely fails to detect.

You might have water loaded with nitrites which would escape your notice unless you completed the test by adding a few drops of acetic or a dilute mineral acid.

The acid is required for the purpose of setting free both the hydriodic acid and the nitrous acid. It is by the reduction of the nitrous acid to nitric oxide and consequent oxidation of the hydriodic acid that we get free iodine.

$$KNO_2 + HC_2H_3O_2 = KC_2H_3O_2 + HNO_2$$
$$KI + HC_2H_3O_2 = KC_2H_3O_2 + HI$$
$$2\,HNO_2 + 2\,HI = 2\,H_2O + 2\,NO + I_2.$$

The iodide must be free from iodate or the blue colour is produced with starch mucilage and a dilute acid, although nitrites are absent.

The test should read:—"It is not affected by . . . . or a mixture of starch mucilage and iodide of potassium, to which a few drops of acetic acid have been added."

The next communication was a—

Note on Aqua Destillata.

By J. Rutherford Hill.

Recently I had brought under my notice a sample of distilled water which gave a very distinct acid reaction with litmus. Assuming that it probably contained carbonic acid which would be removed by heat, a little of the sample was boiled, but still it gave a very decided acid reaction. No mineral acid could be detected, and thinking it might contain some organic acid, such as acetic, a little was distilled, but the distillate was perfectly neutral. On adding a little solution of lime to a portion of the sample a distinct deposit of calcium carbonate separated after standing a short time. It would appear therefore that the acid was carbonic acid and that it could not be entirely removed by boiling. On passing a current of carbonic acid gas through some neutral distilled water containing litmus it very soon became acid, and I found that the blue colour of the litmus could not be restored by boiling. I speak from memory but I am not aware that this fact has been noted before.

I had the curiosity to try how the sample would answer to the other official tests. It gave no reaction with any of them. A current of sulphuretted hydrogen was passed through about ten ounces of the water for upwards of fifteen minutes but not the slightest coloration took place even after standing several hours. On adding a little ammonia, however, the liquid at once became a greenish-black, and after standing several days a distinct black precipitate has separated. A further portion of the sample tested with potassium ferrocyanide gave a distinct blue reaction. There is no doubt that the sample was contaminated with iron, and this would have entirely escaped detection had the official tests alone been relied on. I would therefore suggest that the official test, "It is not affected by sulphuretted hydrogen," should be amended and read, "It is not affected by sulphuretted hydrogen either alone or after the addition of ammonia."

As to the source of the iron I think it is very likely to have been derived from the iron pipes through which the steam was probably conveyed, and as it is not uncommon to obtain distilled water by condensing the waste steam from steam boilers, this impurity is one very likely to be met with.

Mr. Coull then gave a sketch of Van't Hoff's theory, showing how it explained cases of physical isomerism, which had puzzled chemists for a long time. He took the two varieties of ethylidene lactic acid, and fumaric and maleic acids as examples. This was illustrated by means of models and black-board demonstrations.

Mr. Coull exhibited specimens of the two new hypnotics, chloralamide and tetronal, and made a few remarks on their constitution and action.

The reading of the notes was followed by a discussion, taken part in by Messrs Coull, Duncan, Dougall, Henry, Hill, W. L. Howie, Lunan and McEwan, and on the motion of the Chairman a cordial vote of thanks was awarded to the authors of papers.

The Chairman having intimated that the next meeting would take place on Wednesday, 27th inst., when a paper on "Our Vegetable Extracts," by Peter MacEwan, F.C.S., will be read, the meeting was closed.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of the session was held on Friday evening, November 15, in the Silver Street Hall. There was a very large attendance, the business of the evening being the reading of the magazine papers. Four papers were read and gave rise to a good discussion.

At the end of the meeting a proposal was made to start a Materia Medica and Pharmacy Class, which was favourably received, but owing to the lateness of the hour no definite arrangements were made and had to be deferred for further consideration.

The next meeting will be held in the Music Hall Buildings, when Mr. W. L. Howie will give an account of a "Ten Days' Visit to the Hardanger," illustrated with ninety dissolving views taken by the lecturer.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The third meeting of the session was held on Thursday, October 31, when a paper was read by Mr. J. R. Johnson on "The Influence of Light upon the Growth of Plants," and Mr. G. E. Grattan contributed some "Notes on Dispensing." A paper was to have been read by Mr. Wyatt, but owing to the lateness of the hour when it was reached it was decided to postpone it until December 12.

Mr. Grattan, in the course of his notes, referred to the old rhubarb and soda mixture, and stated that a very satisfactory result is obtained by mixing the rhubarb and soda roughly on paper, putting them into the bottle, adding water to half fill the bottle, and shaking it; this gives rise to considerable frothing, which is easily dispelled by the tr. card. co. or other spirit, which is usually prescribed. A powder which is largely prescribed by a Liverpool physician consists of equal parts of zinc, sulphate and lead acetate, which when mixed in a mortar rapidly deliquesce and form a mass. This may be prevented by powdering separately and mixing quickly on paper, and sending out in a well-corked, wide-mouthed bottle. Mr. Grattan showed a number of pil. pot. permang. coated, made in June last according to formula suggested in the *Pharmaceutical Journal* some time ago. It consisted in mixing a little kaolin with the powdered permanganate and massing with lanoline; the pills were in splendid condition.

Mr. Johnson then read his paper, which gave rise to considerable discussion.

The Influence of Light upon the Growth of Plants.

By J. R. Johnson.

In introducing the subject of the influence of light upon the growth of plants he could not claim any originality or novelty for the subject, since a mere glance at the various text-books showed how much attention had already been bestowed upon it. Still the subject was one of the highest interest, and one which they as members of a students' society might well make themselves fully acquainted with. There was a great diversity of opinion upon the various actions of light in vegetable processes, and there was still plenty of scope for those who had the inclination and the opportunities for observation. Light was generally regarded as indispensable to plant life, though this applied more to the complex processes of assimilation, etc., in plants which had already obtained to a considerable growth. Roughly, its influence might be considered *positively*, as in the cell processes (such as the development of chlorophyll, starch and plastids, where its influence was indispensable), and negatively, in its retarding effect upon growth, and its effect upon the positions, shapes and developments of plant organs.

The processes in plant life to be attributed to the positive influence of light having been briefly sketched, special attention was directed to its negative effects as a phase of the subject, the importance of which was not generally sufficiently recognized, and many instances were given demonstrating the retarding effect of light upon plant growth. While in the absence of light growth was far more rapid, provided sufficient material was at hand, it was shown that the presence of light ensured stability of structure and the proper fulfilment of transpiration and many minor plant functions. The special manner in which these conditions obtained in fungi and the lower forms of plant life was also dwelt upon, and the paper concluded with noticing some important provisions in plants againt the effects of too great an exposure to light.

The next meeting will be held on Thursday, 28th inst., at 8.30 p.m., in the Society's rooms, and will be of a social character.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The Association met in the rooms, 74, Commercial Street, on Thursday evening, November 14, the Vice-President, Mr. D. Skinner, in the chair. There was a good attendance.

The Chairman, after a few introductory remarks, called on Mr. Frank W. Young, F.C.S., F.R.S.E., to give his lecture on "Fermentation and Putrefaction."

In his opening remarks Mr. Young said it would be quite impossible for him to cover the whole ground of his paper on that evening, but he hoped he might have the pleasure of coming amongst them again and finishing it. He was led to fix on this subject by a consideration of the proneness to putrefy as exhibited in vegetable infusions and such like preparations. The lecturer then went on to explain the chemical relations of the lowlier forms of life associated with these phenomena and those of a higher description.

Mr. Young then detailed the general characteristics of a fungus, showing that it is not unlike the lower forms of animal life. These could be cultivated for study in Pasteur's solution, which contained cane sugar, ammonium tartrate, calcium phosphate, magnesium sulphate, and potassium phosphate. These are the essential elements for fungoid growth. The familiar experiment was exhibited in which the action of 1 or 2 grains of pure yeast were thriving luxuriantly in the culture solution, carbonic acid gas being also freely evolved and passed into lime water. In this action it was stated that 1 or 2 per cent. of the sugar is appropriated by the germs, while the remaining 98 per cent. is decomposed into CO_2, alcohol, glycerine, and succinic acid. Some vigorous yeast cells were exhibited under the microscope.

Mr. Young emphasized the desirability of keeping in view the fact of the actual *life* of these cells. He then proceeded to state that fermentation was practically life with a deficiency of oxygen. It was developed from germs which were either found on the outside of such fruits as grapes, gooseberries and the like, where the process of expression rendered certain that the juice came in contact with the fermentive germs, or it was produced artificially, as in the case of beer brewing and bread making. These processes were detailed in a very interesting manner.

The first great question which strikes one with regard to putrefaction is, Where do the germs come from? Of course, they come from the air, where they continually float about. They are of excessive minuteness $\frac{1}{10000}$ to $\frac{1}{50000}$ of an inch in diameter, and are much smaller relatively than those of the torula, or ferment germs, which range from $\frac{1}{3000}$ to $\frac{1}{4000}$ of an inch. That they do come from the air was clearly demonstrated by two parts of an infusion of hay, one of which had been heated to about 212° F., and thus sterilized and the neck of the bottle plugged with cotton wool while steam was issuing. In the other bottle, where no such provision had been made, there was to be found a vigorous growth of hay bacilli. The life histories of the various bacteria were detailed in an interesting manner. In the case of the putrefactive germs there was no proof of spontaneous generation. This Mr. Young pointed out was but the result of numerous experiments made by Professor Tyndall. Meat and other organic substances can, as is well known, be preserved by freezing, salting, and the use of antiseptics, while the organisms can be destroyed by boiling and burning. Organized substances were not inherently decomposable, instability was induced by lowly organisms widely diffused through the atmosphere finding a suitable medium. Putrefaction was therefore proved to be a concomitant of life not of death, at the same time these germs were not entirely mischievous in their action. They were shown to exercise a valuable function in oxidizing waste and animal substances, decomposing them with a rapidity only attainable by cremation or actual ignition, the innocuous products, carbonic acid, ammonia and water being formed in the process.

In concluding a most interesting and instructive lecture Mr. Young said he hoped to have the opportunity on some future occasion of taking up some application of biogenitic philosophy to pharmacy, surgery and daily life.

On the motion of the Secretary a very hearty vote of thanks was accorded to Mr. Young for his able lecture. This was cordially supported by the President and Mr. Mair.

Mr. Young was thereafter, along with Mr. J. Rutherford Hill, Edinburgh, elected an Honorary Member of the Association. Mr. Young, having acknowledged the vote of thanks and also thanked them for the honour they had conferred on him, the meeting then broke up.

Parliamentary and Law Proceedings.

THE SALE OF ANTIPYRIN.

CENSURE OF A CHEMIST'S ASSISTANT.

An inquest of considerable interest to chemists and druggists was held at Stockport on Thursday.

The evidence was to the effect that a domestic servant, 22 years of age, named Leah Butterworth, had on the previous Saturday been seized with pain in the head and went to Needham's (late Proctor's) chemist's shop, Shaw Heath, where the assistant, John William Buckley, gave her four packets of antipyrin, telling her to take the contents of one every hour and a half. She took one packet the same night; next morning she became worse, and died before medical assistance arrived.

Dr. Gordon deposed that he had made a *post-mortem* examination and found death was due to tumour on the brain. He had seen the packets of antipyrin; there were about 12 grains in each.

The Coroner: Do you call 12 grains excessive?

Witness: To give 12 grains without a medical examination is excessive.

The Coroner read from the instructions given by the manufacturers of antipyrin that its use in cases of weak heart should be guarded, and that it was to be taken "under prescription, and under medical care."

Witness, continuing, said it should not be given without an examination of the heart.

The Coroner: Would you administer it yourself unless you had seen the patient first?—No.

It acts upon the heart and lowers the system?—Yes, but it would be all right if the patient had not a weak heart.

As a matter of fact it has had nothing to do with causing death in this case?—I will not say that. I have found sufficient to cause death in the tumour.

A Juror: Ought the chemist to have given instructions with the powder?—Most decidedly.

John William Buckley was then called. Having spoken to the sale of the powders, he was asked by the Coroner:

Have you read the directions of the manufacturer?

Witness: Yes.

Have you read that part in italics?—I did not read it until Dr. Gordon came to me.

You are perfectly aware that the powder affects the heart?—Yes, because I ask people who come to me if they have got a weak heart.

Did you ask this girl if she had got a weak heart?—No.

And yet you told her to take a powder every hour and a half.

Are you aware that that might have had a fatal result if she had had a weak heart?—I do not think from experience that 12 grains would have any effect. The instructions say that 1½ grains can be given to a child for every year old, and under those circumstances the dose I gave was low.

Do you know that the faculty do not prescribe more than ten grains?

Dr. Gordon: That is not so.

Witness: They have prescribed fifteen grains for a dose.

The Coroner: A twelve grain dose might have a serious effect on a weak heart.

Has it had an effect in this case? I am speaking for your own good.—I have been told that that quantity would not affect the heart.

You have no right to administer these powders indiscriminately when you do not know the constitution of the person who buys. The jury wish me to point that out to you, and if you supply this compound again I should advise you not to do so unless you have the authority of a doctor.

In answer to witness, Dr. Gordon said witness ought not to have supplied forty-eight grains without instructions to the patient.

The Coroner (to witness): Are you a qualified chemist?—Yes.

Why did you not write the instructions on the labels?

Witness did not answer.

A Juror: Why did you use Mr. Proctor's name on the labels when he has nothing to do with the shop?—We have labels in the shop, and so long as we are qualified I do not think it matters, and I hope, gentlemen, you do not think that any responsibility rests with me in this matter.

The Coroner: The powders are not the cause of death, and that is all I can say. The jury are of opinion that you ought not to have given deceased so many powders without any instructions, and that forty-eight grains is too much to administer to a person whom you know nothing about.

A Juror: We are of opinion that you are much to blame.—I do not think I should bear any blame for the death.

The Coroner: We do not say you should.

The Coroner then summed up. He said there was no doubt death was due to the tumour, and the powders had nothing to do with it, but Buckley had no right to sell this drug without any instructions or prescription from a doctor. He thought the assistant was highly to blame. Had he read the instructions he would certainly not have sold the powder. The most important part in italics he had never looked at.

A Juror said chemists ought not to place young men in charge of shops.

The Coroner said if the assistants were qualified nothing could be done.

A verdict was returned of "Death from Natural Causes."

Reviews.

WATTS'S DICTIONARY OF CHEMISTRY. Revised and entirely rewritten. By M. M. PATTINSON MUIR, M.A., and H. FORSTER MORLEY, M.A., D.Sc. In four Volumes. Vols. I. and II.*

The 'Dictionary of Chemistry,' compiled by the late Mr. Watts, and published between 1863 and 1868, has long since become an insufficient representation of the state of chemistry, and the four supplementary volumes published between 1872 and 1881 have not altogether made up for the deficiencies arising from the remarkably rapid progress of chemical science. The want of a complete book of reference has therefore been much felt by chemists, and the announcement that Watts's 'Dictionary' would be revised and rewritten to bring the work up to the present date was gladly welcomed. Two volumes of this work have now been published, dealing with the subject matter up to the end of the article "Indigo." Comparison of the contents with the original 'Dictionary' of Watts shows that very considerable alterations have been made, not only with the object of bringing the several articles up to date but also for the purpose of economizing space. A system of abbreviations has been adopted in the description of physical and chemical characters of substances that is very useful in this respect, and though it is at first sight rather uninviting that objection is soon overcome. Altogether the present work is far less a book for reading than even Watts's 'Dictionary' was, but that is not the use for which a dictionary is chiefly valuable, and in the case of a dictionary of chemistry it is above all important that, as a work of reference, it should be as far as possible a complete register of established data and recorded observations. It is evident that the editors have carefully applied themselves to that task, and in doing so they have rendered a signal service to chemists as well as to those who require to seek information as to particular facts or to refer to the original papers of chemical investigators. The 'Dictionary of Chemistry' is therefore a work that ought to be in the possession of every chemist and of every person who is engaged in conducting operations of an industrial or otherwise technical nature involving acquaintance with chemical science. In this connection it should also be borne in mind that the expense of producing such a work must necessarily be very great, and that a considerable sale of it is the only means by which the publishers can be adequately compensated for their enterprise in venturing upon its publication.

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* London: Longmans, Green and Co. Large 8vo. Vol. I., pp. i.-xx., 1-752; Vol. II. pp. i.-xii., 1-760. 42s. per vol.

During the twenty-five years that have elapsed since the publication of Watts's 'Dictionary of Chemistry' commenced, the progress of chemical science has been in every way immense. Not only have multitudes of new facts been discovered, but the theoretical considerations according to which the general mass of knowledge constituting chemistry is now regarded are either entirely new or radically remodelled. The recognition of the intimate connection of chemistry with purely physical science has also led to the application of physical methods of investigation which are of great importance and must necessarily be considered in connection with the results obtained by their means. It is for these various reasons that the system of abbreviation has been adopted in the descriptions of the properties of substances. With the same object formulæ have been substituted for the lengthy words now frequently necessary for expressing chemical constitution, and it has been decided that the treatment of subjects appertaining to technical chemistry should be left untouched. In the original work considerable space was devoted to articles of this kind, which would now more appropriately find a place in a separate book. This limitation of the subject matter appears to be very suitable, and it is indeed to be regretted that this excellent principle has not been carried out even further. Considering the urgent demands for space for the admission of mere data, it might also have been convenient to have transferred all the articles of a theoretical nature to a special volume. When it is remembered how vast an inroad is made upon the 1512 pages of the first two volumes of the 'Dictionary of Chemistry,' by such articles as Affinity, Atomic Weights, Bacteria, Chemical Change, Classification, Crystallization, Dissociation, Equivalency, Explosion, Fermentation, Formulæ and Geology, to mention only some of the longer articles of a theoretical, historical, or general character that might be dealt with as has been suggested, it will be seen that much space could thus have been saved. In the two volumes now published there are no less than about three hundred pages of matter of this kind. Of course it may be said in answer to these suggestions that chemistry does not consist altogether of the dry bones of facts, but that it is the living spirit of theory which connects all those facts together into a harmonious and beautiful whole. For the student it may be and no doubt is to a great extent essential that he should acquire a knowledge of facts through the aid of connecting theories. For that purpose, however, we have abundance of excellent manuals and text books. A Dictionary of Chemistry we regard in a different light. It need not be a complete encyclopedia of the science, but should aim rather at comprising within the smallest bulk that material which is most calculated to be useful for the particular purpose contemplated. It is not a student's book at all, until the student is tolerably advanced, and even then not one to which he would best have recourse for studying theories. The article on Analysis is a further illustration of redundancy; it occupies fifty pages, and valuable as it is in itself there is reason for thinking that analysis might be regarded as being so much a branch of applied chemistry as to warrant the omission of its treatment from the 'Dictionary of Chemistry' quite as much as that of a special metallurgic operation or any other branch of applied chemistry. It is also difficult to understand why three pages should be devoted to such a purely pharmacological subject as cinchona bark, while aconite root and belladonna leaves are unnoticed, though perhaps of greater chemical interest. The article on Hopeine might also have been well spared as belonging to apocryphal chemistry.

The opinion that has been expressed above is further supported by the fact that although the subject matter got through in the two volumes by the alphabetical treatment has advanced as far as the article Indigo, there are many instances in which important substances whose names come earlier in the alphabetical order are mentioned only for reference to the later volumes. Thus, for instance, albumin, casein, chondrin, fibrin, gelatin, glutin and several other albuminoid substances are not described in that order, but merely referred to the heading of Proteids. No doubt there are good reasons for dealing with these substances generally and collectively in regard to their intimate chemical relationship, but in a Dictionary of Chemistry one would naturally expect also to find descriptive articles on the several substances in their proper alphabetical place. With the sugars, the same course is adopted, dextrose, galactose and glucose being referred to the article Sugars in a subsequent volume, though cellulose and dextrin are treated of in their proper order. These references of such important substances to later portions of the work are sufficiently numerous to raise some doubt whether the whole of the subject matter can be dealt with in the space of four volumes, as proposed, especially when it is remembered that so much interest attaches to the substances comprised in the two classes of sugars and proteids. It must not, however, be supposed that these observations are offered in any captious spirit, though indicating, as we believe, partial defects in the work that are due rather to the vast extent of its subject than to anything else. At the same time it must be fully admitted that what has been done is well and carefully done in such a manner as to be of the greatest utility to all who desire to gain information or to make references to data and original memoirs in the course of their chemical work.

In recommending this work especially to pharmaceutical chemists we must of course appeal specially to those who take such a high view of their art as to believe that an intimate acquaintance with the sciences involved in its practice is an indispensable requisite. That there are some who think so we believe, and to them we offer the advice that they should possess themselves of the 'Dictionary of Chemistry' as being a store house of valuable knowledge which they may often find opportunity of turning to useful account. The more extended their scientific knowledge the better will they be able to adapt themselves to any requirements that may arise from the progress of chemical discovery. It is impossible to say what section of chemistry the pharmacist may suddenly find himself in contact with as a matter of his daily business. Only a few years ago scarcely anyone could have anticipated that the chemistry of the coal tar colours, though it sprang originally from an investigation directed to ascertaining the constitution of quinine, would eventually have become so prolific in furnishing materials for the manipulation of the pharmacist as medicinal agents.

Obituary.

Notice has been received of the death of the following:—

On the 31st of October, Mr. Charles Pride, Chemist and Druggist, High Street, Ruddington, near Northampton. Aged 45 years.

On the 10th of November, Mr. James William Guilmette, Chemist and Druggist, Crumpsall, Manchester. Aged 69 years.

On the 12th of November, Mr. Edmund Holt, Chemist and Druggist, Deansgate, Manchester. Aged 57 years

On the 14th of November, Mr. Joseph Middleton, Chemist and Druggist, Cleveland Terrace, Middlesborough-on-Tees. Aged 52 years. Mr. Middleton had been a Member of the Pharmaceutical Society since 1869.

On the 20th of November, Mr. Edwd. Davenport, Pharmaceutical Chemist, St. Albans. Mr. Davenport had been a Member of the Pharmaceutical Society since 1850.

Correspondence.

Unqualified Assistants and the Sale of Poisons.

Sir,—A question I would like to ask in connection with this subject is as follows:—What is to be done with that large class of chemists' assistants who are under the age of twenty-one and unable to pass their Minor on that account? It seems rather hard upon them, and I do not see how as apprentices or assistants under twenty-one they are to gain the requisite knowledge to become pharmacists if they do not have the experience of handling, dispensing and selling poisons.

The recent action seems in this respect to savour of the old woman who would not let her boys bathe because they could not swim.

Does the word "sell" include the word "dispense," as poisons dispensed are ultimately for sale?

If proprietary articles, like Battle's Vermin Killer, already packed and labelled, and the poison itself probably never seen by the assistant, are liable, ought not patent medicines containing scheduled poisons to be placed under the same category?

I am pleased to see the Pharmaceutical Society has at last taken up the cudgels on this point, though personally, with regard to the recent action, I think the "extenuating circumstances" ought to have reduced the fine to *nil*, as a deal of allowance ought to be made for assistants situated as mentioned above.

I would suggest that when one becomes an Apprentice of the Society, if he shall have become or been apprenticed to a duly qualified chemist and fulfil the law with regard to obtaining signatures in poison-book, etc., he should be allowed to dispense and sell poisons under the supervision of a qualified man, who of course would be responsible for him. No employer would be foolish enough to leave a shop unless he felt he had a competent, although unqualified person to look after it in his absence. G. S.

Unqualified Assistants and the Sale of Poisons—Meeting in Sheffield.

Sir,—Permit me to correct a sentence which appears in your condensed account of my remarks at the above meeting. Instead of "He inferred that the phrase about 'any person who shall keep open shop' in the Act, referred not so much to any person in a registered man's shop as to any person who might sell poisons in the open air," the sentence should read,—"'Any person who shall sell,' in the 15th section of the Act, referred not so much to any person in a registered man's shop as to any person who might sell poisons 'elsewhere,' as, for instance, in the open air," etc. J. Preston.

The New Antiseptic.

Sir,—We learn from the medical journals and from your own note on the subject, that Sir Joseph Lister has added another to the now lengthy list of antiseptics. The newcomer is the so-called double cyanide of mercury and zinc, with which the distinguished surgeon has obtained excellent results in his practice. It has been ascertained that the salt employed by Sir Joseph has not the composition of a normal double cyanide, that it contains a much smaller proportion of mercury, and it has therefore been handed over to competent chemists for investigation. The result will be interesting, and assuredly the exact composition of the salt can only be determined by careful analysis. There are, however, some general remarks which it may be permissible to make before the appearance of the report referred to. In the first place, it is an almost invariable rule that when a soluble and an insoluble cyanide or iodide unite to form a double salt the product is soluble. It is, therefore, not surprising to find that the new antiseptic salt, which has been prepared in presence of, and been washed with, water, consists essentially of zinc cyanide. The product is not indeed a double salt at all. We know that oxide of copper which has been precipitated by caustic soda retains a certain amount of alkali which cannot be washed out, so in like manner the cyanide of zinc may retain a small proportion of mercuric cyanide. If the double cyanide is really formed in the first instance, it is certainly almost entirely decomposed by the subsequent treatment with water. It is just possible that the mercury is not present as cyanide, but as oxysalt or oxide, especially if an alkaline double cyanide is used at the outset. It might be worth while to try the antiseptic value of zinc cyanide mixed with a small proportion of mercuric oxysulphate, and thereby ascertain if such a mixture is not of equal value to the so-called double cyanide.

Edinburgh. D. B. Dott.

Estimation of Extractive and Specific Gravities of Official Tinctures.

Sir,—In the *Analyst* of this month will be found a paper with the above title by J. Spilsbury, F.C.S. The results published are in many cases very wide of the mark, and as the paper shows an amount of carelessness such as we would not expect from a pharmaceutical chemist, I venture to ask brother pharmacists not to be beguiled into placing their trust therein.

On comparing the list with the results of my own experience I find that though the great bulk of specific gravities sufficiently correspond as to be within a working average, some differ so much as to call for further evidence. Some of these are:—

	J. C. H.	J. S.
Tinctura cinchonæ	·949	·939
,, cinchonæ co. . . .	·950	·937
,, cardam. co.	·956	·944
,, conii	·926	·942
,, hyoscyami . . .	·940	·930
,, jaborandi	·943	·928
,, pyrethri	·850	·860
,, rhei	·943	·955
,, stramonii	·925	·939

I do not think that the state of dryness of the drug would account for many of these disparities, especially of the last; it is more probably to the strength of the spirit employed or to improper exhaustion.

Besides the above, we have in Mr. Spilsbury's list two tinctures made with proof spirit, whose gravities are ·911 and ·898 respectively; considerably less than the menstruum employed. Surely these are not the averages of ten years' experience?

Another, and the most serious matter, is the fact that in this year of grace, 1889, the official tincture of sumbul as well as that of cinnamon should still be made with proof spirit instead of S. V. R.

With regard to the extractive matter, I have by me no personal estimations, but from a cursory glance at Mr. Spilsbury's figures I would doubt their accuracy. I do not see, for instance, how a tincture of ·939 gravity should give an extractive of ·48 per cent., while a tincture of ·926 gravity should give an extractive of ·9 per cent.

59, *George Street, Manchester.* J. C. Husband.

*** The publication of the foregoing letter has been unavoidably deferred through pressure of other matter.—[Ed. Ph. J.]

Querist.—We do not think that there is anything to justify the conclusion you seem disposed to arrive at.

Henry.—(1 and 2). We do not know that the constitution or composition of the compound is exactly understood. (3) The quantity of iron may be determined by incinerating and estimating the oxide of iron in the residue.

J. H.—We do not think there is a battery by which it can be done economically.

Clifford.—We have never seen more than one stone in the fruit, but the stone frequently contains more than one almond.

J. A. Knight.—We know of no work devoted specially to the subject, but useful information will be found in 'Pharmacographia' and Spon's 'Encyclopædia.'

Inquirer.—Apply to the Secretary for a copy of the Regulations of the Board of Examiners.

Communications, Letters, etc., have been received from Messrs. Blunt, Tocher, Hooper, Taylor, Newsholme, Spurr, Welborn, G. S.

"THE MONTH."

New Soda Process.

In some experiments upon the decomposition of metallic chlorides by the electric current it was found that products which were readily soluble in the bath, as soon as they had accumulated to a certain extent always underwent further decomposition, but that this decomposition did not take place when the products were not soluble under the conditions in which they were formed. It therefore occurred to Professor Hempel that as sodium carbonate and bicarbonate are both only slightly soluble in a saturated solution of sodium chloride, it might be possible to obtain sodium carbonate and chlorine direct by the electric decomposition of such a solution whilst carbonic acid gas was being passed into it (*Berichte*, xxii., 2475). This was found to be actually the case, and that under suitable conditions chlorine is given off at one side and crystals of sodium carbonate are formed at the other. In the apparatus employed, which it is stated could be made of any size, a perforated iron plate was used as a cathode and a thin perforated carbon disc as an anode, the diaphragm being a disc of asbestos. Among the special arrangements was one for the removal of the soda crystals, and another for supplying sodium chloride in the place of that decomposed, so that the action was continuous. With a current of the strength of 1·73 ampères, produced by Bunsen elements, the separation of chlorine amounted to 0·930 gram per hour, and it is calculated that with a dynamo the yield per horse power, calculated as equal to 680 volt. ampères, would be 64·5 grams of chlorine and 258·9 grams of soda crystals ($Na_2CO_3+10H_2O$) hourly.

Sulphur and Carbon.

From Vienna comes the rather revolutionary announcement that sulphur and some other substances at present considered to be elements are really compounds of carbon (*Chem. Zeit.*, Nov. 6, p. 1476). The statement was made by Dr. Theodor Gross, in a communication to the Academy of Sciences, in which he offers the following evidence in respect to sulphur. A thin layer of precipitated sulphur, heated in a porcelain dish to ignition and then allowed to burn slowly, left a black skin, which when incinerated in the air without flame fell to a pale grey-brown powder amounting to about 0·2 per cent. of the original material. One part of this was placed in forty parts of potassium hydrate fused in a silver dish, five parts of potassium chlorate added and the whole heated until it no longer frothed. The fuse, when treated with water, gave a flocculent precipitate and the liquid, filtered off, gave with hydrochloric acid a relatively large quantity of carbonic acid. Upon heating the precipitate in dilute hydrochloric acid, with some nitric acid added, it dissolved all but a slight residue containing silver, and in this solution potash or ammonia produced a light flocculent precipitate readily soluble in acids. Sulphuretted hydrogen produced, after excess of alkali had been neutralized by potash, a light brown flocculent precipitate, which could be washed with hot water. This precipitate, according to Dr. Gross, contains a new body, the only known constituent being copper in traces. The dried precipitate when fused under access of air formed granules which had the appearance of melted selenium and amounted to about 2·5 per cent. of the pale brown powder obtained from the precipitated sulphur. Incinerated strongly for a minute in a current of hydrogen 2·7 centigrams lost 3 milligrams. The mass dissolved in hot strong nitric acid, and ammonia added to this solution in excess produced a precipitate that after being washed was readily soluble in dilute nitric acid. In this solution sulphuretted hydrogen again threw down a light brown precipitate, insoluble in potash or ammonia. The author thinks this substance cannot be an impurity, but that it is a carbon compound which is a decomposition product of the sulphur, and that the behaviour of precipitated sulphur under the conditions stated is related to the different modifications of sulphur.

Phenyl-hydrazids of Acids.

The phenylhydrazids are a group of compounds already known to be formed by the action of phenylhydrazin upon the chlorides, anhydrides and esters of organic acids; in a few cases they have been obtained also by simple heating of the base with the free acid, and in others by warming lactones with acetate of phenylhydrazin in aqueous solution. It has now been found by Professor Emil Fischer and F. Passmore (*Berichte*, xxii., 2728), that the formation of phenylhydrazids occurs much more readily than was supposed, and that a large number of organic acids, especially the oxyacids of the sugar group, even in dilute aqueous solution, react readily with the base. The nature of the reaction consists in the combination of the hydroxyl of the carboxyl group in an acid with an amido hydrogen atom of the phenylhydrazin and the formation of the phenylhydrazid under the elimination of a molecule of water. In the case of a monobasic acid it may be represented by the equation:—

$$R\cdot CO\cdot OH+H_2N\cdot NH\cdot C_6H_5=R\cdot CO\cdot HN\cdot NH\cdot C_6H_5+H_2O.$$

The products are beautifully crystalline, those from the monobasic acids being moderately soluble in hot water and difficultly soluble in cold water; those from the polybasic acids are still more insoluble. They are easily purified, and by saponification with baryta water the acids can be readily regenerated and, after removal of the phenylhydrazin with ether, are in a state of chemical purity. As a rule the phenylhydrazids have definite and characteristic physical properties, which render them a convenient means of identifying organic acids that are otherwise difficult to distinguish from one another; but in those of isomeric acids, such as gluconic, galactonic and arabinosecarboxylic acids, the crystalline form, solubility and melting-point are frequently too closely similar to allow of their being utilized with certainty, and it is necessary for their recognition to regenerate the free acids. At first it was thought that the capability to form hydrazids was associated with the lactone-forming property of an acid, since negative results were obtained with glycollic, lactic and glyceric acids, and there seemed to be a limit probably between erythroglucinic acid and arabonic acid; but on the other hand formic acid and the highly oxidized polybasic succinic, malic and tartaric acids are converted under the same conditions into neutral hydrazids, and the same is the case with many of the aromatic acids, as, for instance, cinnamic and gallic acids. The facility with which a hydrazid is formed appears indeed to be dependent on the electro-negative character of the acid; when this reaches a certain degree the hydrazid is formed at a temperature under 100° C., but below this degree a higher temperature is required. The presence of water does not retard the reaction. In using this reaction as a means of isolating an organic acid a moderately dilute solution, about 10 per cent., is treated with moderate excess of phenylhydrazin and an equal quantity of 50 per cent. acetic acid and heated for from half an hour to two hours on a water-bath. Sometimes the hydrazid separates while the liquid is still hot and sometimes on cooling. Any free inorganic acid in the solution should be neutralized with soda before adding the hydrazin, and in the case of sulphuric, hydrochloric and hydrobromic acids, which form not very soluble phenylhydrazin salts, their removal is advisable. If sugar be present the osazon formed by it can in most cases be removed by crystallization of the hydrazid from hot water. Nor is the value of phenylhydrazin as a reagent for aldehydes and ketones depreciated, since the hydrazids can easily be distinguished from the hydrazons by the ready decomposition of the former by alkalies, as well as by the characteristic red colour imparted by a drop of ferric chloride to solutions of them in cold concentrated sulphuric acid. The phenylhydrazids described in the paper are those of gluconic, galactonic, arabinosecarboxylic, dextrosecarboxylic, mannosecarboxylic, rhamnosecarboxylic, saccharic, malonic and gallic acids. It has also been found by Messrs. Fischer and Passmore that the acids of the sugar group combine in aqueous solution in an analogous manner with aniline to form anilids, but the reaction occurs more slowly and the products are much more soluble.

Optically Active Atropine.

It will be remembered that recent researches have shown that under certain conditions, such as contact with an alkaline solution, the lævorotatory alkaloid hyoscyamine undergoes intermolecular change, and is converted into the optically inactive atropine. It has also been found that when the tropine and tropic acid derived from the decomposition of hyoscyamine are combined, it is not that alkaloid but atropine that is formed. Upon the supposition that the inactivity of atropine might be due to it being composed of optically opposite constituents, attempts have been made to split it up into a dextrorotatory and a lævorotatory compound, and although this has not yet been accomplished, some results published in a recent paper seem to indicate that the problem is in a fair way of solution (*Berichte*, xxii., 2590). Experiments with the alkaloid having been unsuccessful, Messrs. Ladenburg and Hundt attempted the splitting up of inactive tropic acid by the action of *Penicillium glaucum* upon the ammonium salt, though without result. But upon the addition of a dilute solution of quinine in alcohol and water to a hot aqueous solution of pure tropic acid (melting point 116°-118° C.), in molecular proportions, evaporating the solution to the point of crystallization, and then cooling, there was at first a formation of an abundance of dull white crystals, whilst upon further concentrating the mother liquor an oil separated that gradually solidified to hard glassy crystals. The first crystallization proved on examination to consist of a dextrorotatory ropic acid compound, while the second crystallization consisted of a lævorotatory compound, the optical characters being still retained by the acid when set free from the respective compounds and purified. The two varieties of tropic acid were then combined with tropine, according to the method followed in the synthesis of atropine. The right-handed acid combined to form an oily base, that gradually crystallized in alcoholic solution, showed a dextrorotatory power of + 10°, and yielded a gold salt more difficultly soluble in hot water than that of atropine and melting at 146° and 147° (atropine 134°). The left-handed atropine was obtained as a crystalline powder, the gold salt resembling pretty closely that of hyoscyamine, but having a lower melting point (146° against 169°) The explanation offered for the difference between this left-handed product and hyoscyamine is that in hyoscyamine two active asymmetric carbon atoms are present, whilst in the synthetic compound there is only one. It is thought that it will be necessary to split up tropine in the same way as has been effected with the tropic acid, and that then from the left-handed tropic acid and the left-handed tropine it will be possible to prepare hyoscyamine.

Solanaceous Alkaloids.

In an interesting note upon the mydriatic alkaloids of the *Solanaceæ*, in *Merck's Bulletin* for September, it is stated that notwithstanding researches have in recent years gradually narrowed the differences supposed to exist between the chemical and physical properties of the principal Solanaceous alkaloids, they have tended on the contrary to increase the evidence as to differences in their physiological action. According to the writer the use of atropine is frequently contraindicated by a kind of idiosyncrasy, it giving rise in some cases to a peculiar variety of conjunctivitis, whilst sometimes it produces severe toxic symptoms. Duboisine and daturine are said to act much like atropine, but more strongly; nevertheless they are favoured in cases of idiosyncrasy against atropine. Hyoscyamine resembles atropine in general action, though it is less toxic; but it differs in being hypnotic in small doses. Hyoscine produces the atropine effect, but its action is more prompt, and its administration is not attended by such dangerous general symptoms as those sometimes following the use of atropine; it is also a hypnotic. Homatropine, the artificial alkaloid, enlarges the pupil and paralyses the accommodation as atropine does, corresponding almost exactly with that alkaloid in its maximum action, but it exhibits a much briefer continuance of the atropine effect.

Senegin.

Senegin, the glucoside occurring in senega root, the formula of which, according to the authors of Pharmacographia, "is not definitely settled," has been the subject of a fresh investigation by A. Funaro (*Gazz. Chim.*, xx., 21). Rochleder represented the composition and decomposition of the compound by the equation: $C_{32}H_{54}O_{18}+H_2O=C_{20}H_{32}O_7+2C_6H_{12}O_6$. But according to the author senegin has the composition represented by the formula $C_{32}H_{52}O_{17}$, and is decomposed according to the equation—

$$\underset{\text{Senegin.}}{C_{32}H_{52}O_{17}}+2\,H_2O = \underset{\text{Senegenin.}}{C_{20}H_{32}O_7}+2\,C_6H_{12}O_6.$$

Senegin, therefore, if the latter equation be accepted, stands very close to Rochleder's saponin, but is not identical. The equation is said to be in accord with the results of analyses of the glucoside, and the quantities of glucose and senegin found.

Betel Leaves Oil.

At the Naturforscher meeting in 1888 Professor Eykman reported that among the constituents of the essential oil distilled from fresh betel leaves he had found a characteristic compound, having the odour of the leaves and the constitution of parallyl-phenol, which he designated "chavicol." About the same time Messrs. Schimmel announced that the phenol present in the higher-boiling fractions of the oil distilled from air-dried betel leaves corresponded completely with eugenol, though subsequently they made the modified statement that the phenol obtained by them was not eugenol but an isomer (*Pharm. Journ.*, [3], xix., 803. With a view to clearing up the apparent contradiction, Professor Eykman has re-examined the oil distilled by himself from the fresh leaves and some distilled from dry leaves by Messrs. Schimmel, with the result of confirming the presence in the former of chavicol, boiling at 236° to 238° C., and in the latter of the isomer of eugenol, boiling at 254° to 255°, which proved to be orthomethoxychavicol (*Berichte*, xxii., 2735). It would seem probable, therefore, that both phenols occur in the leaves, and that chavicol being the more volatile had practically disappeared from the dried leaves, while the method of distillation adopted by Messrs. Schimmel favoured the more complete removal of the higher-boiling compound. Some experiments made with chavicol are said to have shown it to be a powerful antiseptic, it being five times stronger as a bacteria poison than carbolic acid and twice as strong as eugenol.

Aqueous Solutions of Essential Oils.

It has been found by Herr Bergmann, that while mixtures of the fixed alkali soaps with hydrocarbons and essential oils form only emulsions in water, under separation of the respective oils, a mixture of an ammonia soap with an essential oil will form a clear solution in water, especially in the presence of excess of ammonia (*Chem. Zeit.*, Nov. 6, p. 1477). Turpentine oil, or some other essential oil, is first mixed with castor oil, or a mixture of it with other fat oil; the mixture is then subjected to the action of concentrated acid, and the product after being washed with solution of salt is saturated with ammonia in excess. Or the fat acids may be first separated by treatment of the fatty oil with concentrated acid, then washed with salt solution and the essential oil added either before or after saturation with ammonia. The preparation thus obtained is said to form a clear solution, and not only to possess the properties of a soap, but also to exercise in aqueous solution the solvent action of an essential oil.

Cod Liver Oil and Glycogen.

It is reported by Dr. Daremberg that he has established experimentally that in animals in which tuberculosis has been artificially produced, the disease runs a more rapid course if glycogen be introduced into the system either subcutaneously or with the food (*Deut. med. Woch.*, Nov. 14, p. 956). A weakening of the action of the glycogen attends the administration of cod liver oil in cases when the tubercle poison has been injected into the animal subcutaneously, but the oil is without effect when the injection has been intravenous. The oil does not appear to exercise any influence upon the poison itself; its action appears rather to consist in increasing the animal's power of resistance.

Absolute Iodoform.

Some months since (*March* 2, p. 705), reference was made in these columns to a method of preparing iodoform direct from the ley of the kelp industry, based on the reaction between acetone and nascent alkaline hypoiodite, produced by the action of hypochlorite on the alkaline iodide in the liquor. It is now announced by M. Castelhaz that this process is being carried out on the manufacturing scale near Rouen, and it is claimed that the iodoform produced is absolutely pure (*Répertoire*, Nov. 10, p. 481). It is described as occurring in micaceous scales of a fine pale yellow colour, soluble without residue in alcohol, ether, chloroform, and carbon bisulphide, and having only a feeble odour. This difference in odour from iodoform prepared in the usual way is explained by the fact that the reaction in the new process takes place in dilute solution in the cold, without the production of free iodine; whilst in the ordinary process the reaction between free iodine and boiling alcohol gives rise to the formation of hydriodic acid and secondary compounds, to the presence of which in traces the stronger odour is due.

Vinyl Alcohol in Ethylic Ether.

In attempting to purify some mercuric oxychoride from mercuric chloride by shaking a potassium or sodium bicarbonate solution of it with ether it was observed that in ten or twelve minutes the clear liquid became turbid and after a time deposited a white amorphous precipitate. It was further found that if the treatment were continued with fresh quantities of ether a point was reached when all the mercury previously in solution had been precipitated. After a thorough examination of ether from different sources Messrs. Poleck and Thummell have come to the conclusion that the precipitate was due to the mercuric oxychloride forming an insoluble compound with vinyl alcohol ($CH_2{\cdot}CH{\cdot}HO$), and that vinyl alcohol is a constant accompaniment of commercial ethylic ether (*Archiv*, Nov. 15, p. 961). This vinyl alcohol is considered to be produced not only during the manufacture of the ether but also through the oxidation of the pure ether by atmospheric oxygen under the influence of light, with the simultaneous formation of hydrogen peroxide. The same compound is also produced by the action upon ethylic ether of hydrogen peroxide, ozone or chromic acid. The progress of this oxidation of ethylic ether is analogous to that which takes place during the oxidation of zinc in the presence of air and water, and is represented by the equation—

$$\underset{\text{Ethylic ether.}}{\left.\begin{matrix}CH_3CH_2\\CH_3CH_2\end{matrix}\right\}}O + O_3 = \underset{\text{Vinyl alcohol.}}{\begin{matrix}CH_2CHOH\\CH_2CHOH\end{matrix}} + \left\{\begin{matrix}HO\\HO\end{matrix}\right.$$

In the opinion of the authors it is the vinyl alcohol that gives rise to a brown colour when commercial ethylic ether is acted upon by potassium hydrate, whilst the acid reaction is due to acetic acid formed from the vinyl alcohol. Ether may be purified from vinyl alcohol by shaking it repeatedly with water or an alkaline solution of mercury monoxychloride, or by treatment with phenylhydrazin.

The acid salicylsulphonate of sodium has been made the subject of experiments by Dr. Zimmerli

Sodium Salicylsulphonate.

to test its powers as an antiseptic (*Pharm. Zeit.*, Nov. 6, p. 675). The compound is represented by the formula $C_6H_3 \cdot OH \cdot COOH \cdot SO_3Na$, and the idea was that as it contains, like salicylic acid, a free carboxyl group, it would retain its antiseptic properties, which are diminished in the case of the sodium salt of salicylic acid, whilst it would be more soluble than that acid. The results showed that in antiseptic properties the compound ranks below salicylic acid, but above sodium salicylate. Acid sodium salicylsulphonate is described as a white crystalline substance, odourless, acid to the taste, freely soluble in water, slightly soluble in alcohol and insoluble in ether, and giving an intense salicylic acid reaction with ferric chloride. Experiments with sodium α-oxynaphtholsulphonate showed that body to possess only slight anti-fermentative power and it appeared to pass through the body undecomposed.

Cresyl Ether of Salicylic Acid.

Among other new antiseptics, experiments have been made by Dr. Zimmerli also upon the cresylic ethers of salicylic acid, in the expectation that they might prove more powerful than salol, which is a phenyl ether of the same acid (*Pharm. Zeit.*, Nov. 6, p. 675). The three isomeric cresyl ethers, ortho, meta and para, are described as white crystalline bodies, resembling salol in appearance, insoluble in water, but freely soluble in alcohol, the solution giving with ferric chloride an intense violet colour. The results obtained seemed to show that all three cresyl compounds possess certain antifermentative properties, in that they act as deodorants and possess the property of preventing the multiplication of bacteria by the ordinary process of division; but on the other hand the microbes are not killed, the influence being only inhibitory like that of salol. Compared with salol they are weaker in their action. The meta compound is said to occur as a fine powder, suitable as a dusting powder.

New Test for Albumen.

Salicylsulphonic acid has been recommended by Herr Roch as a certain, delicate and convenient test for albumen (*Pharm. Centralh.*, Sept. 19, p. 549). The albumen is said to be thrown down by the acid as a white powder, having an acid reaction and giving with ferric chloride an intense red colour. The separation of albumen from a liquid is stated to be complete, 0·0005 gram in 10 c.c. being distinctly recognizable. In examining urine it is recommended to introduce a few crystals of the acid into a cubic centimetre of the liquid and shake, when the occurrence of turbidity may be taken as evidence of the presence of albumen, since the reaction is not affected by the presence of urea, uric acid, peptones, or glucose.

Tannic Acid.

In a communication upon tannic acid Dr. Etti mentions that he has now obtained from oak barks of different origin a series of three tannic acid compounds represented by the formulæ $C_{16}H_{14}O_9$, $C_{17}H_{16}O_9$, and $C_{18}H_{18}O_9$, one from the bark of the red beech, with the formula, $C_{20}H_{22}O_9$, and another from hop strobiles represented by the formula, $C_{22}H_{26}O_9$. At present, therefore, the C_{19} and C_{21} compounds are wanting in this homologous series. Each compound is said to have its particular colour, ranging from brown red to light red. Whilst two of the acids from oak bark, when dissolved in very weak spirit, give with ferric chloride a dark blue colour like gallic acid, the other acids mentioned give with ferric chloride different shades of green.

Salicylic Acid in Colds.

Mr. S. W. Hope testifies to the value of salicylic acid in the treatment of a common cold (*Brit. Med. Journ.*, Nov. 16, p. 1092). He states that if it be applied to the irritated lining membrane of the nose when sneezing manifests itself, and before any inflammatory action is established, a single application will be found sufficient to abort a common cold. The formula that he suggests is: "℞ Sodii salicylatis ℈iv., acid. boracis (pulv.) ℥j., cocainæ hydrochlor. gr. xxii. Mix by agitation, not in a mortar."

Euphrasia Officinalis in Colds.

The common "eyebright" (*Euphrasia officinalis*), in addition to the wonderful virtues attributed formerly to it in the treatment of ophthalmic complaints, was considered to be "a great dryer." This part of its reputation appears to have been justified in the experience of Dr. G. M. Garland, who states that he has found it of great service in the treatment of acute coryza (*Bost. Med. Surg. Journ.*, Nov. 7, p. 453). The remedy was used in the form of a tincture (strength not given), which in ten drop doses in water is described as exercising a powerful action upon the recently inflamed mucous membrane of the nose and pharynx, reducing the secretion in a very short time. The tincture is said to have been found specially useful in the acute coryza of infants.

Mercuric Chloride in Dysentery.

Acting on the presumption that the efficacy of ipecacuanha in dysentery is due to its power of stimulating the liver and producing an abundant secretion of bile, Mr. Chowdhorry experimented in the Burdwan Hospital with perchloride of mercury, as likely to serve the same purpose without the nauseating effects. He reports (*Lancet*, Nov. 3, p. 901) that he has treated many cases with uniform success. In two of the cases reported a dose of 5 minims of liquor hydrargyri perchloridi in 2 drachms of water was administered every four hours, and in a third the same quantity of liquor in an ounce of water.

Eucalyptus Spray in Whooping-Cough.

Dr. W. W. Hardwick reports (*Lancet*, Nov. 2, p. 901) that he has obtained good results in the treatment of whooping-cough with a spray of a mixture consisting of eucalyptus oil, two drachms; terebene, two drachms; and rectified spirit one ounce and a half. The spray is usually ordered to be used half-an-hour before each meal and at bedtime. At the same time a drop dose of terebene, suspended in water by means of carbonate of magnesia, with the addition of compound tincture of camphor, is administered every three hours.

Tumbeki.

The physiological action of tumbeki (*Nicotiana persica*) has been examined by Dr. Robinson (*Nouv. Remèdes*, p. 546), who finds that it diminishes the inhibitory action of the vagus nerve, thus giving rise to cardiac hypertrophy, and that it produces pulmonary catarrh and emphysema, although, singularly enough, it is used by emphysematous persons to promote expectoration. Dr. Robinson classes it with intestinal convulsants, such as calabar bean, belladonna and nux vomica.

Dr. Tabitski has published the results of

Tonic Effect of Bitters.

observations made in Professor Koshlakoff's clinic at St. Petersburg (*Practitioner*, Nov., p. 362), on the effect of bitter drugs in affections, such as gastric catarrh, in which their use would be indicated. The bitters used were gentian, wormwood and buckbean, in the form of the extractum amarum of the Russian Pharmacopœia. It was found that where deficiency of free hydrochloric acid in the juice was at the root of the indigestion, bitters given on an empty stomach a short time before food caused a decided improvement; but their beneficial action in cases of deficient peristaltic action was doubtful. The action of the bitters appeared to be to increase the amount of hydrochloric acid in the gastric juice, although the total quantity of gastric juice secreted did not seem to be larger.

Hoangnan.

In the *Medical Bulletin* (November, p. 348), Dr. Shoemaker directs attention to the use of hoangnan in skin diseases. He says that after having been engaged for some years in a study of the therapeutic virtues of this drug he regrets to say that his experience does not enable him to endorse the extravagant eulogies of some of its advocates, and that he cannot concur in the laudatory articles in various domestic and foreign periodicals which have recently been published. But he finds that it has a stimulant, corroborant or alterative action upon the cutaneous glandular systems, both perspiratory and sebaceous, but more particularly the latter. This he believes to be due to the accelerated circulation communicating increased tone to the muscular fibres surrounding the gland ducts. Hence both in seborrhœa and in alopecia he has found it very serviceable, and also in hyperidrosis. In anidrosis it often restores the function of the glands. In sycosis and eczema pustulosum he has also seen beneficial results arise from its use. But in a case of leprosy, three months treatment with hoangnan gave no satisfactory results, nor was it of use in erysipelas; but it answered well in various skin diseases accompanied by defective nutrition. He remarks that it contains strychnine and brucine, the latter in larger proportion, to which presumably the medicinal properties of the bark are due.

Sulphonal.

Sulphonal constitutes the topic of three separate articles in the last number of the *Lancet* (Nov. 23, pp. 1051 and 1053). In the first Dr. R. Percy Smith deals with the question that has been raised as to whether a prolonged use of this hypnotic is altogether harmless. Reference is made to observers who have been inclined to attribute symptoms of giddiness and ataxic disturbance to its influence, and Dr. Smith quotes the symptoms observed in some cases under his care in Bethlem Hospital as justifying the impression that it does in some cases interfere with the cortical motor functions. In all the cases, however, suspension of the administration of the sulphonal was attended by an immediate disappearance of the unpleasant symptoms, and, in some, re-administration after an interval produced no bad effect. In the second paper, Dr. Sutherland reports that he has found sulphonal to be a most valuable sedative in chronic insanity where the attacks of excitement are recurrent, but in cases where the excitement is continuous its effects are apparently injurious by increasing the state of excitement of the patient on the following day. A formula recommended by Dr. Sutherland for a draught is: Sulphonal, 20 grains; pulv. tragacanth, 20 grains; syrup aurantii, 1 drachm: water to 1 ounce. In the third paper, Mr. C. K. Bond arrives at the conclusion that sulphonal is of very great value in the insomnia of typhus, in inducing sleep without the disadvantage attending the administration of some other hypnotics of causing stupor leading up to coma.

Photography and Physiological Processes.

The possibility of employing living organisms in the printing of photographic negatives promises to be of greater interest for the light it will throw upon certain physiological processes than for the addition it makes to the materials at the disposal of the photographer. In a paper read before the British Association, and just published (*Nature*, November 7, p. 16), Mr. Walter Gardiner describes how it is possible to utilize for this purpose the sensitiveness to light of the free-swimming swarm-spores, or protococci, of many green algæ. In operating, a water-tight box is used, fitted at one end with a thin glass plate, against which the negative to be printed is placed, film-side nearest. The box is then filled with water containing swarm-spores and exposed to diffused light. The swarm-spores make their way in the greatest numbers to the more highly illuminated parts and then settle upon the glass, so that at the end of from four to six hours a print in green swarm-spores is obtained which may be dried, fixed with albumen, stained and varnished. Mr. Gardiner then refers to the building up of proteid and protoplasm in the chlorophyll corpuscles of a plant, and especially the formation of starch under the influence of light, and states that if a plant, preferably with thin leaves, after being kept in the dark for a time, be brought into the light and a leaf be covered with a sharp negative, starch is formed in the greatest quantity in the parts of the leaf corresponding to those through which the brightest light is transmitted. Such a positive can be developed by suitable treatment with iodine, and if it then be subjected to the action of a silver salt, silver iodide is formed and a permanent print is produced.

Paraguay Plants.

In the *Botanical Gazette* this month there is a very interesting account of the botany of Paraguay by Mr. Thomas Morong. He states that Paraguay is a remarkably rich country, considering its area, and remarks in illustration of the fact, that at the Paris Exhibition this year there were ninety-three specimens of its native plants that are used for medicinal purposes. He mentions one curious composite plant, in which the involucre of the flowerhead consists of a single five-toothed scale and five rows of curious yellow glands sunk beneath its surface, five flowers only in the head, five pappus scales, and stipules consisting of three to five-branched hairs. He also found an asclepiad, the flowers of which entrapped and held a large humming-bird moth by the proboscis. A convolvulaceous shrubby plant persisted in disarticulating its leaves, flowers and buds, so that even if the paper used in drying were changed every hour it was impossible to obtain a satisfactory specimen. As Mr. Morong has collected 750 species and 8000 specimens, there will probably be many interesting additions to botanical science when the plants have been examined and named.

The Pharmaceutical Journal.

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SATURDAY, NOVEMBER 30, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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THE SALE OF POISONS BY UNQUALIFIED PERSONS.

THE paucity of the correspondence that has been received on the subject of the sale of poisons by unregistered assistants and apprentices would appear to indicate that the question is not one which very profoundly moves chemists and druggists generally. Even the discussions that have taken place at Sheffield and Liverpool fail to furnish evidence of any strong feeling of objection to the interpretation that has been put on the law by the decision of Judge HOLROYD, and those individuals who do object to it admit at the same time that it would have a beneficial influence. So long, however, as it remains uncertain whether the decision that has been given will be carried before a higher court, it appears to us undesirable that the assumed question at issue should be discussed in this journal, as it is the organ of one of the "parties" to the litigation. For that reason we have confined our remarks on this subject to showing the purport and drift of the opinions that have been expressed by legal authorities, whose special function it is to interpret the Pharmacy Act as well as any other statute. The consideration of the subject from that point of view appears to be of more immediate importance than the intentions of the framers of the Act at the time it was passed, for in the present case, as in the case of the companies, it will be the interpretation of the Act by legal authorities that will count.

Assuming that the provisions of the Act in regard to keeping open shops are fully in accordance with the intention that every proprietor of a chemist's shop should be a legally qualified person, and admitting the proposition that in such a case the master qualifies the servant, it can scarcely be contended that he does so otherwise than by his direct supervision and control. Otherwise we should arrive at the absurd position that every chemist's business in the country might belong to one individual, and there would be no need for anyone besides himself to possess the legal qualification. This is the point that was dealt with by Mr. Justice GROVE in his judgment in the case of *Templeman* v. *Trafford*, and to illustrate his view he put the case of a person living in Aberdeen and establishing agencies throughout the country at a distance from his place of residence. Since that person could not at those agencies comply with the provisions of the Act in regard to the sale of poisons in the first part of Schedule A, he evidently could not be regarded as the "seller" referred to in the Act. He held, on the contrary, that the seller was the person who actually conducted the business of sale and who controlled the place of sale. This view of the Act is perfectly in accord with the intention that the person who keeps a chemist's shop should be qualified, but Mr. Justice GROVE went still further in his judgment by stating that it did not necessarily follow the mere hand to sell poison should be that of the qualified principal.

The opinions expressed in the judgment above referred to appear to offer a complete answer to the questions asked in the letter of our correspondent G. S. in last week's Journal. How, he asks, are apprentices to learn their business in regard to the sale of poison? and what is to be done with assistants under the age at which they can qualify? He is evidently under the impression that the recent decision goes so far as to indicate that an apprentice or unqualified assistant cannot under any circumstances supply poison. In this we think he is mistaken, and that he overlooks the proper application of the principle that the master qualifies the servant. A sale of poison or the dispensing of medicine containing poison by the hand of an apprentice or unqualified assistant would not, we imagine, be a breach of the law if conducted under the supervision of the master or some other qualified person acting for him. The answer to our correspondent's questions, therefore, is that the interpretation of the law taken by Judge HOLROYD does not raise any obstacle to the employment of unqualified assistants, provided the work they do in the sale or dispensing of poison be properly conducted under the supervision of the master or his legally qualified representative. Neither does it involve any danger that apprentices would be unable to gain the requisite experience in such work. On the contrary the recent decision rather supplies a security, not altogether unnecessary, that the teaching of apprentices this part of their business shall be effectively carried out by their masters with direct personal supervision. In such cases, we can imagine that the actual sellers or persons who hand over poisons would be free from any liability under the 1st and 15th sections of the Pharmacy Act, and that the masters would be the persons to whom the Act refers as the sellers that are to be held responsible. This is a very different matter from that contended for in the defence of the case decided by Judge HOLROYD, which was that a master can depute his responsibility to an apprentice or other unqualified person, and leave them in his absence to do that which it is held on the other hand they would be entitled to do only in his presence and under his immediate direction.

We learn that on the initiative of Mr. H. Long, of Notting Hill, one of the Society's Divisional Secretaries, an association has been formed which is to be named the North Kensington Chemists' Association. At a meeting held at 48, High Street, Notting Hill, last Tuesday, numerous promises of support were received, and the next meeting was fixed for the 10th December at 9 p.m.

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A complimentary supper in celebration of the golden weddings of two of the oldest chemists of Brighton, Messrs. W. D. Savage and J. W. Cornish, was held last week at Booth's Restaurant in that town. The chair was taken by Mr. Alderman Cox, and about twenty-five members of the Brighton Chemists were present on the occasion.

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It has been decided by the Aberdeen and North of Scotland Society of Chemists and Druggists that an entertainment for assistants and apprentices shall be provided towards the end of January on the lines of the one held in March last.

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In the last number of the *Moniteur Scientifique*, Dr. Quesneville called attention to the fact that next month fifty years would have elapsed since the establishment by him of the *Revue Scientifique*, the immediate forerunner of that journal, and stated that as he would at the same time finish his eightieth year, and was not in good health, he had decided with regret to discontinue the publication. Dr. Quesneville did not, however, live to put off the harness, having died in Paris on the 14th inst.

* * *

Another scientific worker, whose name was familiar to American pharmacists, and not unknown to the readers of this journal, has passed away in Mr. Rheinold F. W. Rother. Of German parentage, he graduated at the University at Michigan, and afterwards settled in Chicago and then in Detroit. He seems to have been a great benefactor to the College of Pharmacy, having presented to it land valued at upwards of ten thousand dollars. Mr. Rother was a somewhat voluminous writer on pharmaceutical subjects and the author of two manuals of pharmacy.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Thursday evening, December 5, when a paper on "Methods of Cutting, Staining and Mounting Sections of Various Roots, Barks, etc., used in Pharmacy," by Mr. M. J. Cole, will be read, and Mr. Blackham will move a resolution condemning the prosecution of unqualified assistants for the sale of poisons.

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The next meeting of the Dundee Chemists' Assistants and Apprentices' Association will be held on Thursday, December 5, when a paper entitled "Botany and its Relation to Pharmacy," by Mr. W. Muir, will be read.

Transactions of the Pharmaceutical Society.

MEETING OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, November 20, at 1 p.m.

Present: Messrs. Boa, Gibson, Gilmour, Mackenzie, Stephenson and Thompson, Edinburgh; Fisher, Dunfermline; Hardie and Kerr, Dundee; Kininmont, Glasgow; Lawrence, Oban; Maben, Hawick; Nesbit, Portobello; Paterson and Strachan, Aberdeen; Storrar, Kirkcaldy; and Watt, Haddington.

Apologies for absence were received from Messrs. Frazer and McAdam, Glasgow.

The minutes of last meeting were read and approved.

The report of the General Purposes Committee, from which it appeared that the expenditure for cleaning and painting in the Society's House amounted to a little over £20, was read and adopted.

Mr. Mackenzie, Edinburgh, moved that the gentlemen who had acted as examiners during last term should be nominated for re-appointment.

This was seconded by Mr. Storrar, Vice-Chairman, and unanimously agreed to.

The question of the sale of medicated wines, which had been adjourned from last meeting, was then taken up. In the course of a somewhat lengthy discussion several members strongly deprecated the idea of chemists as a body taking out wine licences. The general opinion seemed to be that many so-called medicated wines were simply used as a tipple, but some inconvenience had been met with in the case of certain preparations of pepsine and coca, which were strictly medicinal and in which wine was used as a menstruum.

Mr. Paterson, Aberdeen, moved, and Mr. Fisher, Dunfermline, seconded, the following motion:—

> "That the Executive of the North British Branch request the Council to approach the Board of Inland Revenue to ascertain their views as to the conditions on which chemists may sell medicated wines, such as pepsine and coca, without infringing the law."

Mr. Maben, Hawick, moved, and Mr. Mackenzie, Edinburgh, seconded the following amendment:—

> "That it be remitted to the General Purposes Committee, with powers to communicate with the Inland Revenue authorities on the question of the medicated wines."

On a division being taken a large majority voted in favour of the first motion, which was declared carried.

Mr. Watt, Haddington, said there was a matter which he wished to refer to in order to prevent any misconception. They were all aware of a recent vote in the Council as to the prosecution of an unqualified assistant for the selling of poison.

The Chairman: Is this case not still *sub judice*, Mr. Watt?

Mr. Watt said he merely wished to make a statement to prevent any misconception which might arise with reference to his views on the position of unqualified assistants. They were all aware that this prosecution was one which appeared to him at the time to be one not worthy of the Council to enter upon. This lad was an assistant of a qualified chemist, in a branch shop with a qualified manager, in whose absence he sold a poison, which was made up and required no skill or dispensing in giving it out. This young man was not of age and could not be qualified. They would understand, therefore, that he (Mr. Watt) had to decide purely on the question before him, and that was whether the Council should prosecute a person who could not be qualified to sell poison, and who sold it in the temporary absence of the qualified manager. He believed it was held, and he understood there was a legal opinion to the effect, that an unqualified person could sell in the presence of a qualified master. The question resolved itself into this, whether this person learning his trade ought to be allowed to sell any poison, and whether he could properly learn his trade without being allowed to do so. That was the question they had to determine, and he thought though technically this young man committed an offence, yet it was one which was unworthy of the Society to prosecute or go on with. Of course they had the Coroner's opinion apparently pressing them to prosecute, and the majority of the Council were of opinion that they must do so. He would state this as a general principle, that the master was the person liable for the apprentice and for the assistant up to a certain age. He thought that during the time he could not be qualified he should be allowed, in learning his trade, to sell poisons, and the master should be held responsible. That was the doctrine he would lay down. The case itself was a very small one, but under it lay a very important question. It was a doctrine which was held and had been ably advocated by their President that the seller and the seller alone was the person who should be prosecuted. He did not think that view could be carried out by the Society to its legitimate results, and he believed it to be the foundation of a great number of the ills they laboured under. He was clearly of opinion that the Society was bound to go against the seller in all cases where he was of sufficient age and when he was acting where the master could not be present. He wished to make this statement to show why, as their representative, he voted as he did on the occasion referred to and to make it clear that he did not hold the view that the unqualified assistant was not to be prosecuted at all. All he meant was that when learning his trade or where the master was the responsible person he ought not to be prosecuted.

The Chairman said he had allowed Mr. Watt to make his explanatory statement, but he could not allow any discussion, as this matter was still *sub judice*.

The meeting then closed.

EVENING MEETING IN EDINBURGH.

The first evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, November 20, at 8.30, Mr. William Gilmour, F.R.S.E., in the chair. There was a very large attendance.

The minutes of last meeting having been read and adopted, apologies for absence were intimated from Mr. J. L. Ewing, Edinburgh, and Messrs. Frazer and McAdam, Glasgow.

The Chairman said he was glad to see so large an attendance at the beginning of another session of their evening meetings. It was rather interesting to go back to the time, now thirty-seven years ago, when these evening meetings were first started, and find that the gentleman invited to deliver the inaugural address on that occasion was Professor Sir Robert Christison, the distinguished predecessor of the lecturer that evening. During the interval that had elapsed since that time they had been addressed by such men as Professors Laycock, George Wilson, Archer and Crum Brown. It was hardly necessary that he should say anything in introducing one so well known to them all as Professor T. R. Fraser. He possessed a world-wide reputation as a pharmacologist, and was specially known to them as pharmacists in connection with his classical work in conjunction with Professor Crum Brown on the 'Relationship between Chemical Constitution and Physiological Action,' as well as by his recent exhaustive research into the natural history, chemistry and pharmacology of strophanthus. A few years ago, when it fell to the Council to fill the vacancy in their roll of honorary members caused by the death of Sir Robert Christison, it was unanimously agreed to elect Professor Fraser as the most eminent Scottish representative of the department of medical science most nearly related to pharmacy. He had therefore much pleasure in introducing the lecturer, not only as a distinguished professor, but also as, in a sense, one of themselves.

INAUGURAL SESSIONAL ADDRESS.

BY PROFESSOR T. R. FRASER, M.D., F.R.S.

Gentlemen,—When your President invited me to give the opening address of this session of the Society, I readily complied with his request. I recognized that the work of the Society, in many of its aspects, is associated with some of my own occupations and interests; and I felt that this association had in a sense been rendered closer by the circumstance that the Pharmaceutical Society of Great Britain had conferred upon me the compliment,—which has been to me a source of much gratification,—of placing my name on the list of its Honorary Members.

This, the North British Branch of the Pharmaceutical Society of Great Britain, has existed for nearly half a century, and it can point to a record of usefulness, which is in many respects an encouraging one; for it has fostered and materially advanced the remarkable progress in pharmaceutical chemistry, and it has given the chief impetus to the improvement in the position of pharmacists and chemists which have occurred during the period of its existence.

It started under happy auspices, as its first President was Mr. Duncan, the founder of the great firm of Duncan and Flockhart, and its first Vice-President Mr. J. F. Macfarlan, whose name still lives among us in one of the chief establishments for the manufacture of organic medicinal substances; while its first Council comprised men of such note in scientific and business capacity as Mr. Ainslie, Mr. Baildon, Mr. Smith and Mr. John Mackay.

For several years its chief supporters were the pharmacists of Edinburgh; but from the first it aimed at being a Scottish and not merely a local Society, and it has gradually succeeded in attaining this position and, at the same time, in increasing its membership. In 1867 the Society possessed in Scotland 118 members and associates; in 1890 the number has grown to 304.

Besides this it has achieved other successes. The commodious building in which we are assembled is an evidence of its material advancement. In it has been collected an excellent Museum, valuable for reference, and admirably arranged and largely used for instruction; and a Library, representative of the history and of the present state of knowledge regarding the subjects in which the members of the Society are specially interested. Provision has also been made in the building for examination halls, amply furnished with the means for testing candidates, bright, comfortable and home-like, and far from suggestive of those "chambers of horrors" which their purpose might lead candidates to expect.

One of the high functions which the Society has had in view from its foundation—that of advancing by the work of its members the sciences that most directly bear upon the occupation of pharmacists—has also been faithfully and most creditably fulfilled. From its earliest days, most admirable communications have been made at its meetings, which have enhanced the credit and importance of the Society and furthered the interests of science. The good example placed before them by their predecessors, has not been neglected by the present members. At recent Evening Meetings, papers have been read on the chemical relationships and characters of organic substances employed in the treatment of disease, on the improvement of forms for administration, and on the preparation and purity of medicinal substances; new drugs have been described and introduced to notice; and information has been given of the advances made from time to time in other countries.

The Pharmaceutical Society of Great Britain has, however, other important objects. Its charter of 1843 no doubt asserts in the preamble that the Society was established "for the purpose of advancing chemistry and pharmacy," but it also asserts that it was established for the purpose of "promoting a uniform system of education." The Acts subsequently obtained, in 1852 and 1868, were intended to facilitate the latter purpose by establishing a register of chemists and druggists, by giving to the Pharmaceutical Society the privilege of admitting men to this register, after due inquiry into their qualifications, and by encouraging them to become registered chemists and druggists by placing the compounding and dispensing of poisons in the hands of registered chemists and druggists.

A sufficient interval of time has elapsed since the passing of these Acts to justify inquiry into the success that has followed the means adopted for realizing the commendable aims of the Society, and, if it be the case that this success has not been in accordance with anticipations, for endeavouring to discover the reasons for failure or partial failure, and the changes that might be introduced to render the results more satisfactory in the future.

In searching for information to assist in answering these inquiries, I fortunately consulted Mr. Rutherford Hill, the Assistant-Secretary of the Society. He has most efficiently responded. Books, journals and pamphlets have been placed at my disposal in almost prodigal profusion. They have been sent to me not only from Edinburgh, but also from London; and I have almost been able to realize the sufferings of Tarpeia, who asked for only one gold bracelet, but had thrown upon her in addition the bracelets and shields of the whole army of the Sabines.

One fact I have certainly learned, and that is that the problem of education is assuredly engaging the attention of many of the leading pharmacists of Great Britain. A very slight application to the wealth of information placed before me has also been sufficient to show that the answer to my second inquiry is undoubtedly that many pharmacists consider that the means hitherto adopted for insuring a sufficient education of chemists and druggists have not proved altogether satisfactory.

These means appear to resolve themselves into a system of apprenticeship with examination, and the providing of opportunities for education by the establishment of a great school for pharmaceutical students in London, and by fostering, in a liberal spirit, local schools in various parts of the country.

In considering with a little detail the action thus taken by the Society, I shall not at present discuss the importance and place of apprenticeship as a means for furthering education; but lest, even for a moment, a doubt should be suggested as to my opinion on the subject, I will at once state that apprenticeship should always occupy a prominent place in any scheme for qualifying a man for an occupation so technical and commercial in its nature as that of chemist and druggist.

As to examination alone as a sufficient test of qualification, there is, unfortunately, in these days of universal examination, an abundance of evidence to prove its inadequacy. The best that can be achieved by it is to compel some sort of education; but it does so at an expenditure which is greatly in excess of its results, and it fails in the case of a large proportion of students. As a test of education it is uncertain and untrustworthy. When it is elevated to the position of the sole gauge of knowledge, it not only fails, but it also tends to degrade knowledge by substituting a pretence and a veneer for real education with its solid and lasting qualities.

The Pharmaceutical Society has, however, endeavoured to supplement the recognized insufficiency of examinations as tests of qualification by equipping a great School of Pharmacy in London, and by encouraging the establishment of local schools in many parts of the country. Every friend of education must regard the School of Pharmacy in Bloomsbury Square with pride. At its origin, it had the good fortune to secure as teachers Fownes and Redwood and Thompson, and its teaching reputation is well sustained at the present day by Attfield, Dunstan, Green, Holmes, and others. Notwithstanding these great advantages, and the further advantage of ample class rooms, laboratories, and teaching appliances, the expectations that had been anticipated of the place it would occupy in the education of pharmacists have not, I believe, been fulfilled.

The Society has also encouraged the establishment of local schools in various parts of the country, but their history has been far from an encouraging one. Bristol, Birmingham, Newcastle and Manchester appear each to furnish a history of disappointment, of praiseworthy efforts and enthusiasm on the part of teachers and of local committees, and of lukewarmness on the part of students. Opportunities have been given, and students have been invited on most liberal terms to use them; but they have seemed to look upon the invitations with distrust, with what we might imagine to be the motives of a specially acute fly when refusing to walk into the spacious and attractive parlour of the famed spider! They have discovered that the time and labour which must necessarily be bestowed on the acquirement of real knowledge, and even the small pecuniary expenditure which is entailed in its acquirement, are superfluous, in order to secure for them the title of chemist and druggist. By less toil and by a shorter process they can successfully prepare themselves for the examinations that constitute the portals for admission to the Register of Chemists and Druggists. To this there could be no reasonable objection, were it not that the opinion of those best qualified to judge clearly indicates that the portal is too wide a one, and that it is in practice impossible sufficiently to narrow it. In fact, superficial information, that which is commonly implied in the word "cram," has proved too strong for the examiners, as, indeed, it usually does, and examination without the safeguard of an ensured and sufficient course of study has been ineffectual to secure the mental training and discipline and the acquirement of real knowledge, which constitute true education.

Some forebodings of this result appear to have existed for many years in the minds of the leaders of pharmacy, and one of the plans by which it may largely be prevented is to be found in the Bill of 1852, which contemplated the introduction of a compulsory curriculum of education as a safeguard to mere examination.

Although this safeguard was not incorporated in the Act of 1852, it has not been lost sight of. In the extensive literature bearing on the subject of pharmaceutical education, which I have had the opportunity of examining, I find that it has for years afforded a topic for discussion. Latterly, the advocates for its adoption have succeeded in their contention, and it now occupies a chief place in the Pharmacy Amendment Bill of 1889; which is, I believe, a measure supported by the majority of the chemists and druggists, and likely in a short time to secure the sanction of Parliament.

When that sanction has been received, there will again be originated the difficulties that have previously been encountered, especially in England, of providing satisfactory classes for students. The discussions on the various schemes that have been proposed for this purpose have at least served to display what is impracticable or undesirable in several of them. They have served to render it improbable that the plans will again be revived of forming educational groups of small towns and villages, or of subsidizing, to any great extent, schools of pharmacy in the more populous centres. The recent establishment of colleges for higher education in many parts of England, the existence of similar colleges and teaching universities in the large cities of Scotland, make such plans altogether unnecessary, even if there were not grave educational objections to their adoption. As the subjects of pharmaceutical education are already represented in these universities and colleges, it is to be hoped that they will largely be adopted as the schools of the future chemist and druggist. They have in this country and in this city already been utilized for this purpose. It is to be hoped that the Universities of Scotland will in the future take an important share in this good work. There appears to be no sufficient reason why the education of pharmacists in botany, chemistry and materia medica should not at once be obtained in these Universities, and, with probably some amplifications also in theoretical, and, partially, in practical pharmacy. I can conceive of no more efficient method for elevating the position of pharmacy itself, and for giving to it and to its practitioners the status which they receive in Germany and elsewhere, than by following the example of the most advanced in education of the continental nations, by recognizing the claims of pharmacy within the Universities of Scotland and England. If the adjustments that would be required were effected, if the support from pharmacists that would be all important for the success of such a scheme were received, there is little doubt that it could be accomplished, and one of the chief problems of pharmaceutical education would soon be solved.

I believe that the time has now arrived when a further step may be taken. If the Universities should undertake the task of imparting education to pharmacists it would not be unreasonable to invite them also to confer some title of recognition, in the form of a diploma in pharmacy, upon those who have successfully undergone this education. If this were done it would be to the advantage of pharmaceutical education if the title conveyed a definite recognition, and of itself entitled to admission to the Register of Chemists and Druggists. To render this more easy of adoption the Pharmaceutical Society of Great Britain might be empowered to assume some efficient part in the examination of candidates for the diploma, either by appointing examiners, or by requiring that the University Courts shall appoint as an examiner in each subject of examination a member of the Society to act in conjunction with the University examiner.

Among the many advantages of such a scheme there is one which I think should not be lost sight of. Assuming that the powers of enforcing a curriculum contained in the Bill of 1889 are obtained, it does not appear certainly to follow that the evils of the present system of examination without an enforced curriculum will be altogether removed. Unless the scheme I have suggested, or some similar scheme, be adopted, the Examining Board would be still constituted of members who have taken no part in the education of the andidates. To this there are undoubtedly many grave ections. Each subject in the curriculum of phar- utical education is a wide and extensive one, and would necessarily be unequally treated by different teachers. Important subjects largely dwelt upon in the education of the student may have no interest for the examiner, while subjects of relatively little interest to the teacher may possess a great importance to the examiner. It would therefore either be impossible to assign any limitation to the range of subjects required from the candidate, or the candidate, by limiting, as far as possible, his studies to the range which rumour might justly or unjustly assign to the examiner, would neglect that which he is not likely to be examined upon, but which may actually be the most valuable instruction he has received. Further, the success of a teacher would be measured by the percentage of candidates who passed the examining board, and the temptation would be ever present so to teach as merely to pass men. The best teaching would in many cases produce a large percentage of failures, and a premium would be given for teaching which would not tend to produce the highest educational results. The very men from whom the advancement of the subject should be expected, would be degraded to the position of "crammers."

These are not extravagant suppositions; opportunities for their illustration unfortunately present themselves in systems of education and examination in this country. They are merely exemplifications of some of the evils of payment by results—evils that are largely accountable for the dissatisfaction in England with the Examining Board virtually constituting the contribution to education of the University of London, and for the establishment of Victoria University on the foundation of the Owens College, and they have become so generally understood that the abolition in general education of the system of payment by results must occur at no distant date. The alternative that I have suggested, which has had so remarkable a success in the Universities of Scotland, has no doubt in these days of ultra free-trade to contend against the cry of monopoly. If, however, monopoly in education implies that which is best for the student and for the subject, then monopoly is a good thing; and the attaching to it of a name which in respect to things not educational, frequently implies undesirable or disadvantageous qualities, should not be efficient in accomplishing its condemnation. But whether or not, in the future education of pharmacists a sufficiently close connection will be maintained between education and examination, much good may certainly be anticipated from the introduction of a compulsory course of study.

I think it may be assumed that this course of study has been foreshadowed in the excellent scheme of examination which is now in operation. The Preliminary examination in subjects of general education will undoubtedly be retained, and it is worthy of consideration if it should not be made in every case an actual preliminary to special pharmaceutical education; and also whether it should not include either French or German and book-keeping among its subjects.

The technical and trade character of the work of a chemist and druggist render it necessary that such a training as can best be obtained by apprenticeship should be retained. The importance of this training is so great that it might be advisable to adopt some plan that would ensure its fullest legitimate advantages. A certificate, for example, might be required from the master that sufficient opportunities had been given to the apprentice for practically engaging in pharmaceutical work—in the making of preparations and in the compounding and dispensing of medicines; and that the apprentice had diligently used these opportunities. The apprentice further should be encouraged to begin and complete his curriculum studies in botany, chemistry and materia medica at as early a period as possible in his apprenticeship.

As to the school studies, the only observations I would make are that for the higher qualification of pharmaceutical chemist, the histology of vegetable drugs should be included in the subjects of education and examination, and that there should be required from candidates for this qualification a thesis embodying the results of some original work related to one or other of the curriculum subjects.

Might I venture further to suggest that as the burden of supporting the machinery of education need not, and probably will not, to any large extent, fall upon the Pharmaceutical Society, the funds that would thus be available might well be applied for the encouragement of original research. Much creditable work has already been done by members of the Society. It has reason to contemplate with satisfaction the researches of Pereira, Hanbury, Howard and Groves; and the advancement of chemistry and pharmacy is being ably carried on by Wright, Paul, Dott, Holmes and many others, as well as by the work which is being conducted in the Society's Laboratories in Bloomsbury Square. The field is, however, a wide one, and the number of competent workers will be increased when the projected scheme of education has been adopted. By an application of funds for encouraging investigation, the credit of the Society, the reputation of its members, and the position of pharmacy would be greatly enhanced.

The question of education cannot be dismissed without some reference to another question, arising from and associated with it. The educational reforms that I have glanced at may be supposed to increase the difficulties of admission to the Register much more than is commensurate with any advantage that would be gained by pharmacists. There is possibly some slight foundation for this supposition. In all occupations to which any measure of State protection is given, it will be found that that protection is never a perfect one. If a good reason can be shown for extending protection it will generally be granted, but it is no doubt the case that it will be more speedily granted if an improvement in qualification makes it obviously for the advantage of the public that it should be granted. It would therefore be unwise to defer the obtainment of powers to raise the qualifications of chemists and druggists until protection has been given against, for example, the assumption by a corporation of unqualified persons of the rights and privileges of qualified individuals.

An improvement in education would also, I believe, lead to a larger share of the work of dispensing being obtained by chemists and druggists. I would unhesitatingly admit that medical men should not dispense medicines unless they are obliged by circumstances to do so. In many districts of the country, however, local conditions and the prejudices of the inhabitants make it difficult for medicine entirely to divorce itself from the trade of pharmacy. In many districts, also, medical practitioners do not find that skilled and efficient pharmacy can be obtained. On the whole, it must be conceded that the advance that has been made in medical education, within recent times, has considerably diminished this ground of complaint against the medical profession; and it may be anticipated that the preparation and especially the dispensing of medicines will more and more be given up to pharmacists.

With increased qualifications, also, remunerative occupation may be found in other directions. It has been suggested, and I see no good reason why the suggestion should not be adopted, that at any rate the higher grade of pharmacists, by extending their education somewhat beyond the present requirements, might qualify themselves to undertake the work of public analysts. The occupation is one that is certain to grow in importance under the changed conditions of local government that have been initiated.

But, gentlemen, is it necessary to consider whether an improvement in education, generally acknowledged to be necessary, should be delayed in its adoption until it has been shown that some further advantages will at the same time be obtained? The advantages consequent upon the improved education are surely in themselves sufficient. The diffusion of knowledge has now so rapidly extended, that its influences are apparent in almost every occupation and rank in society. Pharmacists cannot afford to stand still. Medical knowledge has advanced conspicuously in those directions in which it comes into contact with pharmacy; and medicine requires keener tools, more exactly adapted to produce precise effects, than were formerly demanded, and therefore greater knowledge, attained by improved education, in those who supply these requisites. This greater knowledge will also be the most effectual agency in raising the position of pharmacy, and in gaining for pharmacists a higher public consideration. Above all, it will render more intelligent and will widen the interest of the pharmacist in his every day work.

Mr. J. B. Stephenson moved that the meeting accord their best thanks to Professor Fraser, to whom they were highly indebted for the interesting and valuable address to which they had just listened. He had thought a University man might probably need to be kept right in reference to the affairs of the Society, and probably most of them would be surprised to find the Professor so conversant with pharmaceutical matters and so interested in them. He had shown a very exact knowledge of the position of the Society, and it was certainly very grateful to them all to hear him taking such an appreciative view of their actings and contendings during the last forty years. He felt sure that the Professor's suggestions and hints would give very great encouragement and satisfaction to the members of the Society. He considered the remarks on education and examination specially valuable, and he believed they would be welcomed as an important contribution towards the attainment of the object the Society had at present in view.

Mr. Paterson, Aberdeen, said he rose to second the motion as a country member. He had listened with much pleasure to the address, and he felt that the Professor had put forward the plea for a curriculum in a way which would go far to make it more acceptable in the North than it had hitherto been. There had always been a feeling that the curriculum proposals meant a great centralization of pharmaceutical education in Bloomsbury Square, but the suggestions put forward by Professor Fraser would go a long way to remove all such objections. He would like to see a closer intimacy between the Universities and pharmacy, and it was pleasant to find that they had an advocate so eminently qualified in the ranks of the professoriate. As a practical outcome of that evening's proceedings he thought it would be well for them to consider in what way the Society might approach the new Scottish University Commissioners in order to ascertain how the views sketched by Professor Fraser could be given effect to.

The vote of thanks was cordially awarded with acclamation and formally conveyed to the lecturer by the Chairman.

Professor Fraser in reply said he was much gratified by the way in which he had been received by that large meeting. He was especially gratified by the kind terms in which the mover and seconder of the vote of thanks had referred to his address, and which led him to think that he had succeeded to some extent in appreciating the present condition of things in pharmacy, and in venturing, not too boldly, to suggest some things that it might be desirable to do in order to meet the requirements of the case. He thought they in Scotland were in a much more favourable position to carry out such ideas than was the case in England, where the facilities for the teaching of science were not so great. In Scotland they had the advantage of a University system which could be readily adapted to all kinds of requirements. He thought that if the proposal for bringing together pharmacy and the Universities met with a favourable reception, there need be no great difficulty or delay in getting a workable scheme.

The Assistant-Secretary then directed attention to, and briefly described the following additions to the Museum.

Specimens of Sodium Salicylate in scales, and Sodium Salicylate from the natural acid.
From Mr. Alexander Kinninmont, F.C.S., Glasgow.

Leaves of *Hamamelis Virginica.*
From Mr. D. F. Macdonald, Edinburgh.

Flowering branch of *Rhamnus Purshianus.*
From Mr. Peter MacEwan, F.C.S., London.

Specimens of *Barbaloin* and *Socaloin.*
From Messrs. T. and H. Smith, Edinburgh.

Seeds of *Entada scandens*, Maranta starch, "Mujun," a sweetmeat made from *Cannabis Indica*, and fruit of *Myristica fragrans* preserved fresh.
From Mr. Thomas Stephenson, Bombay.

Fine specimen of Cascara Sagrada bark, Eucalyptol, Exalgine in two crystalline forms, Fiji Sandal Wood Oil, "Guap," a South African *Stapelia*, seeds of *Kickxia Africana*, Ores of tin, zinc, lead, copper and uranium from St. Martin's Lode, Cornwall, stem of *Pinus Balsamea*, smooth variety of *Strophanthus* seeds from West Africa, two specimens of Commercial Tragacanth Gum.
From the Museum, 17, Bloomsbury Square.

In a note from Mr. Holmes it was pointed out that the smooth *Strophanthus* seeds contained an admixture of the common hispid variety.

On the motion of the Chairman a cordial vote of thanks was awarded to the donors.

The Assistant Secretary also mentioned that members had often been annoyed in coming to consult volumes of the *Pharmaceutical Journal* to find that the one they wished to refer to was out on loan. He had now obtained a complete duplicate set, and one set would always be kept for reference and the other for lending.

The meeting then closed.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, November 7, Dr. W. J. Russell, F.R.S., President, in the chair A number of certificates were read for the first time and the following papers were read—

Isolation of a Tetrahydrate of Sulphuric Acid Existing in Solution. By S. U. Pickering.—The freezing points of mixtures of sulphuric acid and water form three distinct curves, representing the crystallization of water, of $H_2SO_4{\cdot}H_2O$ and of sulphuric acid respectively: in each of them the highest point is in exact correspondence with the composition of the substance which crystallizes out. No solutions containing between 75 and 40 per cent. of acid had yet been frozen, but it appeared to the author that if his former deductions from the irregularities in the curves representing the densities and other properties of solutions of the acid were correct, an independent curve representing the crystallization of a new hydrate should occupy this interval, and that this new hydrate could only be either $H_2SO_4{\cdot}5H_2O$ or $H_2SO_4 4H_2O$. Experiment has proved that it is the latter. The two branches of the new curve obtained rise from about —80°, and meet in a sharply marked angle at a point exactly corresponding to the composition of the tetrahydrate, the temperature at which this point is reached being —25°. The tetrahydrate forms large, well-defined, hard crystals. Apart from the consideration that the isolation of this hydrate was the direct outcome of his having previously recognized its existence in the dissolved state, the author maintains that the crystallization of a substance from a liquid necessitates the recognition of its existence in that liquid. The various possibilities are (1) that the solid constituents solidify separately in the proper proportions, and subsequently combine; this view is obviously untenable; (2) that the molecular aggregates constituting the solid are formed directly from the acid and water; this means that a hydrate has no fundamental molecule, and besides leaves the impossibility of explaining how these solid aggregates can hunt each other out, and congregate to form large crystals; (3) that fundamental molecules of the hydrate are formed in solution, but cannot remain there, and consequently separate out almost immediately; this is tantamount to saying that the hydrate is an insoluble substance, a proposition which could scarcely be maintained even if the substance were not crystalline; (4) that the molecules of the hydrate are formed in the liquid, and exist there till the temperature is lowered below its freezing point. This, in the author's opinion, is the only tenable hypothesis. When a liquid freezes and melts at a definite temperature; when the temperature remains constant till the whole of the liquid is frozen; when any alteration in its composition lowers its freezing point; we have the most certain evidence yet adduced for regarding that liquid to be a definite, though possibly somewhat dissociated, compound. If we deny this argument as applied to the hydrate in question, we must deny it in all cases, and conclude that no liquid is a definite substance. The author does not argue that the mere fact of the existence of the liquid hydrate at —25° implies its existence at the higher temperatures (8—38°) at which his density and other determinations were made; on the contrary, he argued that because it existed at the higher temperatures it must exist at the lower ones, and having proved this to be a fact, he holds that the premisses from which his conclusions were drawn must be correct. The author believes that the dihydrate may yet be obtained as a solid, since there is a reach of 7 per cent. in its vicinity where freezing points have not yet been attained. He has also isolated another hydrate which crystallizes in small quantities with the monohydrate, but has not succeeded in determining its composition.

Additional Observations on the Magnetic Rotation of Nitric Acid and of Hydrogen and Ammonium Chlorides, Bromides and Iodides in Solution. By W. H. Perkin, Ph.D., F.R.S.—In his previous experiments (*cf.* 'Proceedings,' 1889, p. 83) the author had limited his observations on nitric acid to the pure acid HNO_3; he has now examined a somewhat diluted acid, and the results obtained indicate that HNO_3 unites with water, forming an acid analogous to orthophosphoric acid, viz., $(HO)_3NO$. The experiments on hydrogen chloride, bromide and iodide were originally made on single samples in a very concentrated solution of each. These gave abnormally high results —rather more than twice the values calculated for the pure compounds—but on examining solutions of different strength it was found that the rotation *increases* up to a dilution equivalent to about 6 or 7 mols. of water to 1 mol. of hydrids, the value then remaining practically stationary. To see whether the solvent had any influence, a solution of hydrogen chloride in isoamyl oxide was examined, and was found to give values nearly identical with those calculated from the chlorine derivatives of the paraffins; and there can be little doubt that if the other hydrides could be examined in a similar way analogous results would be obtained. As union with water should reduce the rotations, the results at present are quite inexplicable. The compounds with ammonia and the compound ammonias have been also further examined. The results are remarkable when considered in relation to those afforded by the hydrides, as the rotations found, instead of being those calculated from the results obtained in the case of paraffin-derivatives, or those *found* in the case of hydrogen chloride dissolved in isoamyl oxide, nearly correspond to those required on the assumption that the hydrides are present in aqueous solution together with ammonia. The rotations, however, do not vary with the strength of the saline solutions. The author's explanation of this is that when the salts are dissolved in water they dissociate almost entirely into the hydride and the amine, the hydride undergoing an increased rotation on account of its being in aqueous solution. In the case of triethylamine chlorhydride the numbers are lower, and there is evidently less dissociation; and in the case of tetrathylammonium chloride little or no dissociation appears to take place. Solutions of ammonium iodide and diethylamine chlorhydride in absolute alcohol gave somewhat lower numbers than aqueous solutions, indicating a somewhat smaller although large amount of dissociation. As already noticed, ammonium nitrate gives numbers very close to the calculated; apparently it does not dissociate to any appreciable extent. As the author was not satisfied with the numbers obtained for neutral ammonium sulphate, the acid sulphate was examined, and this gave the calculated numbers; these, when compared with those for the neutral salt, show that the latter undergoes dissociation to a small extent when in solution, which is in agreement with the well-known fact that its solution in water gives off ammonia when heated. The examination of these oxy-salts shows clearly that the salts containing hydrogen chloride, bromide and iodide, when in aqueous solution, are in a very abnormal condition, but a condition which is easily explained if they are in a state of dissociation.

Dr. Gladstone said that when the refraction equivalents of the hydrides of the halogen elements and of nitric and sulphuric acids in solution were first determined, it was observed that the values were far higher than those calculated; but on re-examining hydrogen chloride solutions he had recently found that as the amount of water was increased a slight increase in the specific refraction also set in, quite analogous to that described by Dr. Perkin. The whole subject of the behaviour of such substances in solution deserved a full and deliberate investigation, with reference especially to the possible occurrence of dissociation. He had little doubt that some dissociation did occur in the case of the ammonium salts. As it is well known that increase of temperature greatly promotes dissociation, it would be well to repeat the observations at various temperatures in order to learn whether a change takes place in the refraction and magnetic rotation. On examining Dr. Perkin's solution of hydrogen chloride in amyl oxide, he found that the refraction and dispersion values deduced for the chloride are very much smaller than those afforded by aqueous solutions: thus another case of correspondence between the three properties of magnetic rotation, refraction and dispersion of light was made evident.

Professor Ramsay, referring to the high values observed by Dr. Perkin in the case of dilute solutions, drew attention to recent speculations concerning the occurrence of atomic dissociation in solutions, and asked, might not the high values be explained by assuming that hydrogen chloride underwent dissociation into hydrogen and chlorine atoms?

Dr. Armstrong said that although it might be argued from the results obtained with aqueous solutions that atomic dissociation attended dilution, the fact that normal values were obtained when amyl oxide was used as solvent was evidence of the insufficiency of such an explanation, and clearly indicated that the water played an active part. According to the now fashionable dissociation hypothesis, the solvent acted merely as a diluent, as one gas does to another, dilution corresponding to reduction of pressure; on this hypothesis, therefore, the values obtained should be the same for solutions of equivalent strength in either solvent. Dr. Perkin's results appeared to indicate that a certain proportion of the water molecules—those which were carried round, as it were, by the hydrogen chloride molecules—underwent what might be termed *extra* rotation. Dr. Perkin based his conclusion that hydrates would afford lower and not higher values on the results which he had obtained in the case of compounds such as the hydrates of nitric and sulphuric acid, and of aldehyde and of chloral; but these were all hydrates of compounds containing polyad elements; the behaviour of mixed elements might well be peculiar. In fact, in discussing these questions valency must be taken carefully into consideration. Dr. Gladstone had suggested that observations should be made at various temperatures; such observations would undoubtedly be of importance, and might even be expected to afford a final settlement in favour of one or the other hypothesis. If the increased rotation be conditioned by hydrates, as such hydrates would undergo dissociation on heating, the values would diminish as temperature rose; but if atomic dissociation took place, the change would be in the contrary direction, although, as the effect of temperature in promoting atomic dissociation is often not very marked until a somewhat high temperature is attained, the effect of moderate heating would not necessarily be exhibited by an increase of the rotation.

(*To be concluded.*)

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the Chemists' Assistants' Association was held on Thursday evening, the 21st instant, Mr. Ellwood, President, in the chair. A paper was read on—

OLEATE OF MERCURY.

BY R. C. HARRISON.

Bearing in mind the vigorous and running fire of criticism to which the last edition of our Pharmacopœia was subjected, it would seem somewhat difficult to find a preparation that has not fallen in for its share.

So far as I am aware, oleate of mercury has escaped as yet; but few pharmacists will fail to have noted the very great deficiency in keeping properties of the present official article, which includes the 10 per cent. and 20 per cent. varieties, and to have been annoyed on being called to dispense it to find it of a dirty grey colour, with a yellowish oily liquid floating on the top.

I hope this evening to lay before you some of the different methods that have from time to time been suggested, all of which have either the objection of not being permanent, or the great trouble entailed in their manufacture; and to lay before you a process that I have found produce in a quick and easy manner a permanent and true salt.

The two chief methods are (1) the precipitation of a soluble mercury salt with either sodium or potassium oleates, and (2) the solution of the oxide of the metal in excess of oleic acid. My objection to the former is the contamination with stearates and palmitates when made from soap, as suggested by Dr. Wolff, and when made from pure oleate of the alkali, the tremendous time and trouble in collecting and washing the precipitate and ridding it of the water. True, my first objection may be removed by solution in ether or some other solvent, but here is an unnecessary addition to time and trouble, and consequently to cost as well, with the result of a product inferior in keeping properties. To the second process the great objection is its deficiency in permanence and its irritating properties when so reduced, due, according to Dr. Tichborne, to the production of oxyoleic acid.

The following are some of the methods which have been advocated:—

A. P. Brown (*Am. Journ. Pharm.*, p. 168, 1889) recommends boiling white castile soap with powdered $HgCl_2$ and a little water till an oily yellow liquid is formed, which is cooled and washed and excess of water driven off by the water bath.

Wolff, in the same journal for November, 1881, advises a similar method with subsequent purification from palmitate by solution in petroleum ether. He says respecting it being a *true* combination, "a solution of a metallic oxide in acid without a reaction or the presence of water cannot be considered a salt according to the present views of chemical knowledge." (Respecting this see Drs. Squibb and Tichborne and E. Painter.)

Oldberg's unofficial pharmacopœia advocates dissolving separately the red oxide in nitric acid, and caustic potash in dilute alcohol, saponifying with this latter solution a sufficiency of oleic acid, and then pouring the mercury solution into this soap solution, washing with water, adding sufficient soft paraffin to make the product contain 10 per cent. HgO and evaporating off water.

Rossenwasser (*Druggists' Circular*, Jan., 1881) uses a process similar to the preceding, and states the soft paraffin prevents the reduction of the metal.

E. Painter ('Proc. Am. Pharm. Assoc.,' 1885) says, the red oxide is preferable to the yellow, and condemns the use of heat; and also says "the idea that true oleates are not formed by solution of the oxide in the acid is as absurd as saying an oxide is not dissolved in a mineral acid."

U. S. P. directs the temperature not to exceed 165°, otherwise it is similar to our official process.

Dr. Squibb (*Ephemeris*, November, 1882) advocates the solution of the oxide in acid, and considers this forms a true salt, and instances the same reason as Painter. He considers normal oleate of mercury contains 28·4 per cent. of oxide (he does not consider the water; it actually contains 27·7 per cent.).

Gmelin, vol. xvii., p. 73, says the mercurous salt may be made by digesting oleic acid and Hg_2O; or precipitating $HgNO_3$ with potassium oleate. It occurs in whitish-grey flocks turning blueish after drying. The mercuric salt he obtains by precipitating Hg2 NO_3 with potassium oleate.

Rice (*Amer. Journ. Pharm.*) says: "The amount of reduction is in direct proportion to the degree of temperature employed, as indicated by the following table. 192 grains of HgO corresponding to 177·7 grains of Hg heated with 10 times its weight of oleic acid gave the following reductions:—

At 300° F. amount of reduced Hg = 175 grains.
280° F. " " = 152 "
212° F. " " = 69 "
200° F. " " = 35 "

Professor Tichborne (*Med. Press*, Sep. 24, 1884) condemns the process of precipitation to form a neutral oleate, as he considers very little neutral oleate is formed, but chiefly an acid oleate. He recommends the solution of the oxide in the acid, and says: "If we let the oleate stand for some considerable time the water seems to be assimilated, and a hydrate is formed," and "if the oleate is gradually heated on a water-bath to 100° C., e water is slowly given off, and long before the theoretical quantity is lost the oleate begins to decompose," and he goes on to say that *no* heat should be used in the manufacture. He considers the reduction is due to the formation of an irritating oxyoleic acid formed at the expense of the oxygen of the HgO. He recommends 2¼ parts of levigated red oxide for 5 parts of commercial oleic acid (which is theoretically 25 per cent. too little for a neutral salt); he gives no details of process, but indicates we must possess suitable machinery to ensure success, which possibly we all do not.

Dr. Shoemaker's method of precipitation is so well-known as to be hardly necessary of repetition. In connection with this product, though, he said in a lecture delivered by him at Westminster Hospital, July 4, 1884, "he preferred the mercurous salt made by precipitation from $HgNO_3$ to the mercuric; it was one and a half times stronger, had a flocculent leaden colour like that of mercurial ointment due to reduction.

Dr. John Marshall recommends the oxide, made by precipitation from the nitrate, being dissolved in oleic acid, and considers the solution of the oxide is assisted by a temperature of 300° F., and describes thus the products of different strengths:—"The 5 per cent. solution is a perfectly clear, pale, yellow liquid, resembling olive oil, but thinner; the 10 per cent. solution is also fluid and perfectly clear, but as dark as linseed oil, whilst the 20 per cent. preparation is an opaque, yellowish, unctuous substance, closely resembling resin ointment in appearance, melting very readily at the temperature of the body and forming a kind of transparent, viscid, colourless varnish when applied to the skin. The chief care to be observed in the manufacture of these solutions is not to hurry the process, and not to employ too high a temperature, or the mercury will be immediately reduced."

It will be seen then there appears to be a great diversity of opinion upon the matter, especially in three particulars:—(1) As to whether the method of dissolving the oxide in the acid, or that of precipitation, is more preferable. (2) As to whether heat is necessary or detrimental. (3) As to whether a true chemical change takes place or no. To these queries I would answer, as results of my observations:—

(1) The solution of the oxide in the acid is preferable, as the product appears to be more readily absorbed by the skin; if true chemical action takes place (as I believe to be the case) the result must be a definite compound, which is not necessarily the case with the salt made by precipitation (see Tichborne). (2) In making a *normal or true* oleate heat is not detrimental, but useful; in making a 10 per cent. or 20 per cent. preparation containing excess of acid, it undoubtedly does cause reduction, if great care is not used, due, most likely, as observed by Professor Tichborne, to oxidation of the oleic acid at the expense of the oxide. (3) I should consider a true chemical change does take place with the formation of water, reason for which I will consider later on.

My first attempt at making a true normal oleate of mercury was some six years ago, by precipitation. I took commercial oleic acid and placed it in ice to free it from stearic and palmitic acids, decanted the clear portion, and saponified this with an equivalent of dried sodium carbonate. I then poured into this soap solution one of mercuric chloride, when the oleate of mercury was precipitated in white flocks. This was thrown upon a filter and washed to free it from chlorides, which was effected at last after no little trouble, by rubbing it with successive portions of water in a mortar. The resulting product was of a greyish, white colour, soapy and somewhat tenacious to the touch. This kept well for two years, when I lost sight of it.

It occurred to me, when the subject cropped up again last year, a similar reaction might possibly occur between mercuric oxide and a fixed oil in the presence of water as occurs between lead oxide and oil in the manufacture of lead plaster, whereby a lead oleate is formed and glycerine obtained as a bye product. I precipitated mercuric oxide by pouring a solution of the perchloride of mercury into one of sodium hydrate, and took of this oxide 64 grains and heated it on a water bath with 176 grains of almond oil (this was chosen as being the purest oil) and a little water for several hours. After several attempts with negative results, I took a portion that had been so heated and shook it up with ether, decanted the clear solution, evaporated off the ether, and from the residue warmed with hydrochloric acid and a few drops of nitric acid, I got, both with stannous chloride and potassium iodide, precipitates indicative of the presence of mercury, which proved reaction had taken place, but only to a limited extent, probably according to the following equation:—

$$2C_3H_5(C_{18}H_{33}O_2)_3 + 3HgO + 3H_2O =$$
$$3Hg(C_{18}H_{33}O_2)_2 + 2C_3H_5(OH)_3$$

I then turned my attention to a simple solution of the oxide in the acid, in the proportions necessary to make a salt of the formula $Hg(C_{18}H_{33}O_2)_2H_2O$, which Tichborne considers to be the true formula. The following is presumably the reaction which takes place:—

$$HgO + 2HC_{18}H_{33}O_2 = Hg(C_{18}H_{33}O_2)_2H_2O$$

I resolved to try digesting an excess of oxide with oleic acid, and dissolve out the oleate with ether from the undecomposed oxide. So I took 60 grains (excess) of freshly precipitated oxide, mixed it with 141 grains of oleic acid, and heated it on a water-bath for half an hour, when it had assumed a light yellowish brown colour and become almost solid, very sticky, and scarcely any oxide apparent to the eye. This I shook up with ether ·720, when nearly the whole of it dissolved, the undissolved portion consisting of mercuric oxide. I evaporated off the ether and obtained a softish, sticky solid, somewhat translucent. This, however, I found in the course of a week had changed to a complete grey colour, due to reduction of the mercury, which was, I believe, caused to a great extent by the evaporation of the ether hastening oxidation. So on another batch, made in precisely the same manner, I substituted petroleum ether. The product here was similar in appearance to that obtained with ether, and it was not till after some weeks that I found signs of reduction.

I now resolved to try and combine them by using simply molecular proportions. I had found by previous experience that the more recently the oxide was prepared, the more easily solution was effected, so I precipitated some as before, collected and dried it at as low a temperature and as quickly as possible. It has since been suggested to me by Mr. Naylor, of Messrs. Hearon, Squire and Francis, to wash the collected precipitate, with a little dilute alcohol before drying, which would facilitate these necessities. I have not been able to try it, but should think it well worthy of trial. Of this I took 54 grains, mixed it with 141 grains of pure oleic acid, which should be of a pale straw colour, with no rancid odour (I may here say I have been unsuccessful with samples of acid highly coloured and rancid), and heated it on a water bath, stirring with a pestle, which I found hastened the process, by breaking up the oxide and thus allowing more intimate contact with the acid. No effect seemed to take place for ten minutes, then the oxide was seen gradually to disappear, and in three-quarters of an hour complete solution was effected. The result was a solid of a pale yellow colour, somewhat sticky and tenacious, and which contains theoretically 27·7 per cent. oxide. This can be reduced to the two pharmacopœial strengths as desired. Of course to follow our official guide the diluent would have to be oleic acid; I would rather advocate the use of lanolin, which, owing to the facility with which it is absorbed, would hasten its physiological action more than any other diluent. True, we would not be able, owing to its consistence, to apply it as recommended by Dr. Marshall with a camel's hair brush, but I see no reason why smearing it lightly over the required part with the finger should not be equally successful. It also obviates the reduction the excess of acid is likely to accomplish. I have often heard medical men express their disappointment with the result of this remedy, and they have consequently given up its use, which non-success is due to the reduction generally taking place, as then its rapid absorption by the skin is greatly delayed, and would more nearly approach the ordinary mercurial ointment; to say nothing of its irritating properties. Respecting the actual chemical change referred to previously, I would emphasize the remarks of Drs. Squibb and Tichborne. To see if water really was formed in the reaction, I took 54 grains of oxide and 141 grains of acid, placed them in a tared dish, heated this over a water-bath for half an hour, when it had lost 3 grains in weight. I then increased the temperature by adding salt to the water in the bath and continued the heat, when the oleate was decomposed; the theoretical quantity of water to be driven off was 4½ grains. I took again 108 grains of oxide and 282 grains of acid, heated them as before, and in three-quarters of an hour had driven off 8 grains without reduction occurring. The theoretical quantity would be 9 grains. This loss of water in manufacture would tend to make the preparation slightly stronger than 27·7 per cent. of oxide. Dr. Squbb says the normal oleate of mercury contains 28·4 per cent. of oxide, but he leaves the water out of consideration altogether, therefore I think for all practical purposes it may be taken as 28 per cent. Its keeping properties you can judge for yourselves, the sample before you having been made over eleven months.

Seeing Dr. Shoemaker's record of his preference to the mercur*ous* salt, I resolved to try its manufacture, and possibly the following few notes may not be considered out of place here, as they may be included under the heading I have chosen. I proceeded as before to precipitate the oxide by shaking excess of solution of soda with calomel, washing and drying precipitate. Of this I took 41 grains and of oleic acid 56 grains, according to the equation—

$$Hg_2O + 2HC_{18}H_{33}O_2 = 2HgC_{18}H_{33}O_2 \cdot H_2O.$$

placed them in a dish on a water-bath, when almost immediately the mixture turned to a grey colour, like mild mercurial ointment; so I took similar quantities and allowed them to stand in the cold for some time, when it is interesting to note in half an hour it had solidified to a *green* solid mass, forcibly reminding one in colour of its near relation, the lower iodide of the same base. On standing twenty-four hours it had changed to the grey leaden colour indicative of reduction, which seems to accord with the observations of Dr. Shoemaker.

In conclusion, allow me to thank you for your kind patience, and to hope you may find this method as successful in your hands as I have in my own.

The President (Mr. Ellwood) alluded to the pharmaceutically interesting nature of the paper, and said oleate of mercury was one of those unsatisfactory preparations which commonly caused the dispenser a good deal of disappointment. He had found that oleate of mercury was less liable to change when stored in a stoppered bottle than under the normal conditions. The method of precipitation advocated by Shoemaker yielded an oleate of mercury which was not nearly so satisfactory a product as that obtained by dissolving the oxide in oleic acid, whilst at the same time it was an infinitely more troublesome process than the latter. He believed the faultiness of the product often lay with the oleic acid, and if freely precipitated oxide was carefully dissolved in pure oleic acid, he believed the evil might be mitigated, even if it could not be altogether removed.

Mr. W. J. Daniels said he was very much interested in the subject, which had occupied some part of his attention for eighteen years. He congratulated Mr. Harrison on the able manner in which he had surmounted the difficulties that attended the preparation of oleate of mercury. In the early days of its introduction it was the custom to use heat, but owing to the liability to change which ensued, he had now for some years employed a cold process which furnished a more stable preparation. The main thing was to use a freshly-precipitated and well-washed oxide and a light-coloured sample of oleic acid.

Mr. E. J. Millard said the paper was useful and valuable as an epitome of the various methods of preparing oleate of mercury. The method suggested by Mr. Harrison did not strike him as particularly original, for a 28 per cent. oleate had been made before, whilst the application of heat was by no means novel. There could be no doubt that the purity of the oleic acid had much to do with the successful preparation of the oleate, and reference had been made to the unsatisfactoriness of dark oleic acid. It must be remembered, however, that depth of colour was not always indicative of impurity, as some dark samples contained higher percentages of free fatty acid than some paler specimens. It was unfortunate that Mr. Harrison had not estimated the oleic acid in his samples, as the presence of notable quantities of hydrocarbon oils or of glycerides would have explained their deficiency. There could be no question, from the manufacturing point of view, that the method of dissolving the oxide in the acid was infinitely better than the precipitation method, which was both tedious and messy. In his experience there were two essentials to the rapid and satisfactory preparation of the oleate. First, that a moderate heat should be employed; secondly, that the oxide, which should be recently precipitated and quite amorphous, should be added gradually to the warm oleic acid. It was doubtful whether the addition of lanolin to the oleate would be an advantage, as it would materially alter the consistency of the product, whilst the absorption might be unpleasantly increased.

Mr. A. C. Stark thought Mr. Harrison's paper showed a good deal of careful work, but he was unable to agree with the conclusions the author had arrived at. It was not at all certain that the method suggested gave a true oleate, and the product certainly differed physically from that made by precipitation. It was remarkable also that all the other oleates should be made by precipitation. Oleate of mercury made by precipitation with sodium oleate, was, he thought, as perfect a preparation of this kind as it was possible to get. It was convenient to dispense, definite in composition, and kept perfectly. The pharmacopœial preparation, on the other hand, contained so much free oleic acid as to be often highly objectionable from a medical point of view, and it was moreover unstable. The precipitation process was of course a far more troublesome and lengthier mode of preparation than that suggested, but he ventured to say that it yielded an infinitely superior result.

Mr. W. L. Williams inquired if the author had conducted a corresponding experiment with the oleic acid, when estimating the amount of water which the typical specimen of oleate of mercury was stated to have lost upon drying. He also suggested that the coloration of dark samples of oleic acid might be due to the formation of oxyoleic acid analogous to the oxylinoleic acid of linseed oil.

Mr. Harrison, in replying, said that he agreed with the remark of the President that samples of oleate of mercury were less likely to decompose when kept in a stoppered bottle. The specimen he showed, however, had been stored in an ordinary loosely covered pot. While claiming no novelty for the suggestions he had made, he thought it was the first time a process had been made public for preparing a neutral oleate of mercury, all those in ordinary use containing a greater or less excess of oleic acid. He admitted that the purity of the acid was a very important point, but had found it made no difference in working on comparatively small quantities whether the oxide was added gradually or not; his own plan was to add the acid direct to the whole of the oxide. Dilution with lanolin had been found satisfactory, but he had made no determination as to the solubility of the oxide in lanolin. He considered the solution of the oxide in the acid by far the best means of obtaining a definite salt, inasmuch as if a definite quantity of an oxide is wholly decomposed by a definite quantity of an acid, chemistry at present teaches us to believe a definite salt is formed, whereas in the precipitation process the neutral oleate (when found so) of the alkali is decomposed by the addition of water, with formation of the alkali, which would tend to give basic salts on adding it to a solution of a mercury salt. He had conducted a control experiment, and had not found the oleic acid to lose weight.

A vote of thanks was accorded to Mr. Harrison for his paper, and the attention of the members was then called to a striking illustration of the action of light upon drugs and chemicals which had been referred to by Mr. W. L. Williams in a short note at the previous meeting. The proceedings then terminated.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

WHO IS INTENDED BY THE PHARMACY ACT TO BE THE SELLER OF POISONS?

A special meeting of this Association to consider the above question was held at the Royal Institution, on Thursday afternoon, November 21.

The President, Mr. A. H. Samuel, F.C.S., who occupied the chair, in opening the meeting said they had been called together to consider a question of the utmost importance to every one connected with the drug trade, and he hoped the matter would be fully discussed by those present. They were, of course, aware that just recently the Council of the Pharmaceutical Society had prosecuted a chemist's assistant for selling a poison, he being unregistered, and that the judge, holding that the person who actually serves the customer is the "seller," fined the defendant £5 and costs, in accordance with the 15th section of the Pharmacy Act. He said that hitherto it had been presumed that the owner of the shop was the seller, and that he only need necessarily be a registered chemist, and the point to be considered was which of these opinions is the correct one. He trusted they would confine themselves to this point. They were not present to consider which reading would prove the more advantageous to the chemist in the future, nor to remark upon the action taken by the Pharmaceutical Society. He then called upon Mr. A. C. Abraham to open the discussion.

Mr. A. C. Abraham, in opening the discussion, explained that personally he was perfectly indifferent as to how this question was decided, but as his name had been publicly mentioned, he gave shortly a few of the reasons which had prompted him to take a certain course at the meeting of the Pharmaceutical Council.

Dr. Symes said he wished in the first place to state and to emphasize that he had no wish to oppose or to in any way raise opposition to the Pharmaceutical Council. As a representative body it should command the respect and support of the whole body in the performance of its duties. It had been placed in an awkward position, and had taken the course which a majority of its members considered best, and on which they were not called on to pass a vote either of commendation or censure. Some day they might with profit discuss the advantages and disadvantages to the public and themselves of conditions to be embodied in a new Pharmacy Act, but at present that was not the question before them. The question was simply this. Was it the intention of the present Act that only a registered person, be he master or servant, could sell a poison? Or in other words, Who is intended by the Act to be the seller? He went on to explain the two views which were held, designating one the "personal" and the other the "delegate" view, and stated that he had the strongest belief that the Act contemplated the latter. He was prepared to consider and discuss fairly anything which may be said to the contrary, but thought the evidence he should adduce would be very conclusive in support of his view. He then recounted from personal experience and observation the condition of things existing immediately before, during and subsequent to the passing of the Act, pointing out that in those days nine out of ten assistants were unexamined and unregistered. He believed the men of experience actually engaged in the business, who may be regarded as the "fathers in pharmacy," and who constructed the clauses of the Act, never contemplated turning all these thousands of men out of their situations and depriving them of their livelihood and their masters of their services and so have paralysed the trade, which must have been the case had they intended and acted on that with which they are now accredited. Had such been the case the Act would never have passed. Then there were hundreds of apothecaries selling in open shops or surgeries poisons to the public at the hands of unregistered persons, and clause 16 of the Act specially provided that there should be no interference with the business of any apothecary, and that exemption still existed, and it seemed rather extraordinary to say that in the interest of the public a chemist's assistant, if unregistered, could not legally sell a poison, but that the same man, if employed in an apothecary's shop, may sell as much as he pleases, even though the nature of his master's business is such that it must require him to be absent much of his time and there would be consequently little supervision. This he considered a point deserving their serious consideration, especially in places where there were still shop-keeping apothecaries. He said that the judges who had considered this matter had been by no means unanimous in adopting the "personal" seller view, and those who had done so had merely expressed an opinion (on side issues) that such was the intention of the Act, without considering or even knowing the surroundings at the time of its birth. He then proceeded to consider the Act, pointing out that the preamble contemplated qualification and examination for persons before commencing business, but not for assistants; in fact, the Act nowhere required registration on the part of an assistant, except where he acted for unregistered employers, as in the case of executors carrying on the business of a deceased chemist. Clauses 1 and 15 were those which furnished grounds for entertaining the "personal" seller view, where they stated that no person should sell or keep open shop for selling, or should use certain titles. This was the usual tautology of legal documents and Acts of Parliament, and was intended by the framers (who were their friends) to protect the interests of those who should go into the business. It would, he said, be obviously unfair to separate the words "any person who shall sell" from those following, and say that they mean something else. Could it be that intelligent pharmacists intended to hit at the assistant who should hand over a bottle of medicine to the purchaser and insist that he must be registered, whilst it omitted mention of the dispenser or compounder, who may be the errand boy so far as the Act is concerned? But clause 15 does provide that a penalty of £5 should be incurred by any person who "should compound any medicine of the British Pharmacopœia otherwise than according to the formularies of the said Pharmacopœia." Now as the preparations the dispenser uses are not made by him, but in the laboratory by other persons, assuredly he is not responsible here. Clearly the intention of the Act, according to a rational view, was in his (Dr. Symes's) opinion that the master was the responsible person to the purchaser for the acts of the laboratory assistant, the dispenser and the counter assistant, who should hand over the drug or poison. He said it had been argued that because in clause 17 it stated, "And for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller," the proper inference was that in all other sections it was not so; there was, however, no evidence in support of this contention, and it would be just as logical to say that because in the widow's clause it requires the assistant to be registered, the proper inference is that for all other purposes he must not be so. The facts were that this section 17 referred to certain labels, and this paragraph defined clearly whose name was to be on the label; it meant what it said, and it said unmistakably that an apprentice (who would not be a registered person) may sell a poison, and provided the conditions for him to do so. Customers did not look to the assistants as the responsible persons, but to the proprietor; in fact, so far as the public and these sections 1 and 15, which had been so much relied on in support of the "personal" view, were concerned, assistants were not persons; they lost their identity and became factors (important factors, it is true) in the establishment to which they belonged; the public trusted, looked to and exacted from the proprietor, and thus complied with the spirit and letter of the existing Pharmacy Act. Dr. Symes concluding by moving that:—"In the opinion of this meeting the Pharmacy Act does not contemplate or authorize legal interference with assistants employed by and performing duties under the direction of registered masters. That both in spirit and letter it regards the master as the seller, the person responsible to the public and amenable to the law."

Mr. R. Parkinson, in seconding the motion, said that Dr. Symes had dealt with the question very exhaustively, and he quite agreed in the opinion held by Dr. Symes.

Mr. Hocken in supporting the motion said he fully agreed with it, and was very surprised to hear of the prosecution. He said that ever since the passing of the Act, chemists had employed unqualified assistants and considered they were strictly within the law in doing so, and he was still of that opinion.

Mr. J. J. Smith was of opinion that the words "who shall sell" were not intended to be applied to assistants, but to those who might possibly sell poisons without keeping a shop.

Mr. Kirby considered that section 17 clearly defined the seller of the poison to be the owner of the shop and not the employee.

Mr. B. Dickins considered that sections 15 and 17 dealt with two distinct offences—the former with the sale of poisons by unregistered persons, the latter with the necessity for labelling the poison with the name and address of the seller, even though he be qualified, He, however, was quite of opinion that the seller is the owner of the shop, and supported the motion.

Mr. J. S. Ward said Dr. Symes had dealt with the Act from the two points of view, viz., its intention and its meaning. With regard to its intention there could be no doubt. The Act was framed by pharmacists, by those who might be called the fathers of English Pharmacy, men of the highest integrity, and it would be absurd to suppose that these men intended to make it illegal for an unqualified assistant to sell a poison on behalf of his qualified master, because to do so would be to say that they deliberately framed an Act that would be impossible for them or their supporters in the country to comply with, it being impossible at that time to find qualified assistants to carry on their businesses with. When, however, they considered the meaning of the words "any person who shall sell" they were dealing with a subtle question of law—one, the settlement of which would, he thought, involve much expenditure. Personally, he was of opinion that the views held by Dr. Symes were correct, and he should therefore support the motion.

Mr. Burgess said in some cases a customer ordered a medicine containing a poison, asks for it to be sent, and pays the errand boy for it. In such a case who would be the seller? He considered it only right to suppose that in all cases the proprietor of an establishment is legally the seller.

The President now put the motion to the meeting, and it was carried unanimously.

Proposed by Mr. Woodcock, seconded by Mr. Kirby, and unanimously resolved "That a copy of the resolution be forwarded to the Council of the Pharmaceutical Society."

Proposed by Mr. Hocken, seconded by Mr. Parkinson, and unanimously resolved, "That two guineas be given from the funds of this Association towards establishing a fund for the purpose of appealing against the decision of the judge in the recent prosecution."

Proposed by Mr. Woodcock, seconded by Mr. A. C. Abraham, and resolved unanimously, "That it is desirable that a fund be raised amongst the chemists of this city for the purpose of assisting to carry the case to a higher court, and that Mr. Parkinson, the Hon. Treasurer of this Association, be authorized to receive subscriptions."

Dr. Symes promised to subscribe one guinea. Mr. Wellings, on behalf of Messrs. Evans, Son and Co., promised five guineas, and Mr. A. C. Abraham promised a subscription.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The eighth meeting of the session was held in Speed's Hall, 47, Commercial Street, on Thursday evening, November 21, when a lecture was delivered by Mr. W. L. Howie, F.C.S. (Barron, Harveys and Co., London), Mr. Jno. W. Russell, one of the Hon. Vice-Presidents, in the chair. There was a large attendance of ladies and gentlemen, including several chemists from a distance.

The subject of Mr. Howie's lecture was "Ten Days on the Hardanger," and it was illustrated with nearly one hundred dissolving view photographs by the lecturer himself. In the course of a highly interesting and instructive lecture Mr. Howie described very fully the pleasure of a short holiday which he spent in Norway during the summer of 1888. The views shown not only consisted of the magnificent scenery which is to be met with there, but also of various phases of life in Norway. In the latter part of the lecture some very interesting facts were detailed regarding Norwegian pharmacy, and from these it was seen that on the whole the lot of the chemist there is somewhat better than here. The sale of drugs is confined entirely to chemists, and these keep to selling drugs and dispensing prescriptions. In order to become a qualified chemist a three years' apprenticeship has to be served, after which there are two examinations, and before these can be passed the student has to go through a necessary curriculum. The result of this is that the business is in very few hands, but at the same time prices are somewhat less than here. Mr. Howie threw on the screen a splendid photograph of the style in which the pharmacists there send out their goods, and this caused some little amusement to the audience. To see bottles sent out with a long narrow label tied round the neck is rather behind the times, and would astonish the authorities in Great Britain. Different styles of labels are used for the various medicines, and the only adhesive label met with is the poison one, which is attached to all lotions or liniments containing any poison. These labels have the well-known symbol of the skull and cross-bones engraved on them, also the word "Gift," which means poison.

The lecture was attentively listened to and frequently applauded.

At the close a hearty vote of thanks was accorded to Mr. Howie on the motion of the Vice-President, Mr. D. Skinner, and on the motion of Mr. T. C. Henderson a similar compliment was paid to the Chairman.

INVERNESS CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second monthly meeting of the Association was held at their Rooms, 9, Union Street, on Monday evening, November 25, the President, Mr. John Fraser, in the chair.

The minutes of last meeting having been read and adopted, Dr. F. M. McKenzie was called upon to read a paper on "State Medicines, or Prevention Better than Cure," giving a *résumé* of the labours of Jenner, Pasteur and others.

On the motion of Mr. Bethune, Dr. Mackenzie was awarded a hearty vote of thanks for his excellent paper.

A like compliment was paid to Mr. Fraser for presiding.

Before the proceedings terminated, the members and their friends had an opportunity of inspecting the materia medica specimens and chemical apparatus neatly arranged on the tables.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the session was held in the Mosley Street Café on Wednesday evening, November 27, at a quarter-past eight, Mr. John Pike, President, in the chair. There was a full attendance.

After the usual preliminary business had been transacted, Mr. George Weddell, Hon. President, delivered an interesting address, embodying a general view of science, which we hope to publish on a future occasion.

At the close of the address a vote of thanks, moved by Mr. Pike and seconded by Mr. Clague, was heartily awarded to Mr. Weddell.

Parliamentary and Law Proceedings.

TINCTURES AND PUBLIC ANALYSTS.

At the Stockton-on-Tees Petty Sessions, November 28, Joseph Power, of Victoria Terrace, Stockton, was summoned by the inspector acting under the Sale of Food and Drugs Act for having sold half a pint of tincture of rhubarb, B.P., which according to the certificate of Mr. W. F. K. Stock, the public analyst of

Durham, residing at Darlington, gave "extractive matter 25 per cent. below that yielded by the B.P. tincture." Evidence was given that the tincture was sold as received from a firm of wholesale druggists.

The defence was conducted by Mr. Glaisyer, of the firm of Glaisyer and Porter, solicitors, Birmingham.

Mr. Umney, of Wright, Layman and Umney, Southwark, London, also appeared on behalf of his firm, who were the manufacturers of the tincture. He produced his laboratory journal, and the written instructions of his firm's chemist given to the compounder when the tincture was made in August last.

Mr. Umney stated that each 100 parts by weight gave four and a quarter parts extractive when dried at 212° F. until it ceased to lose weight. He expressed himself strongly on the impossibility of tincture of rhubarb made from a root so variable in its soluble constituents as rhubarb ever yielding a uniform extractive. He gave his own experience of the yield of extract of rhubarb as being between 35 and 55 per cent. when extractum rhei was made from China (East Indian) rhubarb by the official process. He referred to 'Pharmacographia' in corroboration of this, by Hanbury, who found the ash of rhubarb vary as between 13 and 43 per cent.

Eventually the case was dismissed and costs refused.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Society's Council.

Sir,—The severity of competition, the harassings of the law, and the generally inadequate return the pharmacist receives for the responsible nature of his work are causing widespread questionings as to how his grievances may be remedied, and I think it more likely the true interests of the question will be served by ventilation in the pages of our Journal than by seeking, without due thought and discussion, to post-card a new Council into office next May.

If the gentlemen to whom a change in the Council recommends itself would state clearly what they expect to obtain, and not rest content with vague generalities, the question would doubtless be discussed by others with ability and information, and the matter be clearly placed before the electors.

Knowing as I do that the members of the present Council are good pharmacists and practical business men, commanding respect, and keenly anxious to promote the welfare of the trade, men who have devoted time and loving service to forward and elevate it, I do not see much to be gained (except by themselves) in dismissing them; and I doubt very much if fourteen gentlemen can be found to devote for many terms of office their time to our work.

Governments and societies cannot do much with wind and tide against them, the winds of public feeling, and tides of prolonged bad trade; but those sailing in the vessel are loth to make due allowance for its tardy progress owing to hindrances and stress of weather, for which its commander is not responsible.

There seems evidence on every hand of trade revival, and the fairly-equipped pharmacist will stand his chance of good things.

The public are beginning to learn the worth of reliableness in their medicines, and will still support the establishments who maintain that characteristic. Three or four cannot hope to obtain a living where there is only business for one, and the survival of the fittest law may cruelly thin our ranks, a contingency which will call for increasing efforts on behalf of the Benevolent Fund.

But in the meantime the Society, whilst its Council commands the respect of the members and the authorities, is a valuable organization to us, and is ready to work for any redress that is attainable and worthy to seek. It is a grand centre of education, benevolence and social opportunities. It is possible that a few new men of energetic commercial reputation may help forward its councils.

But I think both its President and Council deserve better of the members than the contemplated replacing of the whole of the retiring councillors by fourteen untried men.

Tulse Hill. WM. WARREN.

One per Cent. Solutions.

Sir,—The President of the British Pharmaceutical Conference having invited further remarks on the subject of the 1 per cent. solutions of the Pharmacopœia, I beg to offer the following.

The importance of ensuring accuracy not only in the preparation but in the prescribing and dispensing of the official 1 per cent. liquors cannot be overestimated, particularly as these solutions are those of some of the most potent remedies in the Pharmacopœia, and deviation from accuracy in either of the three operations mentioned above might be attended with serious results.

These so-called 1 per cent. solutions of the Pharmacopœia, with the exception of Fowler's and perhaps the other arsenical solutions, are an essentially British characteristic of medical prescribing, and as such surely the convenience of British prescribers and dispensers should be consulted before all things. The question as to whether the Pharmacopœia of 1885 has done so must have a negative reply, which is all the more intensified by the papers which have been read and the discussions which have taken place on the subject, for which medical men especially should be grateful as well as the pharmacist.

The present pharmacopœial solutions are neither accurate nor convenient; not convenient because they are supposed to contain about 1 grain in 100 fluid grains, which is a measure practically unknown to the prescriber; not accurate if only for the reason that no directions are given to bring to a given volume. This, particularly in the case of liquor strychninæ, where heat is directed to be employed.

From inquiries made of different medical men one learns that by a 1 per cent. solution they imply 1 grain in 100 minims and not 1 grain in 100 fluid grains.

With the solutions of the 1867 Pharmacopœia, where the counterpart of these solutions were of a strength of 1 grain in 120 minims it was an easy matter to calculate the number of minims representative of almost any fraction of a grain; with the present solutions the reverse is the case.

These solutions being prepared for use in the dispensary and not in the laboratory, and the doses, moreover, being minims, not ounces or grains, they should surely be prepared with the relationship of grains to minims unimpaired; the latter measure has been deemed a convenient one to retain, and until it is abolished this relationship should be retained.

That this relationship of grain to minim in these solutions would but little affect foreign pharmacists may be seen by a perusal of the 'Projet d'une Pharmacopée International,' issued by the last Congress at Brussels, in which the well known solutions of strychnine, morphia and the Donovan's find no place, while two only of the arsenical ones are of the strength 1 per cent., the other, liquor sodii arseniatis, having been fixed at 1 in 500.

There can be no possible objection to a strength of 1 in 100 for these solutions, but let the compilers of the next Pharmacopœia make it 1 grain in 100 minims, a measure readily understood by prescribers and dispensers alike, and not omit to give more precise directions as to bringing them to a given volume.

Brighton. E. F. SALMON.

Estimation of Extractive and Specific Gravities of Official Tinctures.

Sir,—Mr. Spilsbury's figures are valueless on the face of them, but Mr. Husband does not improve matters by launching a series of his own, without a word of information as to the conditions under which the tinctures were made.

The truth of the matter is, there can be no such thing as an "average specific gravity," or anything else to identify official tinctures, so long as the Pharmacopœia itself tolerates such crazy methods of preparing them.

Holloway. F. W. FLETCHER.

Lime Water.

Sir,—In reference to the paper which appeared in your issue of November 23 on the above subject, it may interest some of those who read it, and possibly others, that in December, 1886, I had a batch consisting of quick lime (? 2 pounds) and distilled water, about 5 gallons, put on and treated as directed in my paper (*Pharm. Journ.*, [3], xiii., 433, upon which the Pharmacopœia data are presumably based).

The lot of lime has now been treated with forty-nine lots of distilled water, and has therefrom yielded 150 to 200 gallons of lime water, each batch of which has been tested and has fully answered the B.P. tests, although at times in hot weather it has only slightly exceeded in strength the Pharmacopœia minimum.

The lime still shows no sign of exhaustion. I venture to predict confidently that if Mr. Ellwood obtains lime water (so called) testing double the Pharmacopœia strength he will find that the excess of alkalinity is due to either magnesia, potash or soda, or all of them, and that no difference will be found between lime water made with quick or slaked lime, for the very simple reason that it cannot be made from the former without the latter being first formed.

I may take this opportunity of saying that some time since a gentleman forwarded to me a sample of solution of soda of about four times the neutralising power of lime water. This had been obtained as lime water, and is a most scandalous substitution, to which I think attention should be called.

A. C. Abraham.

Sir,—It is quite evident from Mr. T. A. Ellwood's paper that metropolitan lime water is superior to that sold in some parts of the country. I append the results of a number of samples that I procured and analysed about two years ago:

No.	1	contained	9·44	grs. of CaO	per pint.
,,	2	,,	7·22	,,	,,
,,	3	,,	6·10	,,	,,
,,	4	,,	6·6	,,	,,
,,	5	,,	9·16	,,	,,
,,	6	,,	8·32	,,	,,
,,	7	,,	8·8	,,	,,
,,	8	,,	9·72	,,	,,
,,	9	,,	8·05	,,	,,
,,	10	,,	8·2	,,	,,
,,	11	,,	7·66	,,	,,
,,	12	,,	4·72	,,	,,
,,	14	,,	9·22	,,	,,

No. 13, although sold for lime water, was a dilute solution of soda, containing ·540 per cent. of NaHO with only a very slight trace of lime. The result of No. 13 was confirmed by a well known pharmacist.

F. A. Brown.

Aqueous Solution of Carbon Dioxide.

Sir,—I notice that a new chemical theory is being propounded by Mr. Rutherford Hill, in reference to solution of carbonic dioxide in water, but I fear it is a theory which is not supported by facts and which will not stand examination.

Mr. Hill claims that he has established,—

1. That if a solution of carbonic dioxide be boiled, "the CO_2 cannot be entirely removed by boiling."

2. That if "a current of CO_2 is passed through neutral distilled water containing litmus, the blue colour is not restored by boiling," a fact which has not, he says, been noted before.

3. That iron can remain in solution in distilled water in presence of CO_2, and apparently still remain, after the solution has been boiled. These three statements are all put forward in good faith by Mr. Hill, and evidently he expects every other person to accept them in the same frame of verdant innocence as he himself has displayed; but until we have a higher authority vouching for them, I for one respectfully decline to subscribe to the new chemistry. Till that higher authority appears I content myself with affirming:—

I. That from aqueous solutions of CO_2, the carbonic acid gas *can* all be removed by boiling.

II. That if CO_2 be passed into litmus and water till the water becomes acid, the blue colour *can* be restored by boiling, a fact which has been noted before dozens of times, by every tyro in chemistry.

III. That it is difficult to conceive how the water Mr. Hill was experimenting with could have contained iron as well as CO_2, for the moment it was boiled the iron would have been thrown out of solution. I am quite well aware that ferrous bicarbonate is soluble in water, but when such a solution is boiled the iron is thrown down as ferrous carbonate, or ferric oxide, or a mixture of both, and when the liquid is filtered, not the most infinitesimal trace of iron, either ferrous or ferric, can be found.

I confess I am surprised that any man with Mr. Hill's ability should have made such a series of statements, which, to say the least, are hardly scientific.

W. A. Munro.

Notes of a Botanical Ramble in Cornwall and Scilly, etc.

Sir,—In reading Mr. W. Baxter's interesting mems., I thought a few notes of my own when over the same ground on several occasions about twenty years ago might prove interesting to your botanical readers. At that time Mr. Cunnack, the late Postmaster of Helston, was a great authority for localities, and had an excellent herbarium of his own collection. Besides many of the plants mentioned by Mr. Baxter, I found in 1867 near St. Kevern, growing wild very luxuriantly to a height of 4 feet, *Acanthus mollis*, where it appeared to have been naturalised for about fifty years, probably from seeds carried from gardens on the River Fal, or from St. Agnes, Scilly. I have a plant growing still from the locality. *Mentha Pulegium* grew by the wayside, and the beautiful *Hypericum undulatum* in the bogs, and *Alisma ranunculoides* in some water. On nearing the Lizard, one notices the pale yellow buttercup, *Ranunculus hirsutus*, which supplants the other kinds. Suddenly I came upon a hedge covered with *Herniaria glabra* and *Herniaria ciliata*. Where the *Allium sphærocephalum* grows may be also found a *Thalictrum* among the rocks quite plentiful, and *Inula crithmoides*; *Inula Helenium* grows near St. Kevern. In a valley between the Rill Head and Looe Pool I found the fine *Ranunculus Lingua* and *Carex ampullacea* and a *Statice* (limonium ?), etc.

With regard to *Pinguicula grandiflora*, which I found in bogs on the side of Mangerton, one of the highest of the Irish mountains overlooking the Killarney Lakes, where also the *Saxifraga umbrosa* grows, I brought roots of the *Pinguicula*, and kept it alive in my garden in Dublin in water, and it was very remarkable what a profusion of bulbils were found around the edges of the leaves and shed into the saucer as the leaves became old. The plant bore flowers the next year after transplantation. I heard that some Penzance botanist—I believe Mr. Ralf—had planted *Pinguicula grandiflora* somewhere in a bog near.

The dwarf willow—a procumbent plant 6 inches high—also grows in the Lizard district and *Sanguisorba officinalis*. Visiting Jersey this autumn, I found *Rumex sanguineus* in the interior (three specimens), and have since seen it at Launceston. The *Mesembryanthemum*, which I remember so well at Scilly, was growing wild in Jersey, and *Œnothera biennis* was common there. By the way, *Eryngium campestris* still inhabits its old locality near Plymouth—I have never seen it elsewhere—and the three *Erodiums* are now common round the coast. Mr. J. W. N. Keys of Plymouth published some time since a Flora of Devonshire and Cornwall, which is now out of print.

I remember Mr. Cunnack showing me *Erica ciliaris*, but I never found it in the St. Kevern district. I came upon it, however, quite unexpectedly, covering say half an acre of ground, together with *Erica tetralix* and *Erica ciliaris β-Watsonii*, evidently a hybrid between the two, passing from one form to the other by many transitional links, near Truro.

F. P. Balkwill.

Minor.—We are unable to give you any information on the subject more precise than that which is contained in the Regulations of the Board of Examiners, a copy of which may be obtained by application to the Secretary.

T. E. Polley.—The material sent is insufficient for identification.

Errata.—On page 407, col. ii., lines 2 and 5, in the "Note on a Sample of Decomposed Chloroform," for "Heat" read "Treat."

Communications, Letters, etc., have been received from Messrs. Harding, Stroud, Bennett, Merck.

The Pharmaceutical Journal.

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SATURDAY, DECEMBER 7, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

THE last ordinary Council meeting for the present year was attended by twenty members, the only absentee on that occasion being Mr. EVANS. Two persons were elected Associates of the Society, and seven persons were restored to the Register of Chemists and Druggists. The appointment of examiners for England and Wales and for Scotland was then considered, and the previous members of the two Boards were appointed, with the exception of Dr. THRESH, who has gone into the medical profession and become a Medical Officer of Health. In his place Mr. R. H. DAVIES was appointed as the new examiner. A unanimous vote of thanks was passed to Dr. THRESH for the services he has rendered to the Society for many years as an examiner, also offering congratulations on the position he has attained. The report of the Finance Committee recommended further payments to the contractors for the new buildings which are now advancing towards completion, and the purchase of £100 stock for the Benevolent Fund Donation Account, which has been rendered possible by the liberal contribution of £65 by Mr. CHARLES MAW. On the recommendation of the Benevolent Fund Committee four grants of ten pounds and two of five pounds were made. A further grant of five pounds was awarded from the ROBBINS' Fund to an annuitant whose husband had contributed the largest amount to the Benevolent Fund. The Report of the Library, Museum, Laboratory and House Committee recommended in reference to the questions raised at the last Council meeting that the outward carriage only should be paid on books when the distance is more than five miles from Bloomsbury Square, and that the list of books which are always to be found in the Library and are marked in the catalogue with an asterisk should be extended. These recommendations were adopted as being the best arrangement that could be made under existing conditions. The issue of books on loan has increased from about 400 in 1877 to 1709 in 1888, and is still steadily increasing.

Mr. MARSHALL LEIGH, in speaking upon the motion of which he had given notice, with the object of establishing some means of inducing apprentices to commence the requisite studies at an early period, urged that the award of prizes by the Society would be a useful means by which this influence could be brought to bear on the general apathy of apprentices. He suggested that a number of prizes should be offered annually to registered apprentices and that examination of the candidates for them should be conducted in the same way as the Scholarship examinations. By such an arrangement he thought that the great disadvantage resulting from the long lapse of time between the Preliminary and the Minor examination would be counteracted, for while under existing conditions a great many apprentices never thought about study at all until the time arrived for presenting themselves for the qualifying examination, the plan he suggested would have the effect of inducing apprentices to join the Society, and the examinations he proposed to institute would form a series of stepping-stones from the Preliminary to the Minor. Every year during apprenticeship some further preparation would be made for the final ordeal, and meanwhile apprentices would be kept in touch with the Society. In the discussion of Mr. LEIGH'S motion the desirability of the object aimed at by him was generally acknowledged, and it was admitted that the course he proposed might be useful in maintaining a proper relation of apprentices to the Society between the beginning of apprenticeship, when they passed the Preliminary examination, and the time of presenting themselves for the Minor examination. Every speaker testified directly or involuntarily to the sense of the need for greater attention being given to study during the period of apprenticeship, but there seemed to be an equally unanimous feeling that such a result would be best secured by a more unavoidable influence than the offer of prizes. That plan would still leave an option to the apprentice, and it would have but little effect upon the apprentice's master. If, on the other hand, study during apprenticeship were an established obligation for all who contemplate entering the business of pharmacy there would be no alternative for apprentice or master but to regulate their mutual relations in such a way as to satisfy the requirements. Mr. LEIGH'S proposition appears in fact to acknowledge the justice of all the arguments that are put forward for a definite curriculum; it admits the existence of all the evils which a curriculum is intended to do away with, and so far as the reason for establishing one or other system is concerned the two projects appear to be identical. The only difference is that instead of making the obligation of study unavoidable, Mr. LEIGH would only go half way and trust to the stimulus and sense of

THIRD SERIES, No. 1015.

rivalry that might be evoked by the incentive of prizes. The prevailing feeling of the members of Council was decidedly in favour of the system that would be more certain to be effective, and though fully appreciating the good motive of Mr. Leigh's suggestion, they did not manifest any disposition to trust to less stringent influences. On the contrary it seemed to be generally recognized that for the promotion of pharmaceutical education, success could not be hoped for from anything but a compulsory system. However, the motion was eventually referred generally to the Library Committee for consideration and to be reported upon to the Council.

The motion of which Mr. Hampson had given notice in reference to the drafting of a Pharmacy Act Amendment Bill raised the question whether that Bill should be confined as heretofore to the matter of pharmaceutical education, or whether it should not also comprise provisions calculated to render the Act of 1868 a more complete enactment to embody the principle laid down in the preamble of that Act. The scheme of a curriculum was, however, the first and leading feature of the Bill contemplated by Mr. Hampson as being desirable, and he declared that he considered that to be the keystone of any legislation for pharmacy. The supplementary features of the proposed Bill included provisions for giving associates in business greater privileges as members of the Society, for establishing one title for all registered persons practising pharmacy, and for making membership of the Society a necessary result of passing the qualifying examination. These propositions naturally gave rise to considerable discussion, to the report of which we must refer, but it was decided to instruct the Law and Parliamentary Committee to consider the matter and report to the Council. Two other subjects were also referred to this Committee, viz., that of the Medicine Stamp Acts, consequent upon the presentation to the Council of the memorial from Newcastle, to which reference was made in this Journal two weeks since, and that of medicated wines. A letter from Dr. Quain, the Chairman of the Pharmacopœia Committee of the General Medical Council, addressed to the President of the Society, announced the decision to publish an addendum to the Pharmacopœia, and requested the advice and assistance of the Council of the Society as to the arrangements by which, in the execution of that work, matters of practical pharmacy are to be provided for.

An Evening Meeting of the Pharmaceutical Society will be held at 17, Bloomsbury Square, W.C., on Wednesday next, the 11th inst., when a series of papers on *Scopolia carniolica* will be read, arising out of an investigation that has been carried on in the Research Laboratory. An introductory paper by Professor Dunstan will be followed by one on the Chemistry of *Scopolia carniolica*, by Professor Dunstan and Mr. A. E. Chaston; Mr. F. Ransom will contribute a paper on the Pharmacy of the drug, and Mr. E. M. Holmes one on its Natural History; Mr. Greenish will compare the Histological Characters of the Rhizome with those of the Root of *Atropa Belladonna*; and Sir Dyce Duckworth will communicate some Observations on the Therapeutic Action of *Scopolia carniolica*. In addition there will be a paper on "The Root Bark of Euonymus (Wahoo) and Euonymin," by Messrs. W. A. H. Naylor and E. M. Chaplin, and some "Notes on Calamine," by Mr. W. M. Holmes. The chair will be taken at eight o'clock, but, as usual, the theatre will be open for an hour previously, to afford an opportunity for the inspection of specimens and apparatus that may be exhibited.

* * *

A fortnight since it was noticed in these columns that a decision had been given in Ontario as to the meaning of the word "sells" in the provincial Pharmacy Act, which was quite in accord with the recent decision of the Judge of the County Court at Wandsworth. We now learn that in Melbourne a very similar case was about two months since decided in the same way. A qualified pharmaceutical chemist opened a branch establishment and placed an unqualified assistant in charge. Against this assistant proceedings were taken by Mr. Shillinglaw, Registrar to the Pharmacy Board of Victoria, for a breach of the Colonial Pharmacy Act by selling some laudanum. The defendant pleaded guilty, and the magistrate, after remarking that there could be no doubt a breach of the Act had been committed, inflicted a fine of £2 2*s.* 0*d.*, with £3 3*s.* 0*d.* costs.

* * *

We understand that notice has been given of appeal against the decision of Judge Holroyd, and that a motion will be made in the Queen's Bench Division of the High Court of Justice on Wednesday, the 11th inst., or as soon after as possible, for an order that the judgment should be set aside.

* * *

In reference to the prosecution at Stockton-on-Tees, reported in last week's Journal, we notice that in the local newspapers the defendant is described as a "chemist and druggist," although his name is not to be found in the Register of Chemists and Druggists. It is the more necessary to mention this fact, since that erroneous description of the defendant has been the means of misleading another journal.

* * *

In accordance with announcement the recent judicial decision as to the seller of a poison was brought under the consideration of the Chemists' Assistants' Association on Thursday evening, but the discussion was eventually adjourned to a special meeting of the Association to be held on Tuesday next. The next ordinary meeting will be held on Thursday, December 12, when a paper on "Herbaria" will be read by Mr. G. C. Druce.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, December 12, when a paper will be read on Titanium and its Salts, by Messrs. A. J. Simons and A. O. Scrivener, and a Report on Botany will be given by Mr. R. H. Norman.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 4, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Robbins, Schacht, Southall and Watt.

The minutes of the last meeting were read and confirmed.

ELECTION OF ASSOCIATES.

The following, having passed the Minor examination and paid (as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Bate, Walter Humphries	London.
Galloway, Philip Henry	London.
Taylor, Joseph	Manchester.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

William Braithwaite Brown, 6, West Street, Fleetwood.
Albert Clarkson, 43, High Street, Stockton-on-Tees.
Frederick Craven, Horsefair, Pontefract.
George Henry Hanson, 73, Bartholomew Street, Newbury.
Benjamin Henry Haworth, 37, Portman Street, Moss Side, Manchester.
Joseph Richard Henchley, Edgware, Middlesex.
Albert Hall Morgan, 56, Commercial Street, Hereford.

APPOINTMENT OF EXAMINERS.

The Council went into committee to consider the appointment of pharmaceutical chemists as members of the Boards of Examiners.

On resuming the following were appointed:—

Board of Examiners for England and Wales.

Blunt, Thomas Porter, Wyle Cop, Shrewsbury.
Bowen, John William, 13, Curzon Street, Mayfair, W.
Corder, Octavius, 31, London Street, Norwich.
Davies, Robert Higgins, Apothecaries' Hall, E.C.
Druce, George Claridge, 118, High Street, Oxford.
Fletcher, John, 12, Montpellier Avenue, Cheltenham.
Gale, Samuel, 225, Oxford Street, W.
Gerrard, Alfred William, University College Hospital, W.C.
Greenish, Thomas Edward, 5, Bathurst Street, Sussex Square, W.
Ransom, Francis, Fairfield, Hitchin.
Saul, John Edward, 143, New Bond Street, W.
Symons, Wm. Henry, 130, Fellowes Road, South Hampstead, N.W.
Tanner, Alfred Edward, High Cross, Tottenham, N.
Taylor, George Spratt, 13, Queen's Terrace, St. John's Wood, N.W.

Board of Examiners for Scotland.

Clark, Wm. Inglis, 104, South Canongate, Edinburgh.
Dott, David Brown, 104, South Canongate, Edinburgh.
Gibson, Adam, Thistle Street Lane East, Edinburgh.
Gilmour, William, 11, Elm Row, Edinburgh.
Kinninmont, Alex., 69, South Portland Street, Glasgow.
Maben, Thomas, 5, Oliver Place, Hawick.
Nesbit, John, 162, High Street, Portobello.
Stephenson, John B., 48, Frederick Street, Edinburgh.

A vote of thanks was unanimously passed to each member of the Boards of Examiners in England and Wales and in Scotland for their services during the past year.

VOTE OF THANKS TO DR. THRESH.

The PRESIDENT then moved a special resolution of thanks to Dr. Thresh for the services he had rendered for eight and a half years as a member of the Board of Examiners for England and Wales. Most of those present knew Dr. Thresh personally, and it was not necessary therefore to say much in commendation of this resolution. It was perhaps a source of regret, in some respects, that so many of their best men should get promoted to a different—he would not say a higher—sphere, for he thought as good work could be done in pharmacy as in medicine if a man were actuated by noble motives. By the accidents of life Dr. Thresh had thought fit to go into the medical profession and practice in the special department known as sanitary medicine, and the members of Council, while expressing their thanks to him and regret at losing his services, could not but feel that an eminent member of their body, who had by efforts of the greatest individuality raised himself to be an intellectual giant, was to be congratulated on the fact that his talents had been appreciated, and that he had been appointed to the important post of Medical Officer of Health for Essex. He remembered with great pleasure the fact that he (the President) had nominated Dr. Thresh as a member of the Board of Examiners, and how enthusiastically Mr. Radley then spoke in his favour; and it had been a source of great satisfaction to him to be associated with him. Dr. Thresh had not only rendered signal service as an Examiner, but had been an active officer of the Conference, and generally had thrown himself into the official work of pharmacy with a great deal of zeal. He hoped that Dr. Thresh, even though he ceased to be a member of the Society, would still retain his interest in it, and he would no doubt have many opportunities of being of service.

The VICE-PRESIDENT having cordially seconded the motion and endorsed the remarks which had been made by the President,

Mr. GOSTLING supported it. He said he had watched with much pleasure and interest the progress of Dr. Thresh, from the time of his becoming a Bachelor of Science up to the present, and while regretting that Dr. Thresh had left the ranks of the Society, he was sure they would all congratulate him on the position he had now attained.

The motion was carried unanimously.

MEETINGS OF BOARDS OF EXAMINERS IN 1890.

It was resolved that the Board of Examiners in England and Wales should meet in February, April, June, July, October and December. The Board for Scotland to meet in the month of January, April, July and October.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee included a recommendation that the usual monthly and current accounts be paid; also that a sum not exceeding £1500 be paid to the contractors for the new building during the month of December, on the certificate of the architect. It also recommended the purchase of £100 stock on the Benevolent Fund Donation Account.

The PRESIDENT in moving the adoption of the report said there was nothing special to refer to, except in connection with the Benevolent Fund. Last month he referred to the donation account, and expressed the hope that some friends would come forward with donations to such an extent that it might become possible to invest £100 before the end of the year, and he was glad to say that Mr. Charles Maw had kindly sent a cheque for £65, which would enable the Council to do so, and which made up the sum contributed by Mr. Maw to the Fund to 300 guineas. He would not say anything more about it, as Mr. Maw was one of those charitable gentlemen who liked to keep his good deeds as quiet as possible; but they all appreciated his kindness and the confidence which he showed in the conscientious care with which this fund was administered by the Council for the benefit of the whole trade, and would agree in sending him an informal vote of thanks for his beneficent gift.

The motion was seconded and carried unanimously.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 41) of a member from 1867 to 1870 and a subscriber for the same period. Three previous grants have been made; applicant is still a confirmed invalid. (London.)

£5 to a registered chemist and druggist (aged 54), who has failed in business, is in bad health, and has no resources. (Warwickshire.)

£10 to a registered chemist and druggist (aged 63), who has had fourteen previous grants, amounting to £110, and her health being entirely broken down is quite dependent on benevolent aid. (Edinburgh.)

£10 to the widow of a registered chemist and druggist (aged 44). Applicant has four children, but only one is dependent on her, and she is in very delicate health. (London.)

£10 to a registered chemist and druggist (aged 59); this was a case which had been deferred in October and November for fuller information. (Durham.)

£5 to a former apprentice and associate (aged 34). Applicant recently bought a small business, but it proved unsuccessful. He is now out of employment. (London.)

One case had been deferred for further information.

The Robbins' Fund.

The Committee recommended that £5 be given to Mrs. Caroline C. Davies from this fund, her late husband having contributed £13 13*s.* to the Benevolent Fund.

The VICE-PRESIDENT, in moving the adoption of the report, gave some particulars with regard to one of the cases relieved. The President had taken out of his hands the opportunity of saying anything about the liberality of Mr. Maw, and he had nothing to add except to thank Mr. Maw for the great consideration he had always shown for the wants of his poorer friends in the trade.

The motion for the adoption of the Report was then agreed to unanimously.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
October	Day . .	772	41	6	29
	Evening .	192	16	3	8

Circulation of books.	Town.	Country.	Total.	Carriage paid.
October. . .	116	175	341	£2 4 9½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Owens College, Calendar, 1889.
From the COLLEGE.

Mason Science College, Calendar, 1889.
From the COLLEGE.

Royal College of Surgeons of England, Calendar, 1889. From the COLLEGE.

U. S., Surgeon-General's Office, Index-Catalogue of Library, vol. 10. From the SURGEON-GENERAL.

U. S., Department of Agriculture, Division of Chemistry, Bulletin nos. 13 (part 5), 22 and 23.
From the DEPARTMENT.

Digest of Criticisms on the United States Pharmacopœia, 1880, part 2.
From the CHAIRMAN OF THE COMMITTEE OF REVISION AND PUBLICATION.

Memoirs for a Natural History of Animals, 1701.
From Mr. RICHARD WILLATS.

Jürgens (B.), Vergleichende microscopisch-pharmacognostische Untersuchungen einiger officinellen Blätter, 1889.
From Professor DRAGENDORFF.

Flückiger (F. A.), Bestimmung des Morphingehaltes des Opiums, 1889.

— Jalape und Jalapenharz, 1889.
From the AUTHOR.

The Committee recommended that the undermentioned books be purchased:—

For the Library in London—

Wallace, Darwinism, 1889.

Huxley and Martin, Practical Biology, 1889.

Marshall and Hurst, Practical Zoology, 1888.

Wanklyn, Tea, Coffee and Cocoa Analysis, 1874.

Squire, Companion to the British Pharmacopœia, 15th ed., 2 *copies.*

Kobert, Historische Studien aus dem pharmakologischen Institute der Kaiserlichen Universität Dorpat, 1889, No. 1, *and continuation.*

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest	Lowest.	Average.
October	Morning	680	37	8	21
	Evening	108	10	1	4

The following donations to the Museum had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of Form-aldehyd, Para-formaldehyd, Oxymethyl-sulphuric Acid and its Potassium, Ammonium and Barium Salts.
From Messrs. MERCKLIN and LÖSCKANN, Hanover.

Specimens of five varieties of Commercial Tragacanth. From Mr. J. COLLINS.

Fine Specimens of Uranium Ore from the New Uranium Lode in Cornwall.
From Messrs. E. C. BENNETT AND Co.

Specimens of Galena, Tin Ore and Spathic Iron Ore and Blende and Copper Ore from Cornwall; Magnetic Iron Ore and Arsenical Ore from Devonshire; Silver Lead Ore from Cardiganshire; Rutile, Apatite, and Cobalt and Nickel Ore from Norway. From Messrs. E. C. BENNETT AND Co.

Specimen of Oil of Cubebs and of genuine Cubebs from Java. From Professor VAN EEDEN, Haarlem.

Specimens of West African Drugs, including Agbana, Ahay, Ayra, Cotopar, Dedee, Gbaclalar, Gbeyrihigbe, Rhinor, Toray-Toray and Zaclam roots, and the fruit and seeds of *Kickxia africana.* From Dr. PAPEFIO, Accra.

"Guaap" stems (*Trichocaulon sp.*) from Bechuanaland.
From Messrs. HEARON, SQUIRE and FRANCIS.

Specimen of Red Oil of Cajeput.
From Mr. U. WYATT.

A series of Micro-slides of *Scopolia japonica* and *S. carniolica.*
From Mr. J. HART, F.C.S., Manchester.

The Committee had considered the questions raised at the last Council meeting as to the administration of the Library, and found that the country circulation of books had increased from about 400 in 1877 to 1347 in 1880, when a new catalogue was issued, and in 1888 the issue reached a total of 1709. It was recommended that in all cases the carriage outward of books should be paid by the Society where the distance is more than five miles from Bloomsbury Square, but that carriage both ways should not be paid. It was also decided that the President should revise the list of books marked with an asterisk, as indicating that books so marked are always to be found in the Library.

It was recommended that 850 Calendars and 1650 Registers for 1890 be printed by Messrs. Butler and Tanner.

The application from the Dundee Chemists' Assistants' Association for assistance in forming a library and museum had been deferred to the next meeting.

The staff of the Society's School had attended and reported on their respective classes.

The **President** moved the adoption of the report and recommendations. In doing so he said the chief point in it was the detailed consideration which had been given to the Library regulations, from which Mr. Newsholme would gather that the Committee did not see its way to accept his suggestion. He need not go into all the details, and would only add that certain arrangements were proposed which he thought would conduce to the usefulness of the Library. The question of the mode of appointing Local Secretaries had been discussed, and would be again discussed next week, when he hoped a report would be prepared on the subject. The circulation of books it would be seen had enormously increased under the recent regulations, and was still steadily increasing.

Mr. **Abraham** thought it would be a mistake to pay the carriage of books outward only, because many people had contracts for carriage from London to the provinces, but very few had contracts from the provinces back to London; so that those who had hitherto had their books free would now have to pay.

The **President** said the Society had contracts also, and could not make contracts for the return carriage. There were other considerations which made the Committee think if the members at large did not strongly object to it, that this arrangement would on the whole work well. Members in the country would be better able to select cheap methods of carriage for return than the Society.

Mr. **Newsholme** said if he had known how large the circulation of books was he should not have brought forward the matter as he did. Of course he bowed to the opinion of the Committee, though he was still of opinion that there were a few young men in the country to whom it might be an advantage to have the carriage paid both ways; but perhaps an exception might be made in special cases. He should be quite willing to leave the matter as it was at present.

The motion for the adoption of the report was then unanimously agreed to.

Death of an Annuitant.

The Secretary reported the death, on November 15, at the age of 80, of Mr. John Rogers, an annuitant, who was elected in 1867.

Withdrawal of a Notice of Motion.

Mr. **Schacht** said he had ascertained, since handing in a notice of motion on the matter of the Pharmaceutical Society *v.* Wheeldon, that an appeal had been lodged, and as the case was still *sub judice*, he begged leave to withdraw the notice of motion.

Prizes for Students.

Mr. **Leigh** then moved the following resolution, of which he had given notice:—

> "That in order to encourage youths to study during their apprenticeship, a number of book prizes and certificates should be offered by the Pharmaceutical Society, to be competed for annually by the registered apprentices of the Society; and that the Library, Museum, Laboratory and House Committee be requested to report on the best method of carrying out this proposal."

He said when he saw so many gentlemen present who had given the best thoughts of many years to the question of pharmaceutical education, he felt that perhaps an apology was due from him, as one of the youngest members, for bringing forward this motion. But his excuse was that it seemed such a short period ago when he was an apprentice himself, and in his own person experienced the inconveniences and hardships which attended the lot of an apprentice in a small third-rate town. In order that this subject might be more fully understood he had prepared and sent round a few notes explanatory of the proposal, which would save him referring to them in detail. A proposal similar to this had already been before the Council some years ago on the suggestion of Mr. Martin, who was not then a member of the Council, in the direction of giving prizes to registered apprentices, but that was confined to apprentices attending classes at the various schools in connection with provincial associations. Mr. Martin's suggestion was that these prizes should be offered to all the registered students of the Society. He thought the reason the former suggestion had not been adopted was, that the provincial societies, or their schools, had dwindled down and almost disappeared, so that it seemed hardly worth while to carry out the suggestion; but all would agree that provincial pharmaceutical education was in a very unsatisfactory state, as was shown partly by the condition of the schools and the few pupils attending them. This was also shown by the fact that under 40 per cent. of the candidates for the Minor succeeded in passing at the first attempt. Within his own recollection, there had been something like a dozen schemes promulgated by leaders in pharmacy, but they had all ended in nothing; they had all been doomed to failure, and all such schemes were doomed so long as they did not recognise the fact that the co-operation of the apprentices themselves was absolutely necessary to success, and that this scheme was intended to secure. Apprentices had a great deal to discourage them, and if the Council could only bring some influence to bear which would counteract those discouragements, it would do a great deal of good. The great mass of apprentices neglected study; perhaps 5 per cent. followed it from a pure love of knowledge; but one reason why they neglected it was that they did not see its immediate necessity. Pharmaceutical legislators had put two barriers in the way of a young man starting in business. First, the Preliminary examination, which he passed about the time he entered on his apprenticeship, and secondly, the Minor, and the long distance between these two tended to make the apprentice postpone his studies for the Minor. That was one great drawback to the regulation which prevented this examination being passed under twenty-one years of age. He would have a greater number of smaller examinations, so as to keep the lad steadily at work during the whole of his apprenticeship. The great difficulty was to raise apprentices out of their apathy and make them do things they would not do themselves, and if the Council could by offering them some little inducement bring some incentive before them it would be doing a very good work. The only way to make apprentices study was to appeal to their strongest motives, and amongst the young men after all the strongest desire was the love of rivalry—the desire for approbation and praise. If these prizes were offered they would appeal to the strongest incentive in human nature. He would also say that to those youths who did not feel that stimulus or the sense of rivalry the examinations would be practically useful as giving a sort of hall-mark to them when they were out of their time, for if an apprentice could prove to a prospective master that he had obtained two or three certificates or prizes during his apprenticeship he would be entitled to a better situation and salary than he would otherwise receive. A great many apprentices never thought about study at all, but they did think about what sort of situation they would have to seek when out of their time; and this incentive would have a great influence upon them. His suggestions were these: First, that a number of books or prizes should be offered annually by the Pharmaceutical Society to these registered apprentices. This would tend to bring in apprentice subscribers, and it would get youths to pass the Preliminary before their apprenticeship, The prizes to be awarded on an examination in writing, conducted in the same way and at the same time as the Jacob Bell Scholarship examination, so that the machinery already in existence could be used and the additional expense would be very small. It was just as easy for a local secretary to superintend a dozen youths as two. The examinations to be open to all registered apprentices who had served not more than twelve, twenty-four or thirty-six months at the time of the examination, so that all would compete with others at about their own age and experience. Absolute equality was impossible, but relative equality would be secured. Three sets of examination papers, suitable to youths in the first, second and third years, should be prepared, and prizes of books value one guinea, and certificates, should be given to all attaining a certain standard of efficiency and merit, so that if a large number sent up very superior papers a larger number of prizes could be given, and the competitors would feel that if they honestly did their best they would not necessarily be displaced by those having better opportunities. If ten or fourteen prizes and the same number of certificates were awarded to each group of examinations there would be about thirty-six prizes annually, and the same number of certificates. A course of study as a guide to the students should be indicated a year in advance, to include pharmacy, a knowledge of the Pharmacopœia, the translation of prescriptions, elementary chemistry, materia medica, and botany. Some youths did not need a stimulus, but all would be the better for guidance, and the hints to apprentices given by the Society, though very good, were not definite enough for the purpose of these examinations. These would form a series of stepping-stones from the Preliminary to the Minor examination, and every year during his apprenticeship the youth would be preparing for an examination. The syllabus which he had circulated gave a definite amount of work for each year, so regulated that it passed from the simplest to the more difficult. This would give an apprentice something to work for. As a rule an apprentice commenced in a very ambitious way, anxious to get on, but the thought that he had six or seven years before he could go in for the Minor was sufficient to keep him from study. Under this scheme he would obtain regular progressive training. He had been asked how many students would be expected to go in for such examinations. He thought there was something like 3000 apprentices in the trade. Some years ago Mr. Bremridge estimated that 1000 entered every year, and last year 1500 students went in for the Prelimi-ry. That 3000 afforded a very large field from which candidates would be obtained. Something also might be deduced from the number of candidates for the Jacob Bell Scholarship, about thirty of whom usually entered, being an average of about ten for each prize, but these prizes only attracted a very few men of exceptional opportunities and abilities. The *Chemist and Druggist* offered two prizes for analytical work every month of the value of 10*s.* 6*d.* and 5*s.*; and as a rule there were 35 to 40 candidates for those prizes. But these had not the prestige and dignity connected with them that prizes offered by the Society would have. The lowest estimate he could make of the number entering would be 10 for each centre, making about 600 in all. He had also been asked about the cost, which he should say would be small, because the machinery already in existence could be used, and the extra cost of prizes would probably be some £50 or £60, which he should expect would come back again in subscriptions. A celebrated German once said the English did everything by racing, and there was a good deal of truth in that, but the offering of these prizes would give greater definiteness to study. A great deal of the reading of apprentices was desultory and practically useless. The examinations themselves would be something more than a test of superiority. They would be a help to study and give the student an opportunity of knowing how far he had progressed. Then he had been asked whether it was right to ask the Society to undertake this, but no one else could do it. The local prizes were very good in their way, but they did not carry sufficient weight with them. During the whole life of the Society its watchword had been education. This was the great object and aim of the founders, and perhaps no other public body had done so much for education. The offering of these prizes therefore would be legitimately carrying out the intentions of the founders, and he thought no more useful work could be undertaken than directing and stimulating the energies of the young. Of course, perfection could not be expected at first, but he should expect to find a good deal of steady improvement in the quality of the candidates presenting themselves for the Minor examination. In conclusion he would say that he had not circulated these suggestions outside the members of the Council, nor had he asked anyone to second the motion.

The **President** suggested that the wording should be somewhat modified, so as to read that the question of the desirability of offering book prizes and certificates for annual competition to registered apprentices of the Society be referred to the Library Committee for consideration and report. As the motion stood, it rather indicated that the thing was to be done, and the Committee were simply to say how it should be arranged.

Mr. **Leigh** said he was quite willing to fall in with the President's suggestion.

Mr. **Watt** seconded the motion.

Mr. **Schacht** thought Mr. Leigh had spotted a defect in the system, or rather emphasized it, namely, that between the beginning of apprenticeship and the Minor examination, the Society somewhat lost touch of the young men. There was a great deal to be said in favour of sending this subject to a Committee for further elucidation; but he should much prefer the motion if it left out the word "prizes." The Society owed something to the apprentices, and it would be a wise thing if the Committee saw its way to recommend the institution of these annual examinations, so as to draw these young men a little more closely to the Society; but he should deprecate the multiplication of prizes. He thought the cause of study had been somewhat damaged by giving too many material inducements—that it would be more in accordance with what the Council owed to these young men if it limited its supervision to something like a periodical testing by examination—the certificates to be given to those who passed a certain standard. It would be a matter of considerable interest and pleasure to have to distribute hundreds of certificates of this kind if they were deserved, but he could not contemplate with equal gratification the giving of hundreds of prizes.

Mr. ATKINS was scarcely prepared to agree entirely with the suggestion of Mr. Leigh, though his motive was undoubtedly good, and the idea in his mind was deserving of recognition. There was a deal in it which he most heartily approved, and he thanked him for calling attention to the fact that there was a loss of touch between the point of the Preliminary examination and the Minor. He remembered perfectly well a remark of Professor Michael Foster, in his inaugural address a year or two ago, when talking about examinations he said he would remove the difficulty by examining more, that he would be constantly examining himself as a teacher, and also keeping the young men practised in examinations. His own idea, however, was that it would be better to let this question rest until the educational scheme had been passed. There would then be a motive power, which at present did not exist. There was another point on which he wanted to have all doubt removed, and that was whether it would not be better to recognize not so much the individual student as the local association. He was very anxious, notwithstanding the repeated failures in the shape of provincial associations, which every one must admit, though there were a few doing splendid work, that they should be put in a more flourishing condition, but he believed that would not take place until the great scheme of education now before the country obtained legislative sanction, so that some amount of compulsion might be introduced. Pharmacists had always treated compulsion as a *bête noire*, but it would have to be faced. The great difficulty was to get young men to face the problem of study; a small percentage did it for the love of it, but the great majority did not, and would not until the millennium came, and, therefore, some pressure must be brought to bear upon them. With regard to the question of prizes Mr. Schacht might be right, of which he was not quite sure. He also deprecated the multiplication of prizes; but they had not to appeal to very high philosophical sentiments that ought to animate the human breast, but to take human nature as they found it, and he found that lads were exceptionally fond of possessing elegantly bound books with the endorsement of a university, college, or some other examining body. Still, if Mr. Leigh's scheme were introduced he thought it would cost a great deal more than the sum he had mentioned, and he did not think the Society could at present stand such a strain upon its resources.

Mr. HAMPSON thought Mr. Leigh's purpose would be served if he would leave the matter to be dealt with by the Committee in the thoughtful manner in which he had dealt with it himself. There was much to be said in favour of the motion, but it required a considerable amount of thought, and he certainly could not vote for it at present, though possibly he might be able to do so after further reflection.

Mr. ATKINS wished to throw out an idea for the consideration of the Committee, which he had mentioned recently at Sheffield, and that was that he should be glad if the Society could see its way to giving a prize to successful students in the country in addition to the local prizes they obtained. He found that idea warmly received at Sheffield, and he was sure the successful students would feel it a great addition to the honours they obtained

Mr. WATT said no doubt the Committee would thoroughly thresh out this question, and they must all admire the benevolent and kindly manner in which Mr. Leigh had brought it forward. But he was rather startled with the magnitude of the scheme proposed, and thought the expense to the Society had been greatly underestimated. If there were 3000 apprentices to prepare papers for, assuming that even half of them took advantage of them, it would cost something like £1000, and he hoped this point of view would be seriously considered by the Committee.

Mr. ALLEN said Mr. Leigh's consent to modify the motion had considerably cleared the ground, and there was very little room left for discussion. He should be happy to share in considering the matter in Committee, and Mr. Leigh had put forward strong arguments as to the advisability of instituting prizes and certificates for the apprentices. He thought Mr. Watt was a little in error in speaking of 3000 apprentices. That referred to the whole number in the United Kingdom, but Mr. Leigh referred to the registered apprentices. They were about 1000, and one great argument in favour of the scheme was that if it were to succeed it would be the means of drawing apprentices into the Society, because all the 3000 men, if they wished to compete, must be registered. This, therefore, would be a source of income to meet the expenditure involved. He should not like the statement to go uncontroverted that there was no particular inducement for apprentices to study. There were plenty who were studying for the Bell Scholarships, and Mr. Leigh was also a little in error in saying that only the very best men came forward for these prizes. No doubt the very best men got them, but there were many ordinary men working away with the idea of going in for them. These, of course, were prizes of considerable value. There were four of them: the two Bell Scholarships, the Redwood Scholarship, and the Herbarium Prize; and it seemed to him that a small modification of the existing arrangements might achieve the end desired. At almost every annual meeting the examiners reported that besides the two gentlemen who actually gained the scholarship so many more had shown themselves qualified for receiving it; and possibly these men might have a certificate or perhaps a prize given to them. But all this was matter of detail, which the Committee could sift out.

Mr. SOUTHALL agreed very much with what Mr. Leigh had said about the difficulty of persuading apprentices to study. It was a thing they had been trying at ever since the Society started, and, so far, they had been extremely unsuccessful. The Bell and Redwood prizes were really worth competing for, being worth from £60 to £80; but, considering their value, there were very few men who took the trouble to study for them. So that he was afraid that these small prizes of books would not be sufficient to dazzle the eyes of many of the apprentices, and that not much was to be done except in the way of compulsion. When that was introduced it would be necessary to have schools where the requisite education could be obtained, and more inducement to seek for it; but at present a young man, after working hard all day in the shop, did not feel inclined to sit down and study without help in the shape of a class or something of that sort.

Mr. MARTIN said he was entirely in sympathy with Mr. Leigh's object, having brought forward a similar proposal in 1885, but he hardly thought the experience of offering inducements to apprentices in the country to study had been so great as to warrant the Council in supposing that this effort would be any more successful. If young men did not recognize the immediate necessity of studying for the sake of the knowledge of their business they would gain, he doubted very much whether any large proportion would recognize that necessity for the sake of a prize or certificate. He was rather against the principle of inducing men to do this, that or the other by offering them a bribe, and that seemed to be at the foundation of this scheme, though if young men did not see that there were privileges to be won by hard work and devotion to their calling he did not think that the cutting up of these prizes into smaller portions was the proper thing to do. He did not agree with Mr. Atkins's suggestion about giving additional prizes to successful candidates in local associations. Did he mean that the man who got a prize in a provincial school should also be given a book or prize by the Society? If so, were the questions and answers to be sent up there to be estimated by the examiners. Because if that were not done the prize would be of very little value, as the examinations, say in Newcastle and in Sheffield, might be on a different standard altogether. He should very much like to see men study more than they did, but two or three speakers had already touched the secret of the whole matter in saying that nothing but compulsion would make this a success.

Mr. Martindale said there was no royal road to pharmacy any more than anything else, and whatever the Council might offer in the way of prizes to encourage study would do little to get over the apathy of apprentices towards education. But it was not so much the apathy of the apprentices as of the masters towards the apprentices. They had undertaken to train them and supervise their studies, and they should see that a certain course of education was gone through in each year of the apprenticeship. If the masters could only be got to see that this was their duty it would be a great help, but the only way to do that was by means of the curriculum. It was quite right that the matter should be considered by the Committee, but the great difficulty would be that nothing could be done without compulsion. This system appeared to him rather too much like grandmotherly education, and he hardly liked the multiplication of these small prizes of books, which seemed somewhat paltry. If prizes were to be given they should be something worth working for, like the scholarships.

Mr. Hills said he was in rather a difficult position, for he was very much in sympathy with Mr. Leigh, and admired the moderate way in which he had introduced the subject, and he was much in favour of anything that would encourage education; but on the other hand he failed to find that any one speaker who had spoken was in favour of the motion, and he thought it would be almost better to have an amendment, if necessary. But he should prefer asking Mr. Leigh if he would not be content to put off this matter for a short time until the Curriculum Bill had been got through. If the next motion on the paper were passed there would be a great deal of work to do, and it would require all the efforts of the Council to advance that as much as possible. Several speakers had intimated already that compulsion was the only motive power on which reliance could be placed to induce young men to continue their studies during apprenticeship; he hoped the Curriculum Bill would soon be passed, and then it would be possible to see what it would effect. He agreed with much of what Mr. Martindale had said as to the duty of masters, and also with Mr. Atkins and others, that local institutions should be encouraged as much as possible rather than individual study.

Mr. Newsholme said when he received Mr. Leigh's circular he thought this was a splendid scheme, and he gathered that many thought so too, but he had gone through the matter very carefully, and agreed with many previous speakers that their only hope was in a compulsory curriculum. Under Mr. Leigh's suggested regulations he thought the same men who studied now would continue to study, and take all the prizes, and in the end they would be no better off. Until the new Bill became law nothing could be done, the matter must be left in the hands of provincial associations and the masters, and he would recommend the principals to take up this matter and put it in form.

Mr. Richardson thought Mr. Hills had made a most practical suggestion. If it had not been for the calm and lucid manner in which Mr. Leigh had introduced the matter, there would probably have been many more attacks upon him, but not one speaker had positively blessed the scheme or given any hope that he would support it in Committee. As the second motion to be moved would, he hoped, be sent to the Committee, he hoped this one which Mr. Leigh had so ably proposed would be withdrawn. His view was that if this were passed it would considerably interfere with local associations, which might not be successful in some centres, but were very successful in others, and were doing a good work in a quiet, unostentatious way, and he should be sorry to see them starve for want of means. A good deal had been said about the apathy of students, but that would be found in every profession and walk of life. How many failed every year in the universities and in the medical and legal professions? What happened in the church he would not say, but it was rather hard on pharmaceutical students to suggest that they were more apathetic than other people. He hoped Mr. Leigh would see his way to withdraw this scheme for the present.

Mr. Harrison was not sure that all the speakers had grasped the principle which underlay Mr. Leigh's motion, which seemed to him to be loyalty to the Pharmaceutical Society, whereas several of the latter speakers seemed rather to indicate that the loyalty should be to the local associations, which should conduct examinations and give prizes. If that were done there would be that irregular state of things which Mr. Martin had pointed out with reference to the prizes suggested by Mr. Atkins, that the questions set in one centre would differ from those set in another, and there would be prizes and certificates of the same value and supposed to indicate the same status based on different foundations, and therefore for purposes of comparison valueless. Others said that the Council should wait until the curriculum came into force; that would be waiting for an indefinite time, and he thought the Committee might take this scheme into consideration with the view of letting it take the place of the curriculum until it came into force. It was admitted there were only two methods, compulsion and attraction. He hoped the system of compulsion would soon be introduced, but Mr. Leigh presented a method of attraction in the most attractive form, and until the Society obtained larger powers, such as it was proposed to seek for according to the notice that was on the agenda paper for consideration that day, which he trusted it soon would, he thought it might be advisable for the Committee to consider this scheme with the view of putting it in force until those larger powers were obtained.

Mr. Abraham thought Mr. Leigh's observations might be put into a nutshell; there was sufficient bait offered for the large fish, but not enough to catch the small ones. He greatly sympathized with this proposal, for he thought the system of offering a number of small prizes did more good than offering a number of large ones. The Council wanted to encourage the mass of pharmaceutical students, not to make half-a-dozen extremely proficient who would not do it for themselves. He did not think this system would at all hamper the local associations, but on the contrary would very much assist them.

The President said any details in the working out of a scheme of this sort, assuming the Committee saw its way to recommend it, would seriously affect local associations, but he thought it would be most satisfactory to send this suggestion to a Committee. Possibly some points of the scheme might be useful, but he was bound to say the chief difficulty he had, assuming the scheme could be introduced immediately, was in respect to the effect on the mind of a student who having obtained a certificate for pharmacy, materia medica and botany in each year he competed, thus obtaining twelve certificates or prizes, then went before the Board of Examiners, failed to pass. It was rather difficult for their young friends to understand the distinction between that form of prize or certificate which was given by the Society as a voluntary body, and the certificate of having passed the Minor examination which the Board of Examiners had the power to refuse. He assumed the question would be referred to the Committee, and therefore did not propose to make any general observations upon it.

Mr. Atkins said he was sorry not to have the consent of gentlemen like Mr. Martin and Mr. Harrison, but he failed to see the point of their objection to his suggestion. It was simply to give greater dignity and authority to the prizes given by local associations, and to endorse the work of those societies that commanded the confidence of the district in which they existed.

Mr. Leigh said the President had assumed there would be twelve prizes, but that was not his intention; there would be only three, one for each year. The most successful youth would only get one prize or a certificate in each year.

The President said in that case the one prize would cover all four subjects, so that it would come to the same thing. The gentlemen would attend before the examiners having obtained a certificate for three succeeding years in the most important subjects, and it would be rather awkward for him if he failed.

Mr. Leigh said with regard to Mr. Schacht's observation about the books, he thought they should be such as would be useful to the apprentice in preparing for the succeeding year's examination. The great opposition to the scheme was with reference to the Curriculum Bill, but it might as well be admitted that that was still in the dim future, and it might be in the far away future; it might never become an Act of Parliament. This scheme would do perhaps in an imperfect way what the Curriculum Bill would do, and until that became an Act of Parliament he thought the Council could not do better than accept the suggestion.

The motion was then put as amended, referring the subject generally to the Committee, and agreed to.

Mr. Watt said he hoped the Committee would give special attention to the financial aspect of the question.

A New Pharmacy Bill.

Mr. Hampson said all members were aware that in the year 1883 the Council made an attempt to pass a comprehensive measure which he regretted was not successful. Since then two or three attempts had been made at passing a Curriculum Bill, which again had not been successful. Although he did not say they had been frustrated by the opinion of others, but by the events which controlled and influenced the legislature, not only in this department of the law which they wished to alter, but in all others, he, however, entertained a strong conviction that it was the duty of the Council still to see what could be done, and as President Lincoln said on a memorable occasion, to "keep pegging away," and for that purpose he had prepared a resolution which he would read, as it had been slightly altered according to a suggestion from Mr. Harrison:—

> "That the Law and Parliamentary Committee be instructed to take into consideration the advisability of framing a Bill to be introduced into Parliament to amend the Pharmacy Acts, the scope of the Bill to include the scheme of a curriculum; provision for giving Associates in Business the privilege of membership; the adoption of one title for all registered persons practising pharmacy; and a method by which all persons who pass the qualifying examination shall be entitled to membership, and any other provisions for making the Pharmacy Act of 1868 a more complete enactment of the principle laid down in the preamble."

It was not necessary to read that preamble, because the terms were general and comprehensive. In this effort he did not suggest the Council should cover the same ground as in the Bill of 1883, for he did not think there was the slightest chance of passing a measure which would prevent co-operative societies trading. He did not say it was absolutely hopeless that the Society might at some future time become sufficiently strong, and that public opinion might not so ripen with regard to this question, as to enable them to make the alteration then attempted, but he desired in the first place to put in the front of this measure the scheme of a curriculum. It seemed to him that it was the keystone of any legislation. If pharmacists had any claim upon the attention of Parliament, it rested mainly on their educational aptitude, and it was essential that they should be so educated as to meet the public demand. The next point he wished to refer to was the inclusion or incorporation of all associates now in business, and who entered the business after the Bill passed, in the Society. At present there were a comparatively small number of life members, pharmaceutical chemist members and chemist and druggist members, and he regretted to say that these were gradually but steadily diminishing. What would be the result if the decrease went on as at present? The Society would become a decaying and an absolutely decayed and effete body. The work of the Society was to be carried on mainly by pharmaceutical chemists, but if they diminished in number by the deaths of members, and those deaths would occur with accelerated speed, and the increase of pharmaceutical chemist members did not take place in the anticipated proportion, the Society would be simply left high and dry. It was essential therefore with reference to the economic arrangements and carrying on of the Society that the number of members should be increased. He therefore proposed that all associates in business should be raised to the position of membership. They were partially members, and had certain functions already. By this step the strength of the Society would be increased, and a greater proportion of those carrying on business brought in, and by so doing the Society would be made sufficiently strong to undertake any fresh legislative efforts which might be thought desirable when the time came. With regard to the next idea, that all registered persons practising pharmacy should hold one title, he confessed it was one of very considerable difficulty, but it had to be considered. There were at present chemists, chemists and druggists, pharmaceutical chemists, members of the Pharmaceutical Society, associates in business, associates by examination, pharmacists, pharmaceutists, dispensing chemists, family chemists, and sundry other titles. He did not say that the Committee would recommend this alteration, but at any rate it was worthy of consideration whether some simplification of title could not be effected. There were other matters of great importance which might be added to this Bill, and one he specially wished to lay stress upon. He found that in Ireland at the present moment the dispensing by chemists or pharmaceutical chemists was protected; it occupied something like the position that the sale of poisons did in England, and in every Bill, without exception, introduced in the colonies this matter of dispensing was protected or legislated for. In England, however, where legislation took place first, where much money had been spent and great exertions made for many years, not only without any recompense, but freely and voluntarily, chemists and druggists were absolutely without any legislative protection. He hated the word "protection," and wished he could find some other, but his meaning was they were not entitled specifically to exercise the calling of dispenser of medicine, and in this Bill he should like to include the clause which was included in the Bill of 1883. He did not wish to interfere with the dispensing by general practitioners; that was hopeless, but there ought to be some legal recognition of the chemist. There were many other points he might mention, but he earnestly desired that the Committee would take the matter thoroughly in hand. If not, the Curriculum Bill would not be passed, or anything else. Two or three years before 1883 Mr. Elias Bremridge framed certain suggestions with regard to the future of the Society in any legislative attempts which might be made, which, he thought, were well worthy of consideration, and he hoped a copy of those suggestions would be brought before the Committee.

Mr. **Harrison** seconded the motion, and desired to support it very strongly. It had been perfectly clear for several years that the Act of 1868 had not proved all that was expected of it. After twenty years' working, great anomalies had been discovered in it, such as would be naturally expected in an Act which was a compromise between a number of conflicting interests. Those conflicting interests had now come to a head, and the time had come when some definite step should be taken to remove them. He agreed with Mr. Hampson, that it was not desirable to attempt to stop the practice of pharmacy by co-operative societies, but it was quite possible for the Committee to frame a clause in such a way that all persons who practised pharmacy should do so under the same conditions. They should frame the principle laid down under a preamble that they proved themselves competent to carry out the work entrusted to them. He went for this enlarged scheme the more readily because he did not think it was possible—and the last two or three years must have proved that it was impossible—to pass a small scheme, even for a curriculum, unless some such scheme as this was embodied in it. If the Council went for a curriculum scheme which would provide for greater educational advantages, and at the same time give greater commercial advantages, the enthusiasm of both classes of members would be aroused. Those who placed greater reliance on the educational status of members would combine with those who looked for greater advantages from legislative provisions, and in that way, and in no other way that he could see, an amount of enthusiasm might be aroused which would enable them to pass a formal enactment, but without that he failed to see the slightest chance of obtaining any legislation at all. A Curriculum Bill, pure and simple, the great mass of members were almost entirely uninterested in, and would not support, but if the two were combined the whole body of members would rise together and support it. It was perfectly clear that if chemists and druggists laid before Parliament, as a combined body, the claim that men who exercised the same calling should be accorded the same amount of consideration in the exercise of that calling, Parliament sooner or later would grant what was asked, and he could not think that there was any moment more propitious than the present for obtaining such a measure. There was no great measure pressing on the immediate attention of Parliament, and if such a Bill was pressed during the next session, there would be a better chance of obtaining a careful hearing than if it was postponed for two or three years, when in all probability one or more questions of burning importance would be before the country in a very tangible form. He hoped, therefore, this resolution would be sent to the Parliamentary Committee in order that a Bill embodying all that was required and believed to be necessary for the protection of the public—not the protection of themselves, and nobody was more competent than they were to judge what was necessary for the safety of the public—might be presented to Parliament. If that were done he believed it would receive at all events careful consideration, if not absolute acquiescence.

Mr. **Richardson** had great pleasure in supporting the motion, and agreed with every word enunciated by both the proposer and seconder. He was particularly glad to hear the remarks of Mr. Harrison, representing as he did so very large a constituency of those who had not thought fit to join the Society, and who had hitherto been termed, perhaps somewhat improperly, "outsiders," and whom they all wished to get into the Society in some way or other. It had been frequently said that they had the opportunity of becoming members if they liked, but he knew a great deal about members in the provinces, and there was that guinea which always stood in the way. He would go a step further, and endeavour to get every member of the trade connected with the Society, in order that they might assist in returning members who should govern them in the conduct of their business. He hoped sincerely that some method might be arrived at by the Committee which would include the whole body of chemists and druggists all over the kingdom, that they might not only be a body in name, but a strong body, in fact able to carry future legislation. He was convinced it was not the slightest use attempting to pass a Curriculum Bill unless there was something behind it which would please the trade at large. He believed every man in Scotland would vote against the Curriculum Bill.

Mr. **Watt** said that was not so.

Mr. **Schacht** said he should very much like this motion to be carried, but he was afraid he could not quite follow those who had spoken in the opinion that the more that was added to the clauses of a Bill proposed to be introduced the more likely the Bill was to be carried. He had argued several times on the opposite side, and he would remind those who had used that argument that in the first year of its introduction into Parliament it was within an ace of being carried, having gone through everything but the very last stage, and having only been crowded out by the pressure of business during the last few weeks of the session. He doubted whether it would have stood such a chance had there been half a dozen other considerations included in the Bill. Still he did not think that was sufficient ground to exclude the consideration of this proposal from the Committee. The alteration proposed was very important, and he was not quite reconciled to the introduction of any matter other than what was included in the curriculum. The effort to make all the Bill a little more exactly in accord with the preamble would, in his opinion, be very useful indeed, and he should recommend that preamble to the careful study of every member. It said:—"Whereas it is expedient for the safety of the public that persons keeping open shop for the retailing and compounding of poisons, and persons known as chemists and druggists, should possess a competent practical knowledge of their business . . . be it enacted." That was extremely important, and anything which would serve to bring the Act in absolute accordance with those words would have his entire support.

Mr. **Atkins** said he should certainly vote for this motion going to Committee, but he did not agree with the mover and seconder in the opinion they held very strongly that they would succeed in carrying what they both admitted to be of primary importance, the educational portion of the measure, by weighting it with other matter. Members of Parliament to a large extent had been educated up to a certain comprehension and understanding of that subject, and it would be necessary to go through the same process of education right away from the beginning, if a large amount of matter which would necessarily be controversial were put on board the ship. Mr. Hampson admitted that on one point he saw great difficulty, a difficulty which he hoped would be solved, and he was quite prepared to let that question go to Committee, but he felt strongly that the keystone of the argument was the question of compulsory education. By slow processes he had arrived at that conclusion himself, and was very strong in the conviction that that must come first before other matters could be solved. It showed the enormous advance made since ten years ago, when many were determined to put down co-operative stores and other evils, but they found that events had been too strong for them, and they were not now going to enter on a crusade against those great bodies. The great question with him was this, that the Council was agreed on the curriculum, and he feared it would imperil the principle of compulsory education by loading the Bill with a large amount of extraneous matter, however important that might be.

Mr. **Hills** said he should like to support the motion, but he felt very much sympathy with the last two speakers, as to the advisability of adding other matter to the Curriculum Bill. Others, however, wiser than himself thought otherwise. It seemed to him the idea was to get the support of chemists generally by giving them all they wanted, for instance, giving associates in business the privilege of membership, but whatever might be thought at that meeting there would be a number who took a different view, and controversial matters would be immediately raised. The great point in presenting any Bill to Parliament was to present it with as little matter likely to be opposed by their own members as possible, and it seemed to him that the Council would be more likely to get a Curriculum Bill by going simply for that than by introducing extraneous matter. At the same time he was quite willing that this should be considered, and if, as Mr. Harrison said, and he could speak with great authority on these matters, by introducing these other points they could go as a combined body, if the 14,000 registered chemists and druggists would go in a combined body, there was scarcely anything but what might be got.

Mr. **Allen** desired to accentuate what had been said by Mr. Hills. He was perfectly in accord with the proposer of the motion in desiring that a matter of this kind should be submitted to a Committee, but he could not follow out the argument of Mr. Harrison that because the Bill had other things in it, it was more likely to be passed. Those present were nearly all committed to the theory that a Curriculum Bill was better unweighted by any controversial matter, and it always seemed to him unfortunate that in any desire they had for legislation for the good of the public at large they must always tread so hardly on the toes of some of their own friends, and he feared a Bill of the kind now advocated by Mr. Hampson would put an enormous strain on the loyalty of members of the Society and pharmaceutical chemists. In years past several attempts had been made to procure that united loyalty on the part of members and pharmaceutical chemists, and amid all the outcry this desire for the general good of the trade had to some extent prevailed. He could only hope now that if the Council went to Parliament with a Bill which must to some extent take away the particular rights which members of the Society and pharmaceutical chemists now enjoyed they would still have the loyalty of the whole body of the trade, and more particularly of their own members. If unity in that direction could be secured he was sure the Bill would get that attention in Parliament which it desired.

The **Vice-President** said he should be very sorry to offer any opposition to this question being considered in Committee, but it would be very undesirable that it should be relegated to the Committee with a foregone conclusion, and therefore he hoped the wording might be modified, and that in the third line, instead of the scope of the Bill including the scheme of a curriculum, it should state the subjects for the consideration of the Committee should be so and so. The motion involved the necessity of a Bill containing the whole of this matter or nothing. He was quite prepared to accept the curriculum, but not to adopt one title for all members practising pharmacy.

Mr. **Hampson** said he did not wish to bind the Committee in any one particular. He rather wanted on that occasion to gather an expression of opinion, but certainly not to tie the hands of the Committee.

Mr. **Martindale** said he had great sympathy with Mr. Hampson in his motion. The wish to consolidate the Society was certainly very laudable, but in doing so the position of those who had been examined must be considered. When the Pharmacy Act, 1868, was passed he was one of those who, having just passed the Major himself, felt that the desire of Mr. Hampson to get all who had passed the examination affiliated with the Society as members was hardly fair. The membership seemed to the outside public to give such a strong title, higher even than pharmaceutical chemist, chemist and druggist, or associate, that to confer that on the whole would be making the title of little service. Although membership might be granted to some extent, it would still be a system of confiscation to abolish the two grades which existed in the Society conferred by the Major and Minor examinations, unless the lower examination was brought up to the standard of the present Major. It would be even unjust if a title were conferred on those who had merely passed the Minor. The question was, did the public require a higher standard of examination? and he was somewhat inclined to doubt it. Chemists were required to carry on business in small country towns and villages, and it was also desirable to encourage a higher class of chemists who were engaged in large centres and big towns, so that they might be more on a par with their medical brethren. The object was not merely to grant a pass examination to retailers of poisons in small places, but to have a higher standard for those who would aspire to something higher. The examinations which had been conducted during the last twenty years had produced a great effect, and had raised the position of pharmacy very much, but they rather tended to produce a dead level. The mass had been elevated very considerably, but they had not the great lights they had in former times, and it appeared to him that the adoption of Mr. Hampson's view was going a considerable way on the lines of trade unionism. It was a good principle, as far as it went, to define their rights as much as possible, but there were still those who would aspire higher, and it was the duty of the Society as an educational body especially to encourage those who wished to attain a higher grade. If there was one title only those energetic spirits would be checked, or they would be driven outside the trade to obtain titles from other societies or corporations in such a way as to be detrimental to the interests of the Society. He could hardly agree therefore with the idea of one title for all persons practising pharmacy, but for the sake of consolidation should be willing to grant all associates in business the privilege of membership.

Mr. **Richardson** asked if Mr. Hampson objected to a higher title being given to a higher qualified man.

Mr. **Hampson** said he had no particular objection.

Mr. **Martindale** said the adoption of one title was part of the motion, and that he objected to. The only point he would be willing to concede would be the consolidation of the Society, so as to get as many as possible who were at present outside it to join by offering them membership if they chose, instead of the title "associates in business." Doing this would strengthen the position of the Society in going to Parliament, and for that purpose it would be worth doing. He should still, however, confine the title of pharmaceutical chemist to those who had passed the Major examination. He had thought over this matter very carefully, and he could not see his way to going further than he had indicated, which was, to a certain extent, a sacrifice of the interests of the Major men, but it was a sacrifice which it might be worth while to make in the interests of the whole body.

Mr. **Cross** said he should vote for the motion, and as in former years he had supported the idea of a Bill simply for a curriculum, he was very glad to see that that claim was the first mentioned by Mr. Hampson. At the same time he should attend the Committee with an open mind and see if other provisions could be embodied in the Bill which would be useful to the trade at large. The curriculum was better understood throughout the country now than it ever was before, and there was greater unanimity amongst all sections of the trade as to the desirability of its becoming law. Compulsory education, as well as compulsory examination, was now universally looked upon as the great want in pharmacy, and if any other provision was attempted to be added to the Bill which would jeopardize it he should vote against it, because the great difficulty in approaching Parliament was confessedly the want of unanimity amongst themselves. Mr. Martindale had illustrated one important point, namely, the appropriation of a title, and many people still held the view that having once obtained the title of pharmaceutical chemist it was unfair to confer that title on men who had not striven to gain it in the same manner. But there was another question which ought to be embodied in future legislation, and that was the qualification of the individual. With regard to fighting the stores *qua* stores he had no sympathy, but he did think it was unfair that men who were compelled to be examined should not have that protection which was alike good for the public and themselves in the pursuit of their calling. So long, then, as corporations employed qualified men he did not think they should find fault with them, and if they could embody that in an Act of Parliament it would be satisfactory to those who were seeking to enter the calling. All matters of detail he would leave for the present, but he hoped the Council would continue to knock at the door of Parliament until it obtained what was absolutely necessary to the trade—a Curriculum Bill.

Mr. **Robbins** thought it was most desirable to unite the whole trade into one body, but could hardly see that this motion was likely to accomplish that purpose. It appeared to him rather otherwise. It was always said that it was necessary to go to Parliament as a united body if there was to be any chance of passing a Bill; but it was now proposed to disfranchise 1700 pharmaceutical chemists, or to take away their privilege, and he did not think that was the way to get a united body. Again, if there were to be one title only there would be only one examination, for no one would go in for a second if he could get nothing by it. Mr. Hampson thought if this Bill were passed the whole trade would join the Society, but he could hardly see that. The Society could not be carried on without money, and so long as the guinea subscription was charged he feared it would always be a difficulty. If Mr. Harrison could get the whole trade to come and bring their guineas when the Bill was passed it would be a great motive for passing it, but he feared there would not be a very large accession.

Mr. **Harrison** said he did not intend to convey the impression that all would become members of the Society, but that all would join in obtaining a Bill.

Mr. **Watt** was extremely gratified with the reception this motion had met with. The process of education of the Council had been very rapid, and he was very much pleased to see it. It was very different from the reception accorded to a motion brought forward in Committee some time ago, and he cordially indorsed what Mr. Hampson and Mr. Harrison had said. He slightly differed from them as to putting the educational part first, and was rather disposed to put them together and to state that legislation appeared to him to be the most important. He hoped the fullest consideration would be given to the measure, and that no attempt would be made to strangle the motion. The expression of opinion in favour of going in for a large measure had been very strong, and he thought if a Curriculum Bill were to be passed, the only hope of doing so was in combination with a measure which would benefit the trade generally. He did not say such a Bill would unite all the trade, but the great body of chemists would join. With reference to the addition of members, the anomaly of that Society representing 14,000 chemists with only 3000 members was one which could not be remedied a day too soon. The title was a matter which might be easily solved. All it was necessary to do was to see that persons were qualified to discharge the duties incumbent on them. That was the first and should be the only consideration. If any persons chose to take a higher title, there was no objection, so far as the Society was concerned, but he did not think it was a matter for serious consideration, but rather one of sentiment. It should be encouraged, but it was not essential to the discharge of the duties of a chemist and druggist that he should be a pharmaceutical chemist. He could sympathize with the wish of those who had passed the measure that they should be recognized as such, and had no objection to give a higher title to those who went in for it. Like a previous speaker he did not like the word "protection," and he considered it was only fair play. That a man who was educated to a trade or profession should be put upon an equality with one who was not educated was not fair play. It was not protection any more than in the case of a medical man who could not practise without being qualified. He could not see how Parliament could refuse the reasonable request when the qualification of the individual was put as the ground on which pharmacists claimed the right to discharge the duties of their profession. He was decidedly of opinion that if 1800 or 1400, or even 1200 men went for a measure they would undoubtedly carry it, whatever government was in power, and he hoped nothing would stand in the way of their going in a united body to put the trade in a proper position before the country.

Mr. **Hills** said he should be very glad to hear definitely from Mr. Watt whether he was in favour of a curriculum or not.

Mr. **Watt** said he hoped the curriculum would be passed.

Mr. **Cross** also said he perfectly agreed that the only proper protection was the personal qualification.

Mr. **Newsholme** said now the motion was modified so as not to bind the Committee to the particular form of procedure, he could heartily support it. On previous occasions he had often referred to the question of associates having a standing on the Council, though he failed now to go quite so far as Mr. Hampson. But he did hope the curriculum would be put in the forefront of the Bill. He should not be prepared to go further with the next clause than giving associates in business the privilege of membership. If the Bill were confined to that he thought it would have the support of associates in business throughout the country who during the last session had done a considerable amount of damage to the Curriculum Bill. He believed their great ground of opposition was that they ought to have some better representation, and though it might be argued they could easily get that by passing the Major, as they were allowed to carry on business, he thought it was only right they should have, as they said, personal representation on the Council.

Mr. Watt said what he objected to was going for the curriculum alone. He did not object to it in combination with other matters.

Mr. Gostling was in favour of the motion being submitted to the Committee, but felt strongly with Mr. Martindale that the pharmaceutical chemist should retain his distinctive title.

Mr. Abraham said if there were one qualification the examination would have to be levelled up or levelled down. If it were to be levelled up all chemists would be made pharmaceutical chemists, and if it were levelled down it would simply remove from the pharmaceutical chemists their present exemption from jury service, which was a very valuable privilege. One gentleman said that so long as the assistant was qualified it appeared to be quite immaterial whether the principal was qualified or not, but he should be very sorry if it were to go forth that that was the opinion of the Council. He maintained that it was of the utmost consequence that the principal should be qualified. The assistant merely sold or dispensed drugs which were given to him by the principal, and if bad laudanum or opium were supplied him, the assistant had no means of finding out the inferiority of the articles. He strongly maintained, as he believed in accordance with the principles of the Pharmacy Act, that the qualification of the principal was essential to the proper conduct of the business.

Mr. Martin said it was with considerable pleasure that he saw this notice of motion on the agenda, because other members of the Law and Parliamentary Committee would remember that last year he emphasized very strongly the view that it was not desirable to go to Parliament for a Curriculum Bill alone. It was not necessary to-day to discuss in detail what the new Bill should contain. The motion simply implied that the Committee should entertain the idea of adding something to the Curriculum Bill, and with that explanation he most cordially supported the motion. Mr. Hampson said, with regard to the Curriculum Bill, it was not quite clear, even on that Council, that they were all united in desiring to keep it free from other matters, and he thought that was a fair reflection of opinion outside. It was clear that the trade were not with them with regard to the curriculum solely. He admitted it had the support of the *élite* of the trade, though there were exceptions even to that, and, on the other hand, there was a strong opposition to it. With regard to opening the doors of the Society to membership he could not conceive for a moment there could be two opinions as to the absolute necessity of taking that step. It was not only a question of arithmetic that the chemist and druggist members would soon be *non est*, but they knew also at the same time that in the course of perhaps twenty years, with an addition of perhaps about fifty qualified as pharmaceutical chemists, the management of the Society would be left in the hands of a mere handful, and that was not desirable. To remedy that, and if possible to make a great effort to get into the Society as members the large number of those practising pharmacy under the name of chemists and druggists, he wanted the doors open to admit them. He did not say with the guinea, or without the guinea. That was a matter for the Committee to decide, and it would require considerable thought. He hoped the Committee would meet shortly to consider this matter, and that a Bill might be framed which would meet with the support of something like the entire trade. It was a mere guess whether the curriculum would float with or without other matter. He was strongly in favour of a Curriculum Bill, and also strongly in favour of some additions being made to it, which he did not think would embarrass its progress.

The motion was then put and carried.

It was also resolved that the Committee should meet in the following week.

The Medicine Stamp Acts.

The President read a communication from Mr. Barnard S. Proctor, of Newcastle-on-Tyne, enclosing a memorial on the subject of the Patent Medicines Act, and suggested that it be referred to the Law and Parliamentary Committee.

Mr. Harrison said he was going to move that the memorial, which he believed had been sent to every member of the Council, accompanied with a circular on the same subject, be referred to the Parliamentary Committee.

Mr. Martindale seconded the proposal. He thought it was well worth consideration, for chemists wanted to know where they stood, and had been very much harassed by the Inland Revenue authorities, much more than they were in former years. He had been required to stamp certain articles which were held to be liable, though he held they were not, and in former years similar labels were exempt. It was never intended that such things should be included, and he did not like having to put a quack medicine stamp on these preparations. Of course, if it were held they were liable to duty he must submit to it, but he wished if possible to prevent all medicines from being included under the Patent Medicine Act. It had been explained by the President on a former occasion that this duty was not paid by them but by the public, but they certainly had to buy the stamps in the first place, and in addition to that many persons objected to buying articles bearing this stamp which had the appearance of being quack medicines.

The memorial was referred to the Law and Parliamentary Committee.

Medicated Wines.

The President said a communication had been received from the Executive of the North British Branch, enclosing a resolution asking the Council to approach the Board of Inland Revenue as to the conditions on which chemists might sell medicated wine, such as pepsine and coca, without infringing the law. He thought that might be sent to the same Committee. The answer given to the application was that any chemist and druggist might sell medicated wine, such as pepsine or coca, if a sufficient amount of pepsine or coca was put into it as to leave the wine a medicine and not a beverage; and he did not think there was much more to be done. The subject was not free from difficulty. It was not desirable to encourage pharmacists taking out licenses or to deal in all sorts of liquors of that sort. He believed the authorities were disposed to do anything which could be shown to them to be proper in the matter, but their attention had been called to the fact that large quantities of so-called medicinal wines were being sold. Their attention was called to that not only for the purposes of the revenue but by those who thought that the taking of wines and spirits was undesirable. It sometimes happened that just in proportion as people became publicly teetotal so they went to the pharmacist for more medicine than before, such medicines very often partaking of the form of alcohol or medicinal wines.

Mr. Harrison said he quite agreed it was very desirable that this matter should be considered, as it was also very desirable that pharmacists should not sell potable wines as medicines. It sometimes worked great moral evil, for many persons were induced to take wine who otherwise would not be led into it. Perhaps all that could be done was to ascertain what degree of medication would suffice to relieve wine of the excise duty.

Mr. **Gostling** said he knew one particular patent medicine, the name of which he mentioned, which was much used by teetotalers.

The **President** said that contained a fair amount of spirit.

Mr. **Gostling** said so he was told.

Mr. **Watt** desired to endorse what had been said about the undesirability of chemists having anything to do with a license.

The communication was referred to the Law and Parliamentary Committee.

APPLICATION FROM THE MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

An application from the Midland Counties Chemists' Association for a grant of £25 for the purchase of books was referred to the Library Committee.

ADDENDUM TO THE PHARMACOPŒIA.

The following letter from Dr. Quain on the subject of the Pharmacopœia was read:—

"General Council of Medical Education and Registration of the United Kingdom,

"299, Oxford Street, London, W.

"December 3rd, 1889.

"To the President of the Pharmaceutical Society of Great Britain.

"Dear Sir,—The General Medical Council having decided to publish in the course of the ensuing year an addendum to the British Pharmacopœia, 1885, with the view of introducing new substances which may have received the general approval of the medical profession, have given authority to the Pharmacopœia Committee of the Council to make the necessary arrangements for carrying this object into effect under the direction of the Council.

"I need scarcely say that it is of the utmost importance to obtain accurate information as to which of the comparatively new medicines and compounds possess well-recognized medicinal value, and the Committee are seeking the co-operation and assistance of the various medical authorities with the hope of obtaining this information.

"And as to the manner of preparing or defining the medicines and compounds, the Committee are instructed to invite opinions from the members of the Pharmaceutical Societies of Great Britain and Ireland, and of pharmacists generally, through the councils of those societies or otherwise.

"But as regards these matters of practical pharmacy in connection with the Addendum, the Committee would gladly avail themselves of the special resources of the Pharmaceutical Society of Great Britain, in their Library, Museum, and Laboratories, and have desired me to request the assistance of the Council of that Society in this pharmaceutical direction.

"I have, therefore, on behalf of the Committee, to ask you to submit this communication to your Council and to express the hope that the Council will comply with our request for opinions and assistance in the directions indicated. In that case the list of suggested articles when in form would be forwarded to you. I may add that the reporter on the British Pharmacopœia to the Medical Council, who is charged with the general editorial arrangements, would be authorized to co-operate in any way that may be desired by the Pharmaceutical Society.

"I am, yours faithfully,

(*Signed*) "Richard Quain, M.D.

"*Chairman of the Pharmacopœia Committee.*"

The **President** suggested that he should be authorized to send a reply saying that the Council would be willing to render the assistance required and would be prepared to appoint a Committee in due course.

A resolution to this effect was passed unanimously.

CORRESPONDENCE.

The **President** read a letter which had been received from the Liverpool Chemists' Association enclosing a resolution passed at a special meeting with regard to the recent prosecution of an assistant for selling poison.

Another communication on the same subject had been received from one of the divisional secretaries—Mr. Nind. He thought he might convey to him in reply that his suggestion would receive in due course the consideration of the Parliamentary Committee.

GENERAL PURPOSES COMMITTEE.

The report of this Committee, which was taken in Committee, included the usual report from the Solicitor, stating the progress made with cases which had been placed in his hands. In one case judgment had been given against a defendant who had since filed a bankruptcy petition. As already reported in the Journal judgment had been given against the defendant in the Battersea sale of poison case, but notice of appeal had been received, and copies of correspondence which had passed between the solicitor of the Society and defendant's solicitor were enclosed. A letter had been received also from the defendant's employer asking whether the Council would accede to an arrangement for each side to pay its own costs in an appeal. It was recommended that the Secretary be instructed to reply to the effect that the Council is acting ministerially, and that it does not appear fit and proper that the usual course of procedure in the Courts should be departed from.

Several other cases of alleged infringement of the Pharmacy Act had been considered by the Committee, and it was recommended that proceedings be taken.

On resuming the report and recommendations of the Committee were received and adopted.

BENEVOLENT FUND GENERAL MEETING.

ELECTION OF ANNUITANTS.

A General Meeting of the Members and Associates of the Pharmaceutical Society and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Thursday, December 5, at 12 o'clock, for the election of **Four Annuitants**.

Mr. **Alexander Bottle**, Vice-President, in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, who examined the voting papers and brought up the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the twenty-fifth election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following result:—

Mumbray, Henry G.	5482
Edwards, Hannah C.	5200
Pitman, Emma	4392
Copney, William	4182
Spendelow, Mary E.	4144
Brown, Eliza	2717
Davis, Samuel Forbes	2402
Suggate, Henry E.	494

*3660 voting papers were received, of which number 96 were informal (59 unsigned and 37 incorrectly filled up, representing a total of 272 invalid votes) and were disallowed.

W. K. Hopkin, *Chairman*.

R. O. Fitch.
John Butterworth.
J. T. Tupholme.
H. Bate.
Snowden Kirk.
Richard Thomas.
W. Prior Robinson.
Edward B. Stamp.
Ralph Hall.
H. Bowman Spink.
T. O. Sandell.
E. L. Hickey.

Henry Long.
T. Howard Hall.
John Morris Broad.
Geo. B. Hatfield.
Wm. Gulliver.
J. C. Hyslop.
F. T. Silvers.
John Goodwin.
H. F. Austin.
J. Carter.
Edwd. Cullinan.

December 5, 1889.

The Vice-President then declared the following four duly elected Annuitants:—

Mumbray, Henry G.
Edwards, Hannah C.
Pitman, Emma.
Copney, William.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the twelfth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on Wednesday, November 27, at 9.15 p.m., Mr. A. Russell Bennet, President, in the chair.

The minutes of last meeting having been read and approved, the Chairman called upon Mr. Hill, in the absence of the author, to read the following communication on—

Our Vegetable Extracts.

BY PETER MACEWAN.

After a few introductory remarks, in the course of which the writer referred to decoctions and infusions and their probable future, he proceeded to say that the aim of extraction is to obtain the active principle of a drug, in its natural state, if possible, in a solution which will retain its activity and not deposit any of its valuable constituents on keeping. It is not possible, without introducing strictly chemical processes, to obtain the active principle alone; it is necessary to take along with it the "extractive," that being the name for all sorts of substances of which we know little, and of many of which we know nothing. Even our knowledge of active principles is limited to a small number of drugs; consequently we are compelled to take out of most drugs all that will dissolve in the menstruum employed. Obviously the best time to achieve this object would be when the drugs are in a fresh condition, for the active principles are in most instances dissolved in the plant juice, or the juice may be saturated with the principle, while some of the latter is also deposited in the tissues. In both cases the substances are, while in the moist state, better fitted for extraction than when dried. The process of drying cannot be without effect on vegetable principles—the most delicate compounds with which we have to deal.

We take too little advantage of fresh drugs in our pharmaceutical practice. Why, for instance, should we not make the tinctures of belladonna and henbane from these drugs before they are subjected to a process of exsiccation, which is certain to injure the extremely delicate principles to which they owe their activity? The instances in which we do use fresh drugs are not assuring of our regard for the superior virtues of such drugs; as it happens that in most cases the preparations are but little used, or are employed as pill excipients and placeboes. The writer proceeded to advocate a closer study of fresh drugs, and then commented on the treatment of dried drugs before they are brought in contact with menstrua. As a rule, we are apt to powder drugs somewhat too finely. This is not a disadvantage for simple maceration, but for percolation fine powders are more of a loss than a profit. Insufficient swelling, bad packing, and other causes tend to impair the process of percolation, and too fine a condition of the drug is an aggravation. We may employ fairly coarse powders, and given a period for thorough maceration, there is little reason why we should use in any case powders of greater fineness than No. 20.

The methods of extraction were next referred to. Maceration he said is a process which is not suitable for the preparation of solid or liquid extracts, because it requires an amount of menstruum relatively large to that of the drug. That is a circumstance which is distinctly unfavourable for extracts, because it means evaporation more prolonged than it need be. It is the process, nevertheless, which the Pharmacopœia employs in most cases. On the other hand, it is very little used—exclusively used—in the preparation of tinctures. There are only eight instances, apart from cases of simple solution, in which maceration is exclusively used for the preparation of tinctures.

In the case of the thirty-two 1-in-8 Pharmacopœial tinctures made by percolation—not to mention the 1-in-10, and even 1-in-27 ones—percolation is unnecessary—indeed it has by experiment been proved to be so, and that a week's maceration is more effective than percolation, so far as tinctures are concerned. The objectionable feature of the Pharmacopœia process is that it is neither one thing nor the other; the maceration is not continued sufficiently long, and the conditions of percolation are not on the correct lines, and rather favour loss of spirit. The whole process might be improved on modern lines; but the necessities of the case only require all the tinctures weaker than 1-in-5 to be made by simple maceration for eight days, the drug being kept suspended in the spirit. The weakness of our official percolation process as applied to tinctures is the use of so much menstruum for preliminary maceration. The proper plan to pursue would be to moisten the drug with half its weight of menstruum, allow to swell, then pack in the percolator, and continue to percolate with the remainder of the menstruum. The drug is exhausted long before the half of the menstruum is used.

Speaking of standardization, the writer advocated that something in the nature of characters and tests should first be introduced into the Pharmacopœia. We should have notes on colour and odour, and factors about specific gravity and percentage of extractive matter. In the absence, and even in the presence of well-characterized principles, such factors as these are a good indication of the quality of the preparation.

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* 5679 voting papers issued.

In regard to fluid extracts, the writer said that they are, in a sense, concentrated tinctures. There is not a single Pharmacopœia preparation of this class, except liquorice, which has not a faulty formula. In the case of cimicifuga and coca the faults of the tincture-percolation process are present in an exaggerated degree. We take 20 of drug, macerate in 40 of spirit, then transfer to a percolator, and collect the first 15 of the filtrate—we do not get a percolate when we work in this way. What we ought to do is to moisten 20 of the drug with 10 of spirit, allow to stand for some time, then pack and percolate. In this way there is some hope that the first 15 ounces will really be so much stronger than what follows it that there is some reason for reserving it. Cascara sagrada and black alder extracts have very poor formulæ. Sarsaparilla and fluid taraxacum would be much better if there was not such a prodigal waste of spirit. Why not treat 40 parts of each with 20 of spirituous menstruum; then pack in a percolator, displace 20 ounces with water, and use the subsequent aqueous percolate for evaporation? Ergot is a notorious example of blundering. This extract will never be right until we stop heating it.

In the remaining portion of the paper the writer dealt with solid extracts, confining his remarks to concentration by the different methods of evaporation now in use, viz.:—(1) Evaporation in open steam-pans; (2) evaporation *in vacuo* at a temperature varying from 30° to 40° C.; (3) concentration by freezing and subsequent evaporation of the concentrated liquid at a low temperature. The apparatus employed in each section was described, a few historical comments being given to show the advances which have been made during the past sixty years.

The Chairman, in moving a vote of thanks to the author, which was awarded with acclamation, said he was sure they all agreed with him in feeling that they were much indebted to Mr. MacEwan for the continued interest he showed in their work and for this interesting and suggestive communication. The subject was one of much practical interest, and they would have observed that it had made its appearance in one form or another at almost every Conference meeting in recent years. He agreed with the opinion that it would be an advantage to have in the Pharmacopœia some characters and tests for galenical preparations. There was also no doubt that by improved formula for official preparations much might be done in the way of preventing waste of spirit.

Mr. Lunan, in seconding the vote of thanks, said the scope of the paper was more extensive than the title indicated, and included the whole question of the exhaustion of drugs. He thought it was a good thing to have galenical preparations as near a uniform standard as possible, but he did not see how this agreed with the author's proposal to use fresh drugs. These varied very much in the percentage of water they contained, and there would be a corresponding variation in the products. He was much interested in the elegant and scientific method of preparing extracts by freezing. He thought they must admit that in many respects the French pharmacists were in advance of their British *confrères*.

Mr. Duncan said it might be quite true that it would be best to make galenical preparations from the fresh drugs, but he thought one great difficulty in the way would be the fact that they could not be obtained in a fresh state, except at one season of the year.

Mr. Drummond said there was undoubtedly great room for improvement in the direction of adjusting the menstruum to the drug, and this subject offered a wide field for experiment. There was one point suggested by the paper, and that was that the constitution of the Pharmacopœia Committee was much too narrow. It consisted of only three persons. He thought it should be much larger, and ought to include several practical pharmacists as well as medical men.

Mr. Dougall said he thought the author was correct in saying that there was a tendency to carry the powdering of drugs much further than was at all necessary. He could also confirm his adverse criticism on the official process for percolation. If the drug were simply moistened with sufficient menstruum to cover it, then packed in a percolator and more menstruum poured on, it would often be found that the percolate would come through almost as thick as syrup, and the drug would be completely exhausted long before the whole of the menstruum had been used.

Mr. D. McEwan said he thought the suggestion that official tinctures, etc., should have characters and tests given was a valuable one.

Mr. Hill said Mr. Lunan's objection that fresh drugs varied in percentage of water could be met by following the method adopted in the Homœopathic Pharmacopœia, namely, drying a portion of the drug so as to determine the percentage of water, and then taking a weight of fresh drug equal to a constant weight of dry drug, counting the water in the drug as part of the water required to make up the proof spirit menstruum. He could not say he entirely agreed with the author as to allowing the manufacture of galenical preparations to pass into the hands of large manufacturers. If that was to be the case how were apprentices to be trained in practical pharmacy. He had recently met with a case which seemed to support the view that fluid extract of cascara became inert when long kept and exposed to the air.

The Chairman reminded members of the Annual Conversazione on December 13, and intimated that an excellent concert programme had been arranged. He also intimated that next meeting would take place on December 11, when papers on "Ext. Cascaræ Sagradæ Liquid," by John Findlay, and "Seidlitz Powders," by J. H. Hoseanson, will be read.

The meeting then closed.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The fourth meeting of the session was held on Thursday, November 28, in the Society's Rooms, Colquitt Chambers, 6, Colquitt Street, the Vice-President, Mr. J. R. Johnson, in the chair. A very pleasant evening was spent in listening to a selection of songs, recitals and pianoforte solos, ably rendered by several lady friends and members.

The next meeting will be held on Thursday, December 12, when a paper will be read by the President, Mr. H. Wyatt, on "Some Dry Reactions of Simple Salts." There will also be a discussion upon the sale of poisons question.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second "Musical Evening" took place in the Association's Rooms, 74, Commercial Street, on Thursday, Nov. 28. There was a large attendance of members and others. The Vice-President occupied the chair.

The arrangements of the evening were in the hands of Mr. T. C. Henderson, who provided an excellent programme of both vocal and instrumental music, also one or two readings and recitations, and altogether a verg pleasant evening was spent, and the usual votes of thanks brought the meeting to a close.

The next meeting of the Association takes place on

December 12. The work on the syllabus is "Short Papers by Members." These have been arranged by the Secretary, Mr. T. C. Henderson, and are as follows:—1. Short Note on Pill Coating, by Mr. Isaac Hyslop. 2. Short Note on Infusions, by Mr. R. M. Lindsay. 3. An Improved Formula for (*a*) Lotio Hydrargyri Nigra, (*b*) Lotio Plumbi c. Opio, by Mr. T. C. Henderson.

The apprentices' prize essays will also be read.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the session was held in the Music Hall, on Friday, November 29, Ex-Bailie-Paterson in the chair. The subject for the evening was a lecture by Mr. W. L. Howie (Barron, Harveys and Co.), entitled "Ten Days on the Hardanger." The lecture was delivered in a very lucid and graphic manner, each point of interest being illustrated by a dissolving view taken by Mr. Howie himself. Ninety-six views in all were exhibited, many of them being enthusiastically cheered, one view especially, showing the interior of a Norwegian pharmacy, received unstinted applause.

There were about 400 ladies and gentlemen present, and the prolonged applause bestowed on the lecturer at the close indicated the great amount of pleasure he had given.

Mr. Paterson moved a vote of thanks to Mr. Howie, which was heartily responded to. Mr. Curtis having paid a similar compliment to the Chairman the meeting closed.

At the next meeting Mr. Clark will read a paper on "Volumetric Analysis," giving experimental illustrations.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

(*Concluded from page 433.*)

Phosphoryl Trifluoride. By T. E. Thorpe, F.R.S., and F. J. Hambly.—The authors find that phosphorus oxyfluoride, POF_3, may be easily and conveniently made by heating a mixture of cryolite and phosphoric oxide, and collecting the products at the mercurial trough. The interaction appears to be strictly analogous to that by which Kolbe and Lautemann obtained phosphorus oxychloride by heating phosphoric anhydride with common salt; $2P_2O_5 + 3NaCl = POCl_3 + 3NaPO_3$ (*Ann. Chem. Pharm.*, cxiii., 240).

Acetylation of Cellulose. By C. F. Cross and G. T. Bevan.—By heating cotton cellulose with acetic anhydride and zinc chloride (Frachimont, *Ber.*, 12, 2059), the authors have obtained a product which, judging from the results of analysis and the proportion of acetic acid which it yields when submitted to alkaline hydrolysis, appears to be a *pentacetyl* derivative of cellulose; the yield was found to be 83 per cent. of that calculated for a pentacetate, and the insoluble product of hydrolysis exhibited the behaviour of a normal cellulose. The compound is very stable, being reprecipitated unchanged from its solution in a mixture of nitric and sulphuric acids. It would appear therefore that all the oxygen of the cellulose molecule acts as hydroxylic oxygen. In discussing the bearing of these results, it is pointed out that the evidence upon which substitution of OH in the cellulose molecule has been assumed to be at a maximum with the triacetate (Schutzenberger) and trinitrate, is insufficient. Franchimont's representation of the molecule of cellulose as an aggregate of "glucose" groups, condensed according to the equation

$$n(C_6H_{12}O_6)—(n—1)H_2O$$

is based upon strong evidence, but affords no suggestion of the mode in which the condensation takes place. The extreme inertness of cellulose, as evidenced by the fact that it does not interact with acetic anhydride at its boiling point, but only at a temperature of 180°; its resistance to the powerfully hydrolytic action of acid sulphites at high temperatures; together with the results detailed in this communication, go to show that it is probable that cellulose represents a type of carbon compound *sui generis*.

Dr. Armstrong remarked that present ideas as to the constitution of cellulose are mainly an extension of our views concerning carbohydrates of the cane-sugar and dextrin-groups; we are accustomed to regard these latter as etheric-derivatives of the glucoses, and to look on cellulose as a compound of a somewhat similar type. But its physical properties, its behaviour on acetylation, and the peculiar condition under which alone it undergoes hydrolysis serve to indicate that perhaps it is a compound of a different and special type, as the authors of the paper suggest may be the case. In seeking to formulate the constitution of cellulose, the possibility that it may even be a closed chain compound should not be entirely overlooked, the occurrence of compounds such as inosite and quinic acid—both derivatives of hexhydrobenzene—in plants being not without significance from this point of view.

Action of Light on Moist Oxygen. By Arthur Richardson.—The author finds that the presence of liquid water very much facilitates the oxidation of many substances under the combined influence of sunlight and oxygen. If, however, the water is present as aqueous vapour, the decomposition is exceedingly slow, and in some cases is entirely arrested. He finds that peroxide of hydrogen is formed when water containing pure ether is exposed to light in an atmosphere of oxygen; on shaking some of the ether with a solution of potassium bichromate, the ether at once assumed a decided blue colour. From an extended series of experiments the following facts have been observed:—(1) The amount of hydrogen dioxide formed depends on the proportion of ether to water present. (2) No dioxide is formed when a mixture of water vapour, ether vapour and oxygen is exposed to sunlight. (3) No dioxide is formed when water and ether are exposed in an atmosphere of carbon dioxide. (4) No iodine is liberated from potassium iodide by a mixture of water, ether and oxygen from which light has been excluded. On exposing pure water, acidified with pure sulphuric acid, to light, hydrogen dioxide was found in the solution; this was estimated by permanganate of potassium. Water exposed to rays of low refrangibility gave no hydrogen dioxide. On placing water which contained the dioxide, immediately after exposure to light, in the dark, it was found, after some time, to be free from dioxide; but hydrogen dioxide was formed on again exposing the solution to light; this process could be repeated indefinitely. From these and other experiments the author is led to believe that the oxidation of substances under the influence of light involves in many cases initially an oxidation of water to hydrogen dioxide, and that the oxidation of the compound is the result of a secondary interaction between it and the hydrogen dioxide.

Dr. Armstrong said that it had long since been stated that peroxide of hydrogen was formed when ether and water was exposed to atmospheric oxidation. Mr. Kingzett had brought the subject under the notice of the Society several years ago (cf. *Chem. Soc. Journ.*, Abstr., 1877, p. 183). Dr. Richardson assumed that the water was directly oxidized; Mr. Kingzett had argued—and in the case of turpentine had adduced weighty experimental evidence—that the hydrogen peroxide was a secondary product, formed by the action of water on an organic peroxide. It was impossible to say from Dr. Richardson's results which explanation was the correct one; perhaps neither was wholly correct, as it was not impossible that the conjoint influence of the water and ether was an essential feature of the interchange with oxygen. Dr. Richardson had added ether or sulphuric acid with the object of protecting the peroxide from decomposition; surely weak solutions of hydrogen peroxide were not so unstable that proof could not be obtained of its formation if it really were produced on exposing water and oxygen to light. There was no satisfactory evidence that it was formed in the absence of a third substance. In the case of the experiments made without ether, it was just possible that the minute amount of organic matter present in the water—perhaps that derived from stoppers—had been effective in promoting peroxidation; the disappearance of the peroxide in the dark tended to favour this view.

Professor Thorpe said that he had recently had occasion to satisfy himself that water played an important part in promoting peroxidation. It had long been known that the atmospheric so-called ozone reactions were at least principally due to hydrogen peroxide. Finding in the Admiralty instructions the statement that the air of the Hebrides was said to contain more ozone than any air in the world, he had during a recent yachting tour there exposed Schönbein paper at various distances above sea level. He had always found that after six hours' exposure the "ozone" manifestations were very much stronger 5 or 6 feet above the sea than some distance above the sea, at the mast-head of the yacht.

Professor Ramsay drew attention to the fact that when a substance capable of destroying hydrogen dioxide was present, the peroxide might be formed and immediately thereafter destroyed. Such was probably the case in polluted rivers; and it might well be that the continual formation and decomposition of hydrogen peroxide was the effective cause of the oxidation of organic matters in waters. Its formation apparently tended towards a maximum, which in presence of matter capable of decomposing it would never be reached.

Mr. Groves remarked that weak solutions of hydrogen peroxide were by no means unstable, but would keep for months.

Professor Dunstan asked whether Dr. Richardson had proved that the oxidizing substance was hydrogen peroxide. He had made a series of experiments which showed that it was not formed when *pure* ether was used, although a substance was produced which was capable of liberating iodine.

Dr. Thorne, referring to the possible effect of a third substance in influencing oxidation, said that he had had occasion to observe that in bleaching coloured fibres a solution of 75 per cent. strength of hypochlorite in presence of oxygen gave the same results as one of 100 per cent. strength used alone.

The question was asked whether the precaution had been taken in the experiments with potassium iodide to exclude carbon dioxide from the air.

The President said that in experiments which he and Captain Abney had made together on the fading of water colours, the action of aqueous vapour had been most strikingly apparent; colours were found to be stable on exposure to light in dry air which were considerably affected when aqueous vapour was present.

Dr. Richardson, replying, said that the bichromate test indicated that the substance formed in presence of ether was hydrogen peroxide. Using pure water, he had obtained traces of peroxide, which, however, could not be estimated. In some cases the bottles in which the exposure to light was effected were provided with glass stoppers. He thought that very little was known as to what happens when iodine separates from potassium iodide: the solution does not exhibit an alkaline reaction.

αβ-Dibenzoylstyrolene and the Constitution of Zinin's Lepiden Derivatives. By FRANCIS R. JAPP, F.R.S., and FELIX KLINGEMANN, Ph.D.

Ethylic $\alpha\alpha_1$-diacetyladipate. By W. H. PERKIN, junr., Ph.D.

Action of Dehydrating Agents on α-ω-diacetylpentane. Formation of methylethylhexamethylene. By F. STANLEY KIPPING, Ph.D., D.Sc., and W. H. PERKIN, junr., Ph.D.

Action of Reducing Agents on α-ω-Diacetylpentane. Formation of Dimethylheptamethylene. By F. STANLEY KIPPING, Ph.D., D.Sc., and W. H. PERKIN, junr., Ph.D.

Oxyamidosulphonates and their Conversion into Hyponitrites. By EDWARD DIVERS, M.D., F.R.S., and TAMEMASA HAGA, F.C.S.

The Alloys of Lead, Tin, Zinc and Cadmium. By A. P. LAURIE.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, Nov. 28, Mr. E. White, Vice-President, in the chair.

The first paper read was on "Joule and his Work" by Mr. H. W. K. Pears, who gave a sketch of the life of the eminent physicist and described his principal contributions to science; more particularly the experiments by which he determined the mechanical equivalent of heat were described in detail and illustrated by diagrams.

After a discussion on Mr. Pears's paper a report on Materia Medica was given by Mr. A. E. Chaston. The subjects dealt with comprised the production of iodoform from acetone; the composition of oil of ground nut and the distinction between oleic acids of animal and vegetable origin; salicylates of mercury; mandragorine, an alkaloid obtained by Herr Ahrens from mandragora root; a test for the purity of cocaine, proposed by Dr. Stockmann, which consists in heating with strong hydrochloric acid, when, if pure, only a yellow colour is produced, while the presence of isatropylcocaine produces a brown or black colour; the relative activity of different kinds of "digitalin;" and the composition of senegin, the glucoside of *Polygala Senega.*

The report gave rise to a discussion in which the Chairman, Secretary, Messrs. Ough, Smith, Pears, and Sherlock took part.

The following short note was then read by Mr. E. Le Cudennec.

NOTE ON "LIQUOR MAGNESII CITRATIS."

The B. P. method of preparing this liquor consists in dissolving carbonate of magnesia in a solution of citric acid, adding syrup of lemons, and lastly crystals of potassium bicarbonate just before corking the bottle; on shaking the mixture solution of the crystals is effected.

The method which I have been accustomed to employ in Mauritius presents two advantages.

I. Economy of time, which is a consideration in view of the fact that this preparation has generally to be prepared extemporaneously.

II. The compounder is exposed to less risk from the bursting of faulty bottles.

Into the bottle introduce the bicarbonate of potassium in powder; on this pour the syrup and then gently the solution of magnesium carbonate in citric acid (prepared as the Pharmacopœia directs). The syrup forms a stratum between the bicarbonate and the acid solution, preventing reaction whilst the cork is inserted and secured.

The bottle is then enveloped in a cloth and slowly shaken.

I employ simple syrup in place of the syrup of lemon, adding a few drops of tinctura limonis recentis before corking. An equally good product with an economy of time, to the extent of about six minutes, is secured by this modification.

A question as to the removal of marking ink stains was raised by Mr. Ough and discussed by Messrs. Cranstone, Sherlock and Smith.

The Secretary announced that the Executive Committee had appointed the following Committee of Reporters on science:—

Pharmacology, Miss M. E. Buchanan; Practical Pharmacy, Mr. F. C. J. Bird; Botany, Mr. R. H. Norman; Materia Medica, Mr. A. E. Chaston; Physics, Mr. E. J. Eastes; Organic Chemistry, Mr. A. C. Stark; Inorganic Chemistry, Mr. L. W. Hawkins; Analytical Chemistry, Mr. C. G. Willsher.

The meeting then adjourned.

Obituary.

Notice has been received of the death of the following:—

On the 21st of November, Mr. John Bonny, Chemist and Druggist, Market Street, Blackpool, Lancs. Aged 43 years.

On the 27th of November, Mr. John Mead Frank, Chemist and Druggist, late of Shaw Street, Liverpool. Aged 50 years.

On the 27th of November, Mr. William Boden, Chemist and Druggist, Exmouth Villas, Teddington. Aged 56 years.

On the 1st of December, Mr. William George Jackson, Pharmaceutical Chemist, Northgate, Hartlepool. Aged 78 years. Mr. Jackson had been a member of the Pharmaceutical Society since 1842.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Sale of Medicated Wines.

Sir,—With reference to the medicated wine question, which has been under discussion by the N. B. Executive, perhaps the enclosed letter that I have just received from the Board of Inland Revenue may be of interest.

It was reported that in certain districts of Scotland chemists were threatened with prosecution, by officious and over-zealous excise officials, for selling, among others, pepsine wine, without holding a wine license.

To test the matter, I prepared a list of all the Pharmacopœial wines, along with pepsine wine, giving strength, wine used, and dose, and forwarded the same for advice to the Board of Inland Revenue, Somerset House. I received a prompt, courteous reply, requesting me to send full recipe for pepsine wine, a label, price at which it was retailed, along with a sample of the wine for analysis. To all of these particulars attention was given in my reply note. The recipe given was as follows:—

Pepsine	320 grains.
Hydrochloric acid (strong) . . .	2 drachms.
Sherry wine	1 pint.

Dose: One or two teaspoonfuls once or twice a day.

It is the reply received to this communication which I forward for publication.

Chemists interested in the sale of other medicated wines, coca for example, might with advantage do as I have done.

Dunfermline. JOHN H. FISHER.

[*Copy.*]

"Inland Revenue,
"Somerset House, London, W.C.
"29th November, 1889.

"Sir,—In reply to your letter dated the 16th instant I am directed by the Board of Inland Revenue to acquaint you that they have instructed their local officers not to interfere with the sale by you, without license, of the medicated wines mentioned in your letter, including the 'pepsine wine,' so long as its present composition is retained.

"I am, Sir,
"Your obedient servant,
(*Signed*) W. B. HEBERDEN,
"Mr. John H. Fisher. "*Assistant Secretary.*"

Lime Water.

Sir,—Permit me to briefly reply to the letter of Mr. A. C. Abraham in Journal of 30th ult.

If he refers to my paper again he will find the conditions mentioned under which a supersaturated solution of calcium oxide can be obtained, he will also find by reference to the table that I did not obtain a commercial specimen of that strength, and neither do I think that such could be maintained under the ordinary circumstances of the pharmacy.

My remarks upon the point are based upon a paper appearing in *Pharm. Centralh.* (vol. xxvi., pp. 442-446 and 455-457), by A. Goldammer. An abstract appears in *Journ. Soc. Chem. Ind.* (vol. v., p. 450), from which I take the following quotation:—"A large number of experiments show that while calcium oxide possesses in a marked degree the property of forming supersaturated solutions, calcium hydroxide does not. Solutions supersaturated at a low temperature contain about 2·4 grams per litre."

A paper in the *Journal of the Chemical Society* for 1888, page 500, gives the solubility of CaO in water at 19° C. as 1 in 640, or about 1·37 grains per ounce.

I think it would be a decided advantage to your readers if Mr. Abraham, instead of "confidently predicting," would practically ascertain the truth of these statements and then give the facts.

By a further reference to my table it will be observed that samples of lime water requiring oxalic acid in excess of B. P. figures did contain traces of impurities; in one instance chlorides, in the other magnesium. I have never analysed a sample containing any large quantity of potash or soda.

The method adopted by Mr. Abraham in using his lime continuously for making lime water yields him different results to what it has me, although he does not state whether the lime water is drawn off soon after making, or only as required for use; as, on the authority of Lamy the longer the lime and the water remain in contact, the less calcium oxide is dissolved.

I have carefully read Mr. Abraham's paper in volume xiii. of the *Pharmaceutical Journal*, and do not see that it bears upon the points at issue in his letter; he there recommends washing the lime, a point mentioned by the Pharmacopœia, and also emphasized in my paper.

T. A. ELLWOOD.

Sir,—As far back as the year 1850, in the *Pharmaceutical Journal* of that year (vol. ix., 1st series) data were given, comprised within seven lines, which to one who deserves the title of "chemist" are enough that he may ensure a continuous supply of lime water of the standard strength and goodness.

Why are we ordered to waste a lot of "Holy Water" in cleaning a nasty impure article, when this may be obtained ready for our use free from all impurities whatever?

I make always quite 50 gallons of liq. calcis from a pound of lime. Why should I not, seeing that I use pure calcis hydras, prepared for me by the manufacturing chemist, and aqua pura bright and fresh, usually drawn over by myself? I could even, in such cold weather as this is, imitate successfully the prevalent mountebankism and advertise liq. calcis conc. one, two, or even three, without fear of the consequences.

With respect to the uncertainty in the value of lime water the pharmacist is much to blame—the pharmacist of yesterday, I mean, because he paid too much attention to the dispensing doctor of the day before. This old-fashioned specimen used to send his errand boy to run and catch what he could of calcium oxide from a passing builder's cart, tumble it into a pailful of ordinary water, stock it in the black bottles round the top of the shop—so as to keep it warm—and take his ease.

I would not, Sir, mention these facts but for another, that even now the poor people in some parts of London are advised by their benevolent medicus to get a lump of lime and stir it in a few quarts of water, to be used for mixing with baby's food, instead of buying it at what is branded as an exorbitant price, *4d.* or *6d.* a pint.

What should we have been without the Pharmaceutical Society? Well, none can tell what would have been, if what is was not; the sheet anchor this, it seems to me, of these who, with such beautiful simplicity, are ever asking "What has the Pharmaceutical Society done for us"?

J. C. HYSLOP.

ALLIUM SPHŒROCEPHALUM.

Sir,—I may perhaps be allowed to remark, with reference to the botanical notes just published by Messrs. Baxter and Balkwill, that the Allium they mention as growing at the Lizard and elsewhere on the Cornish coast is not *A. sphærocephalum*, L.

The Cornish plant belongs to another section of the genus, and differs, among other characters, in its simple, distinct stamens, and large heads. It is *A. sibiricum*, L.

The only British stations for *A. sphærocephalum* are at Bristol, on St. Vincent's Rocks and Durdham Down.

JAMES W. WHITE.

EUONYMUS BARK.

Sir—The paper on "Chemical Observations on the Root Bark of Euonymus," read by Messrs. Naylor and Chaplin at the last Conference, shows some excellent work on a drug whose composition has hitherto been imperfectly revealed by investigation, and taking advantage of the provisional naming of a newly described substance I would express a hope that the name may never come into general use. These chemists have isolated a white crystalline body from the aqueous extract of root bark, and call it "atropurpurin." My objections to this name are the following:—(1) The name "atropurpurin" would convey the idea that it has some relation to purpurin, an anthraquinone derivative having pigmental properties; to apply such a term to a white crystalline body not reddened even by sulphuric acid is misleading if not injurious. (2) The name evidently rests upon the specific name of the plant, and in that case the substance should be the active principle of the plant or something peculiar to that species, but neither of these possibilities has been proved.

My interest in the subject is due to my having recently examined the barks of two species of Indian euonymus, *E. pendulus*, a Himalayan tree, and *E. crenulatus*, growing on the Nilgiri Hills. Both barks were astringent, on account of the presence of tannic acid, and the aqueous extracts were highly crystalline. The crystals were neutral in reaction, sweet to the taste, negative towards alkaloidal reagents, fused when heated, contained no nitrogen, and were dissolved by boiling rectified spirit, from which they solidified on cooling. Kubel in 1862 found in the bark of *E. Europæus* a saccharine crystalline substance closely resembling mannite, but differing in melting point and crystalline form, and it is worth noting that the melting point, 182° C., of the crystals found by Messrs. Naylor and Chaplin is identical with that of dulcite, an isomeride of mannite.

D. HOOPER.

OLD MEDICINE JARS.

Sir,—It may be interesting to see a brief notice of some of the "simples" that were used in their medical practice by the monks of Italy in the 16th century. My information is derived from old medicine jars taken out of suppressed monasteries, and now forming part of a collection of *Faience* and *Urbino* ware in the National Museum at Florence. The jars are of two sizes, holding respectively two and four quarts, and are of the usual elegant shape of waterpots in this country, with two handles and a short spout like that of a teapot. All are tastefully, though not very artistically painted in colours on a white ground, and bear as their device the figure of a monk holding in his hand the particular flower or herb that forms the chief ingredient of the medicine.

The larger jars, why, I know not, bear on their front a bust portrait of some Pope, and most of these are not labelled. The labels are painted near the base of each jar, and give the Italian names of their contents, with many abbreviations not always easily decipherable. One especially, which I give *literatim*, was very difficult to interpret:—

SY̊ D́ POMS̍ C·P̂T.

These letters, I have ascertained, stand for "Syropo di Pomi Composito," or Compound Syrup of Apples.

With a few exceptions all the names are of distilled waters of the following indigenous plants:—Orange flowers, parsley, endive, betony, broom, chicory, blackthorn, borage, hollyhock, pimpernel, hops, couchgrass, liverwort, sage. The exceptions are the before-mentioned syrup, a plaister of melilot, and a distillate of snails.

Beside these jars I remarked a very large and handsome vase holding perhaps four or five gallons, which had the place of honour assigned to it in the middle of the saloon. It differed from the other jars in having four beautifully modelled handles, no spout, and a slightly conical bronze lid, and but for the medical label on the base it might have been intended for some nobler use. Curiously enough this last named jar has precisely the same shape as an Etruscan urn found in one of the tombs at Chiusi, which is made of black clay and ornamented with figures of animals in low relief. The label of the medicine jar has the words TERIACA MAGNA, which is an electuary still used by old-fashioned people. It is a modernized form of the ancient "Mithridate," and is a wonderful farrago of drugs according to the formula given in an old pharmacopœia, which includes the following:—Squill, iris, ginger, gentian, calamus aromaticus, spikenard, valerian, scurvy grass, dittany, canella, red rose leaves, saffron, long pepper, aniseed, cardamom, myrrh, bitumen judaicum, castoreum, extract of opium, storax, and desiccated sulphate of iron. These ingredients are to be finely powdered, and well mixed with honey and white Spanish wine.

In my opinion the interest attaching to these 16th century ceramics is not so much in the light thrown on the pharmacy of that period, as in the evidence they afford of an æsthetic taste which could invest articles in daily use with a grace and dignity that compare favourably with the practice of our own times.

Guildford. HENRY TAYLOR.

Apprentice.—There are two "Bell Scholarships," each of the value of £30, in addition to free laboratory instruction and admission to the lectures. They are awarded on the results of an examination, and are tenable for one year. Candidates must be Registered Students or Apprentices of the Society, of not less than twenty or more than twenty-two years of age on the day on which the examination is held, and have passed not less than three years in the pharmacy of a registered chemist and druggist. Further particulars will be found in the Society's Calendar.

Indignans will find some useful information as to the views of the Inland Revenue authorities respecting medicated wines in the letter from Mr. J. H. Fisher, printed on the preceding page.

J. F. Brown.—In your interest we regret that the satisfaction of your professed preference should be interfered with by anything so unfounded as the opinion you appear to entertain.

Mr. Arnold Graves, Honorary Secretary to the City of Dublin Technical Schools, writes to dispute the statement in the letter of Mr. Patrick Kelly, referred to in the report of the meeting of the Council of the Pharmaceutical Society of Ireland (see before, Nov. 16, p. 398), that there is only one school in Dublin, and that a day school, at which students can take out the one hundred hours' laboratory practice required by the Pharmaceutical Society of Ireland. As a committee has been appointed to consider the subject referred to in Mr. Kelly's letter, we suggest that Mr. Graves would do best to put himself in direct communication with that committee.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Merck, Cripps, Davis, Pollard, Welborn, Munro.

ON SCOPOLA CARNIOLICA.*

[*Communication from the Research Laboratory of the Pharmaceutical Society.*]

INTRODUCTORY.

BY PROFESSOR W. R. DUNSTAN.

Rather more than a year ago Mr. Ransom brought under my notice a rhizome which had recently appeared in the drug market, being offered as a substitute for the root of *Atropa Belladonna* under the name of *Belladonna Scopolia*. It was imported from Germany, and was stated to grow wild in the Carpathian Mountains and in other parts of Austro-Hungary. The juice of the plant was supposed to possess mydriatic properties. From further inquiries it appeared that an abundant supply of the plant could be obtained should any demand arise for it.

Two species of *Scopola* have already been made the subject of chemical investigation, viz., *Scopola japonica* and *Scopolina Hladnikiana*; *Scopola japonica* has been used to some extent in medicine. The new rhizome was not, however, likely to be derived from either of these plants, since the first is indigenous to Japan and does not grow in Europe, while *Scopolina Hladnikiana* is rare and practically unknown outside the botanic garden.

Having regard to the probability that the plant might contain one or more of the mydriatic alkaloids and to the commercial scarceness of their principal source, *Atropa Belladonna*, it seemed desirable to make a chemical examination of the rhizome, and if constituents were discovered likely to possess valuable medicinal properties to submit preparations made from the plant to therapeutical examination. Chemical investigation soon showed that we have in this plant a new and important source of hyoscyamine.

Dr. Lauder Brunton undertook to try the therapeutic effect of the drug, but unfortunately was compelled by pressure of other work to abandon the experiments before they were completed. As far as these experiments were carried they seem to show that galenical preparations made from this rhizome possess properties similar to, if not identical with, those of belladonna. In order that the therapeutic action of this species of *Scopola* might be well established, Sir Dyce Duckworth has made a further series of trials of galenical preparations prepared by Mr. Ransom, and standardized to correspond with those of belladonna. The results of these experiments are recorded by Sir Dyce Duckworth in a paper printed on p. 466.

The pharmacy of the plant has been very fully worked out by Mr. Ransom, who describes in a paper printed on p. 464 the methods of preparing standard galenical preparations.

Since it is important that the plant from which the rhizome is derived should be identified and described, Mr. Holmes has investigated the subject, and has been able to refer the rhizome to *Scopola carniolica*, a plant which grows freely in several parts of Europe, notably in Austro-Hungary. A full account of the plant is given by Mr. Holmes in the paper printed on p. 468.

The remarkable resemblance between *S. carniolica* and *Atropa Belladonna*, which the chemical investigation has disclosed, suggested a comparison of the histological characters of the rhizome of the one plant with the root of the other. This comparison has been made by Mr. Greenish, whose description is given, together with woodcuts of the two sections, on p. 471.

The chemical examination of all the constituents of this plant is not yet quite complete, although the most important have been minutely studied. We think it desirable to publish our present results without delay, since it appears from an announcement in a recent number of a German periodical that at the meeting of the Naturforscher Verein at Heidelberg Professor Schmidt, of Marburg, stated that he is working at a species of *Scopola*, which seems likely to be the same as that we have investigated.

ON THE CHEMICAL CONSTITUENTS OF SCOPOLA CARNIOLICA.*

BY PROFESSOR W. R. DUNSTAN AND A. E. CHASTON.

Two species of *Scopola* have been chemically studied. *Scopola japonica* by Lanngaard (*Pharm. Journ.*, [3], xi., 10), by Eykman, and later by Schmidt and Henschke (*Archiv d. Pharmacie*, 1888, 185). The root of this plant is shown by Schmidt and Henschke to contain atropine, hyoscine and hyoscyamine. The so-called "scopoleine," once thought to be a distinct alkaloid, contained in *Scopola japonica*, is a mixture of these bases. Besides these alkaloids the plant contains a fluorescent substance scopoletin, and a fat which is said to be composed of the glycerides of stearic, oleic and palmitic acids.

Scopolina Hladnikiana, a rare plant remarkable for its green flowers, has been partially investigated by Schmidt (*Archiv d. Pharmacie*, 1888, 214), who found it to contain hyoscyamine, but was unable from lack of material to complete his examination of it.

Extraction of the Rhizome.—Having in a preliminary experiment ascertained the presence in the root of what was probably a mydriatic alkaloid, and being aware of the ease with which the mydriatic alkaloids are changed or decomposed, great care was taken in extracting the constituents from the rhizome, and also in dealing subsequently with the alcoholic extract to avoid heating the material above 50° C. The rhizome having been air-dried at a low temperature was finely powdered and completely exhausted by percolation with cold alcohol. This process was carried out for us by Mr. Ransom. The percolate from nearly 5 kilos of the rhizome was evaporated at 30°–40° C., by which means a semi-fluid mass containing much fat was obtained. This residue was incorporated with water containing one per cent. of hydrochloric acid and slightly warmed. The fat was now separated and the resulting acid liquid repeatedly extracted with chloroform until nothing further was removed. The liquid having been rendered alkaline by the addition of very dilute ammonia the alkaloid was removed by agitating the liquid with chloroform.

Examination of the Alkaloid.—By the spontaneous evaporation of the chloroform a coloured mass was obtained. This was dissolved in very dilute hydrochloric acid, the liquid again rendered alkaline with weak ammonia and the alkaloid extracted by repeated agitation of the liquid with ether. The residue left by the evaporation of the ethereal solution was dried over sulphuric acid in a vacuous desiccator and then dissolved in pure anhydrous ether. By the gradual spontaneous evaporation of the ether large silky needle-shaped crystals were deposited. These were removed, drained free from adhering ether, and dried in a vacuous desiccator, after which they were repeatedly recrystallized from pure ether. The alkaloid now melted at 108·4 (corr.) and possessed all the properties of pure hyoscyamine.* From the original ethereal solution a second deposit of crystals was obtained. These were recrystallized, and then were observed to melt at 107·7° C. A third fraction was deposited from the same liquid, which when recrystallized melted between 106°-107° C. By combining these three fractions and recrystallizing them from ether, a group of large silky needles was obtained melting at 108·5° C. Pure hyoscyamine melts at 108·5° (Ladenburg).

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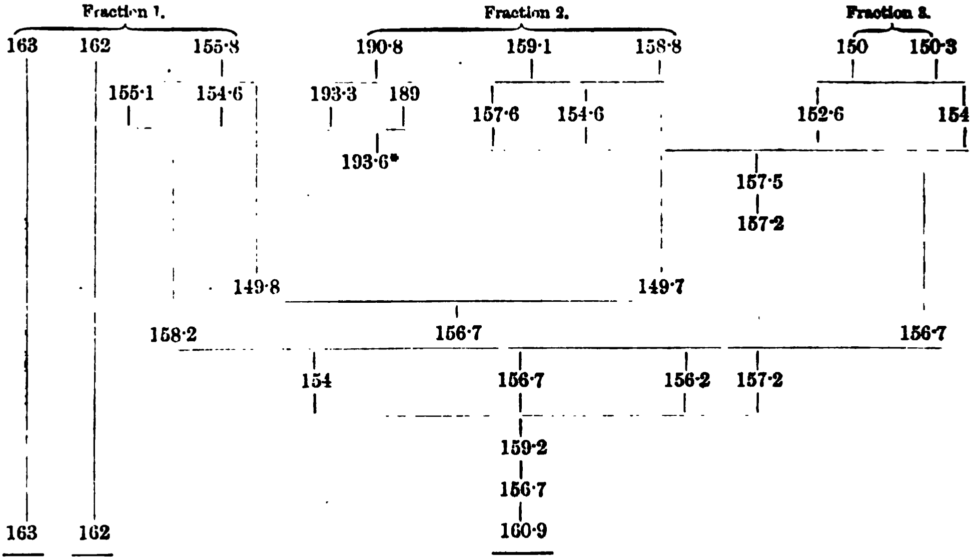
* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, December 11.

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, December 11.

The remainder of the ethereal solutions was spontaneously evaporated, when a slightly coloured residue remained. In order to ascertain whether either atropine or hyoscine was contained in it, the substance was dissolved in dilute hydrochloric acid and fractionally precipitated with a solution of gold chloride; the different fractions of aurochloride thus produced were repeatedly recrystallized from water, and acidified with hydrochloric acid until fractions having constant melting points were obtained. This method is long and tedious, but it is the only one which would serve to detect the presence or absence of the other mydriatic alkaloids; it is the plan which was adopted by Ladenburg in his well-known researches on these bases. The results afforded by this process of fractional precipitation and crystallization are tabulated in the following diagram (I). The fraction of aurochlorides resulting from three successive precipitations of the liquid with gold chloride were repeatedly crystallized until the melting point of the salt was not altered by further treatment. For example, when a small quantity of a solution of gold chloride was added to the acidified solution of the alkaloid a precipitate was obtained (Fraction 1). This precipitate was dissolved in warm water acidified with hydrochloric acid. From the solution crystals soon separated, which were removed, washed with acidulated water and dried. These crystals melted at 163°. After evaporating the liquid to a slight extent more crystals were deposited, which were likewise removed, washed and dried. The melting point of this second deposit was 162°. The liquid when further evaporated yielded a third deposit of crystals melting at 155·8°. The crystals melting at 163° and 162° respectively, were not appreciably affected by recrystallization, but that melting at 155·8° was separated by recrystallization into two small fractions, the one melting at 155·1° and the other at 154·6°. These fractions were too small to be recrystallized by themselves and they were therefore retained and subsequently dissolved and recrystallized with later fractions having about the same melting point; it will be seen from the diagram that these crystals ultimately afforded an aurochloride melting at 160·9° and not changed by further treatment. By pursuing this method the three original fractions, by repeated crystallization, were resolved into aurochlorides melting at 163°, 162° and 160·9° respectively; the mean of these numbers is 161·9°, a constant which agrees well with the melting point

Fractional Precipitation and Crystallization of Aurochlorides.

I.



* ? Hyoscine. Minute quantity insufficient for recrystallization.

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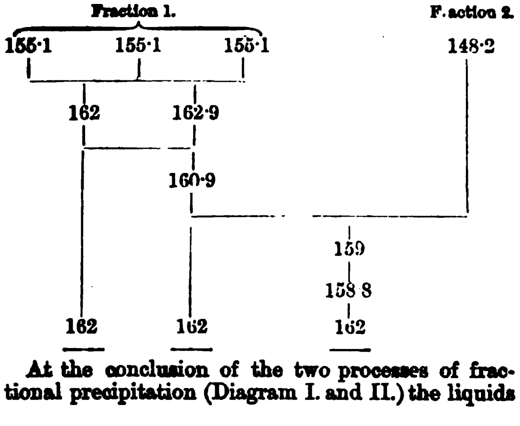
* The determinations of all the melting points recorded in this paper were taken with a thermometer which had been recalibrated against a standard, and the readings have in all cases been subjected to Regnault's correction for exposed stem.

of hyoscyamine aurochloride, which is stated to be between 159°-162° (Ladenburg and Will). These crystals were in fine golden yellow scales. Employing Dumas' method the amount of nitrogen contained in the salt and also the amount of gold (by weighing the residue left after the combustion) were determined. The combustion was conducted in a vacuum and the nitrogen collected through the limb of a Sprengel pump. Percentage of nitrogen found = 1·9; percentage of gold = 31·27. Calculated for hyoscyamine aurochloride, nitrogen, 2·2 per cent., gold, 31·3 per cent. There is no doubt, therefore, that the alkaloid is hyoscyamine. It remains to notice one fraction of the aurochloride which melted at 190·8° and after recrystallization at 193·6°. Of the many specimens of aurochloride we examined only this minute portion melted at this temperature and the quantity was so small that we were unable to examine it further. It is possible that it may have contained hyoscine aurochloride, which melts at 196°–198°.

The whole of the alkaloid obtained from the rhizome had now been exhaustively examined with the exception of that which remained dissolved in the alkaline liquid even after repeated agitation with ether. Since ether is soluble in water it is hard to completely remove a substance from its aqueous solution by shaking it with ether, even when the substance is very soluble in this liquid. After the ether had been expelled, the solution was acidified and precipitated with a solution of iodine in potassium iodide, the resulting periodide of the alkaloid was collected, washed and decomposed with a solution of sodium thiosulphate, from which liquid, after the addition of ammonia, the alkaloid was removed by agitation with chloroform. The residue left by the evaporation of the chloroform was in a fused and uncrystalline condition; but when dissolved in dry ether crystalline alkaloid was deposited, and after recrystallization melted at 106-108°. The part which remained dissolved in the ether was dissolved in diluted hydrochloric acid and fractionally precipitated with a solution of gold chloride. The fractions of aurochloride were then crystallized until they possessed constant melting points. The results of the process of fractionation which are tabulated in the diagram (II.) reveal the presence of no other alkaloid than hyoscyamine.

Fractional Precipitation and Crystallization of Aurochlorides.

II.



At the conclusion of the two processes of fractional precipitation (Diagram I. and II.) the liquids from which the separate fractions had been deposited were evaporated to a very small volume, but with the exception of a few more crystals melting at 155° (which were mixed with other fractions and recrystallized), nothing was obtained, and on evaporating to dryness a residue of gold chloride remained. From some experiments that were made in the course of this inquiry it appears that the melting point of hyoscyamine aurochloride undergoes a marked diminution when the salt is deposited from a solution containing excess of gold chloride, owing no doubt to the action of occluded gold chloride.

Of the known mydriatic alkaloids *Scopola carniolica* is thus shown to contain only one (hyoscyamine) in any appreciable quantity; there may also be present a minute amount of hyoscine, although we were unable to conclusively prove this to be the case. *Scopola carniolica* appears to be distinguished from other plants which yield mydriatic alkaloids in containing hyoscyamine in an almost, if not quite pure condition. It must, however, be borne in mind that in investigating the alkaloidal constituents of this plant advantage has been taken of the facts recently established with reference to the instability of hyoscyamine when in contact with fixed alkalis, or when heated to the temperature of boiling water. The plant was dried at a low temperature, exhausted with cold alcohol, and the alcoholic percolate was evaporated at 30°–40°, whilst no fixed alkalis were used in extracting the alkaloid. It has not yet been definitely established that atropine is actually present in belladonna, or, indeed, in any plant, and it has not yet been shown that the hyoscine which is often obtained, besides atropine and hyoscyamine, is a constituent of the plant, and has not been produced during the extraction of the alkaloids.

Examination of the Fatty Constituents.—The fatty and resinous constituents were separated as far as possible from the alcoholic extract of the rhizome, after mixing it with dilute hydrochloric acid, and the remainder was extracted by repeatedly shaking the acid liquid with chloroform. From nearly 5 kilos of the rhizome about 90 grams of fat and resin were obtained. Light petroleum dissolved about half of the mixture, leaving resin undissolved. The resin possessed the usual characters, and was not further examined. The fat was saponified by prolonged ebullition with alcoholic potash. The alcoholic liquid was then diluted with water, and the alcohol distilled from it. The aqueous solution was repeatedly extracted with ether, and the residue obtained by the evaporation of the ethereal solutions again saponified with alcoholic potash. Ether now removed a slightly coloured substance which crystallized in rosettes of fine needles. These were several times recrystallized from alcohol, by which means colourless plates were obtained, melting at 132°. They gave the characteristic colour reactions for cholesterin with sulphuric acid and chloroform, and also with ferric chloride. By drying at 100° the crystals lost 4·6 per cent. of water (calculated for $C_{26}H_{44}O,H_2O = 4·61$ per cent. of water), and the melting point of the anhydrous substance was found to be 137·5°. The dried material was dissolved in chloroform, in which it was readily soluble, and absolute alcohol was added until a slight turbidity appeared. A mass of fine needle-shaped crystals soon separated, which were anhydrous, and melted at 137·5°. When burned in a current of oxygen they yielded the following results :—

		Calculated	
	Found.	for $C_{26}H_{44}O$.	for $C_{27}H_{46}O$.
Carbon . .	84·1	83·87	83·93 per cent.
Hydrogen .	12·8	11·82	11·91 "

which agree fairly well with the formulæ $C_{26}H_{44}O$, or $C_{27}H_{46}O$, each of which has been assigned by different observers to cholesterin. The substance is difficult to burn, and it is doubtful whether the results of combustion alone can enable us to arrive at a decision as to which formula is correct.

In order to further characterize the substance it was converted into the benzoate. This is usually effected by fusing it with benzoic anhydride. We thought that possibly the use of benzoic chloride in the manner recently suggested by Baumann and Udransky, for the preparation of the benzoic derivatives of amines might prove to be more convenient. The cholesterin was found to be readily soluble in benzoic chloride, but on decomposing the solution with soda, cholesterin and not its benzoate, was precipitated. It was observed subsequently that if the solution of the cholesterin in the benzoic chloride is heated near its boiling point for about fifteen minutes and then poured into an excess of a 5 per cent. soda solution, after shaking for some time, until the excess of benzoic chloride has been completely decomposed, the cholesterin benzoate remained insoluble. It was collected, washed and dissolved in ether. The ethereal solution was then mixed with about half its volume of absolute alcohol, in which the benzoate is almost insoluble, when a mass of crystals was obtained. These after recrystallization melted at 145·5°, and were not altered by a repetition of the process. The remainder of the ethereal solution yielded more crystals, which likewise melted at 145·5°. There was no doubt, therefore, that we were examining a single substance.

Cholesterin has been detected in small quantity in many plants. *Scopola carniolica* contains rather more than 0·1 per cent. Cholesterin from different sources does not appear to possess the same properties. Animal cholesterin (from brain and gall-stones) does not seem to be identical with vegetable cholesterin, and further, various specimens of vegetable cholesterin differ to some extent among themselves. Some of these substances are probably isomerides and homologues of cholesterin, but other specimens have in all probability not being sufficiently purified before examination. The following are the recorded properties of the principal varieties of cholesterin which have been noticed up to the present time.

Formula $C_{26}H_{44}O$ or $C_{27}H_{46}O$.

	M.P.	M.P. of benzoate.
Cholesterin (from brain and gall-stones, sheeps' wool, etc.)	146°–148°	146 –151
Iso-cholesterin (from sheeps' wool, etc.)	138°–138·5°	190 –191
Para-cholesterin (from a fungus)	134°	127°–128°
Caulosterin (from lupines) .	158°–159°	—
Daucosterin (from carrots) .	136·5°	145°
Phytosterin (from seeds) .	132°–133 ; 136°–137°*	— 145°–147°
Cholesterin (from *S. carniolica*)	132°–133° ; 137·5*	145·5°.

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* Anhydrous

The cholesterin from *S. carniolica* appears to resemble most nearly phytosterin and daucosterin, both of which are vegetable cholesterins. We intend to make a further study of this substance.

Cholesterin has not apparently been noticed in other plants of the sub-order *Atropaceæ*, or of the natural order *Solanaceæ*. It is remarkable that Schmidt and Henschke did not find it in *S. japonica*. As the occurrence of the substance is of some importance, especially in connection with a comparison of the chemical constituents of *S. carniolica* with those of *Atropa Belladonna*, we searched for cholesterin in belladonna root.

About 5 kilos of the roots were exhausted with alcohol. The fat was separated and saponified with alcoholic potash. The soap solution when extracted with ether afforded a crystalline substance which after recrystallization from alcohol melted at 132°, and possessed the same properties as that obtained from *S. carniolica*. The quantity of cholesterin in the root of *Atropa Belladonna* is probably not less than that in the rhizome of *Scopola carniolica*. We have not yet found an opportunity to examine *Scopola japonica* or any other atropaceous plant.

From the decomposition of the soap which had been prepared from the fat of *Scopola carniolica*, a crystalline fatty acid was obtained, which we are still engaged in investigating. The complete purification of this substance by recrystallization from alcohol has proved to be a tedious operation. It appears to be mainly, if not entirely, composed of an acid which melts between 74° and 75°, corresponding in its properties with arachic acid $C_{20}H_{40}O_2$, one of the higher members of the acetic series.

We have obtained two other constituents from *Scopola carniolica*, but have not yet been able to minutely investigate them. One is a crystalline sugar reducing Fehling's solution, and yielding an osazone which appears to be identical with that obtained from dextrose. The other is a crystalline substance whose aqueous solution is highly fluorescent, especially when alkaline. It appears to be identical with the scopoletin which Eykman obtained from *Scopola japonica* and with the chrysatropic acid which Kunz obtained from *Atropa Belladonna*. There are grounds for believing this substance to be methyl-æsculetin.

THE PHARMACY OF SCOPOLA CARNIOLICA.*

BY F. RANSOM.

The increasing demand for belladonna and its alkaloids has induced the examination of allied plants, with the object of ascertaining whether they contain the same or similar principles.

Some years ago attention was called to a Japanese plant, *Scopola japonica*, and certain alkaloids having mydriatic properties were extracted from the rhizome. Since that time a rhizome, very similar in appearance, has been offered by Continental dealers under the name of Belladonna Scopolia. It is difficult to ascertain the exact locality from which the plant is obtained, but it is believed that the commercial supply is derived from Austro-Hungary, probably from some districts of the Carpathian Mountains. The samples are all very similar in appearance, and that upon which the following work has been carried out is identified by Mr. Holmes as *Scopola carniolica*. The price usually quoted is considerably less than that asked for belladonna root, and the supply appears to be abundant.

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* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, December 11.

Although no details had been previously published with reference to the constituents of the plant, its similarity to the Japanese species, and the fact that it is offered as a substitute for belladonna, suggested the probability of similar properties. A preliminary examination indicated the presence of an alkaloid which powerfully dilated the pupil of the eye. Mr. Reynolds, of Leeds, has kindly supplied me with fresh and dried specimens of *Scopola carniolica*, which he has grown in his garden for some years. The juice from the fresh leaves was examined and found to contain a similar mydriatic alkaloid.

In order to compare the value of the rhizome with belladonna root, experiments were made to determine the percentage of alkaloid present. The following process for estimation was found to give satisfactory results, and is a slight modification of that proposed by Professor Dunstan and myself for the assay of belladonna (*Pharm. Journ.*, 3rd series, xiv., 623).

Twenty grams of the dry rhizome in No. 60 powder are percolated in the cold in a continuous extraction apparatus with equal parts by volume of absolute alcohol and ammoniated chloroform; about 60 c.c. of the mixture is required. When the liquid ceases to drop from the percolator heat is applied to the receiver, and the marc exhausted by hot percolation. (Exhaustion is indicated by the absence of any precipitate when a drop of solution of iodine and iodide of potassium is added to the acid solution of the residue obtained on evaporation of five drops of percolate.) The percolate is then agitated with two successive 25 c.c. of distilled water acidulated with hydrochloric acid, and separated. The mixed aqueous solutions are agitated with chloroform to remove the last traces of mechanically adherent colouring matter. The chloroform is separated, and the aqueous liquid rendered alkaline with ammonia, and agitated with two successive 25 c.c. of chloroform, which are mixed and agitated with a small quantity of distilled water, rendered faintly alkaline with ammonia, to remove adherent aqueous liquid. If the chloroform solution is still coloured, it should be again exhausted with acidulated water, from which the alkaloid is finally extracted with chloroform after the addition of ammonia. The chloroform is then evaporated spontaneously or over a water-bath, and dried at a temperature of 200° F. (93° C.). Twenty-five grams of a sample of the rhizome received from Moravia, estimated in this manner, yielded by spontaneous evaporation a light crystalline residue, very similar in appearance to that obtained from belladonna. In order to preserve its crystalline form it was dried as far as possible over sulphuric acid in a desiccator, and it then weighed ·134 grm. = ·54 per cent. It was found, however, that this residue contained water, which could only be removed by the application of heat. When heated in a drying oven for about an hour at a temperature of 100° C., a loss in weight of about 25 per cent. occurred, and the residue, now amorphous, weighed only ·108 grm. = ·43 per cent.

This is slightly higher than the average of three samples of belladonna root examined by Professor Dunstan and myself, which yielded respectively ·35, ·38 and ·39 per cent. of total alkaloid. Another sample of Scopola, received from Western Germany, but probably grown in Hungary, yielded ·51 per cent. of alkaloid. These residues were proved to consist of practically pure alkaloid, by precipitating the acid solution with iodine, filtering, washing, and dissolving the precipitate in solution of hyposulphite of sodium, and recovering the alkaloid with chloroform after the addition of ammonia.

The results of further investigations into the chemistry and therapeutic action of the drug confirm the impression that we have in Scopola a medicinal agent of considerable value. The fact of its action being dependent upon an alkaloid which can be assayed without difficulty, renders it especially adapted for galenical preparations of standardized strength. In order to determine the best solvent for the alkaloid equal weights of the powdered rhizome were macerated for 48 hours and percolated with alcohols of the three following strengths:—

(1) 10 fluid ounces alcohol 56 per cent. O. P.
(2) 8 „ „ „ + 2 fluid ounces water.
(3) 7 „ „ „ + 3 „ „

Thirty cubic centimetres of each percolate were evaporated to an extract over a water-bath, the extract was dissolved as far as possible in warm distilled water, and after the addition of ammonia was exhausted with chloroform. After separation the chloroform was agitated with very dilute hydrochloric acid and again separated. The acid solution was rendered alkaline with ammonia and the alkaloid extracted with chloroform. This, on evaporation, left crystalline residues which, when dried, weighed as follows:—

(1) ·054 grm. = ·18 per cent. of alkaloid.
(2) ·0595 grm. = ·20 „ „
(3) ·0475 grm. = ·16 „ „

From these results it appears that for Scopola, as for belladonna (*Pharm. Journ.*, [3], xvii., 843), the best solvent is not the official rectified spirit, but is prepared by adding 1 fluid part of distilled water to 4 fluid parts of alcohol 56 O. P. It is therefore proposed to employ a diluted spirit of this strength for the liquid preparations. It was found, however, that the increased amount of inert extractive which is obtained renders it inadvisable to employ this menstruum for the solid extract, and the official rectified spirit is therefore employed in this formula.

The following formulæ are suggested as providing standardized preparations, corresponding in alkaloidal value with the average strength of the present official preparations of belladonna:—

Extractum Scopolæ Alcoholicum.

Alcoholic Extract of Scopola.

Take of—

Scopola rhizome in No. 20 powder	1 pound.
Rectified spirit	48 fluid ounces.
Distilled water Sugar of milk	. . Of each a sufficiency.

Mix the spirit with 12 fluid ounces of distilled water. Macerate the Scopola in two pints of this mixture for forty-eight hours, agitating occasionally; then transfer to a percolator, and when the fluid ceases to pass, continue the percolation with the remainder of the diluted spirit. Afterwards subject the contents of the percolator to pressure, filter the product, mix the liquids, and evaporate over a water-bath to the consistence of a soft extract. Estimate the alkaloidal strength of this extract by the following method:—

Dissolve 2 grams of the extract in about 10 c.c. of warm distilled water, acidulated with a few drops of diluted hydrochloric acid. Pour the solution into a stoppered glass separator, and add ammonia until the liquid is distinctly alkaline. Agitate for a few minutes with 10 c.c. of chloroform, separate, and again wash the aqueous liquid with 3 c.c. of chloroform. Agitate the mixed chloroform solutions with 10 c.c. of diluted hydrochloric acid, separate, wash with 3 c.c. of the diluted acid, mix the acid solutions, render alkaline with ammonia, and agitate with 10 c.c. of chloroform. After separation wash the alkaline solution with 3 c.c. of chloroform, mix the chloroform solutions, evaporate in a dish of known weight, and dry the residue, which should be nearly colourless, at a temperature of 200° F. (93 C.). The weight of the residue thus obtained, multiplied by fifty, will give the percentage of alkaloid present in the extract.

Having thus ascertained the strength, warm the extract over a water-bath in a dish of known weight, and adjust by evaporation or by the addition of distilled water and sugar of milk in such proportion that the finished extract shall be of firm consistence and shall contain two per cent. of alkaloid.

It is also proposed to prepare a standard liquid extract of which 100 c.c. shall contain ·25 grm. of alkaloid. This will probably prove to be a useful preparation in itself, corresponding to the liquid extract of belladonna in the United States Pharmacopoeia, but it is mainly intended to be employed for the preparation of the tincture and liniment, which can be immediately obtained from it by dilution with alcohol and addition of camphor.

Extractum Scopolæ Liquidum.

Liquid Extract of Scopola.

Take of—

Scopola rhizome in No. 20 powder .	1 pound.
Rectified spirit Distilled water	of each a sufficiency.

Mix 24 fluid ounces of the spirit with 6 fluid ounces of distilled water. Macerate the Scopola in this mixture for forty-eight hours, agitating occasionally. Transfer to a percolator, and when the fluid ceases to pass subject the marc to pressure, and filter the product. Mix the liquids and measure the exact volume of the mixture (a), after removing 25 c.c. for analysis. Evaporate the 25 c.c. over a water-bath to the consistence of a soft extract. Estimate the alkaloid present in this extract by the process given in the formula for the alcoholic extract. The weight of the residue thus obtained, multiplied by four, will give the parts by weight of the alkaloid in 100 fluid parts of the liquid (a).

Adjust the total volume of this liquid, either by evaporation over a water-bath, or by the addition of a mixture of four fluid parts of rectified spirit and one fluid part of distilled water, so that 100 c.c. of the liquid extract shall contain ·25 gram of alkaloid.

Emplastrum Scopolæ.

Plaster of Scopola.

Take of—

Alcoholic extract of Scopola . . .	4 ounces.
Resin plaster Soap plaster	of each . . . . 8 ounces.

Melt the plasters by the heat of a water-bath, then add the extract, and mix the whole thoroughly together.

This plaster contains nearly ·4 per cent. of alkaloid.

Linimentum Scopolæ.

Liniment of Scopola.

Take of—

Liquid extract of Scopola .	24 fluid ounces.
Camphor	1 ounce.
Rectified spirit Distilled water	of each a sufficiency.

Dissolve the camphor in the liquid extract, and dilute to 30 fluid ounces with a mixture of 4 fluid parts of rectified spirit and 1 fluid part of distilled water.

One hundred fluid grains of this liniment contain one-fifth grain of alkaloid.

Tinctura Scopolæ.

Tincture of Scopola.

Take of—

Liquid extract of Scopola . .	4 fluid ounces.
Proof spirit.	21 „ „

Mix.

One hundred fluid grains of this tincture contain $\frac{1}{25}$ grain alkaloid.

Unguentum Scopolæ.

Ointment of Scopola.

Take of—

Alcohol extract of Scopola . . .	1 ounce.
Benzoated lard	9 ounces.

Mix thoroughly.

This ointment contains ·2 per cent. of alkaloid.

OBSERVATIONS ON THE THERAPEUTIC ACTION OF SCOPOLA CARNIOLICA.[*]

BY SIR DYCE DUCKWORTH, M.D.

Physician to St. Bartholomew's Hospital.

Mr. President and Gentlemen,—A month ago Professor Dunstan kindly placed at my disposal a variety of preparations of Scopola for trial in my wards at St. Bartholomew's Hospital, and I agreed to employ them as occasion offered.

I must premise that I am not now much given to experimental therapeutics. This study had more interest for me some years ago than now. I am afraid that I am by nature of so conservative a disposition that I am rather given to exert my bedside art with the old and commonly approved remedies which have well served better physicians than I pretend to be. I am disposed, indeed, to to say with Bianca, "Old fashions please me best; I am not so nice to change true rules for new inventions."[†]

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[*] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, December 11.

[†] "Taming of the Shrew," act iii., scene 1.

I always feel myself under a heavy sense of responsibility in regard to hospital as well as to other patients, and I inculcate in my bedside teaching very strongly the duty of humanity in dealing with each case committed to our care. Our duties to the governors of the hospitals, no less than to society at large, compel a degree of caution in respect to the use of remedies which renders it positively difficult to take up new weapons in our treatment of patients; for be it remembered, the modern physician does not treat *diseases*; he treats *patients* suffering from diseases.

In truth, it was easier thirty years to try new remedies than it is now. In these days of publicity, with a large portion of the cheap press demoralized and hungry for gossip, it is necessary to be more than ever cautious in the conduct of the affairs of life. Personally, I have nothing but contempt for the vulgar intrusions I allude to, but I grieve to know that the worst result of idle criticism of this kind is a very positive injury to society in general, and to sick people in particular.

For me, the real tests of the value of drugs for the sick are to be applied at the bedside, and appraised there. This work necessarily follows on the primary researches instituted in the physiological laboratory. Both methods are now required if we are to work on a scientific basis. The clinical art of using drugs cannot of course be followed in a laboratory.

In trying remedies, it was formerly not uncommon to put a whole series of patients under the influence of some of them without special reference to their ailments. Such a system was little scientific, but, still, some results were readily and promptly obtained. Such a practice cannot be repeated in these days. We must now work more cautiously, and employ only such cases as appear likely to yield trustworthy results.

You may possibly think that a temper of mind such as this is little fitted to advance the art of therapeutics or to promote new research. I am not of that opinion. The moral for me is that in prosecuting new inquiries in the direction we are interested in to-night, we have simply to find out what is true, and not to work for mere results to cap our labours. The tendency for the young inquirer is to have results promptly brought out in concrete form, to produce something. This too often means hasty and incomplete observations which will not bear the test of time. Those who work longest and best in laboratories best know that a long and weary research, honestly carried out, with all care to avoid fallacies, often leads apparently to nothing, or something seemingly worse than nothing,—to wit a contradiction of the pet theory originally conceived. Is the research therefore useless? By no means. Good work is never lost, and remains fruitful for all time in every sphere of life. I learn, then, from all new investigations that patience and time are necessary factors in eliciting the truth, and that disregard of these commonly means failure all along the line.

Let me not be misunderstood in this too long preface. Though it is long since I did any experimental work myself, I wish to say that I am in full sympathy with experimenters, and I cordially wish success to the new Research Laboratory established here. I have no mawkish sympathy with anti-vivisectors, and fully recognize the value of experimental research properly carried out on the lower animals, a practice which the vulgar and unthinking public in this country, so full of strange inconsistencies, has unhappily almost banished from these kingdoms, to an extent at all events that we are a laughing-stock amongst the educated nations of Europe, and, as a consequence, our tale of scientific bricks is very small in practical physiology and pharmacology as compared with that produced on the continent. We have, therefore, to steal much of our knowledge of this kind, or to import it, and the same unthinking, and particularly pious, public is very pleased to avail of it at our hands if it will ease their pains and prolong their lives.

To come to my communication. In but a few weeks, I have had not many opportunities of trying Scopola. I have assumed as well-established that this drug has many of the properties of the atropaceous products, that it has anodyne and hypnotic powers, and will cause dilatation of the pupils.

For the observations I report, I have to thank my present senior house physician, Mr. Ogle, M.B., who has very carefully watched the effects of the different preparations submitted to me.

In the following case the extract of Scopola acted efficiently as an anhydrotic, and the extract locally applied acted excellently as an anodyne.

1. F. G., æt. 28. Suffering from pleurisy with some effusion. Sweated profusely at night. After ten days without treatment half a grain of Scopola was ordered to be taken at bedtime. For three days the patient sweated slightly in the early morning, then ceased to sweat at all morbidly, notwithstanding a rise of temperature which occurred on one evening; whereas previously rises of temperature had been attended with very profuse sweating. The drug was stopped on the eighth day (December 1). Since then the patient has not noticed any sweating, nor has the drug caused any undue dryness of mouth or skin nor dilatation of pupils.

The same patient had a mass of enlarged and tender glands in his left groin, which made movement of that hip almost impossible, on account of pain. On November 24 liniment of Scopola was ordered warm, on lint. On November 15 there was no pain and little tenderness. On November 26 patient was able to move the hip-joint freely, without pain.

2. J. N., 17. Convalescent from rheumatic fever with infrequent pulse, and low tension. The average pulse-rate before the administration of the drug was fifty-seven to the minute; he was taking 60 grains of salicylate of soda daily. On November 16 tincture of scopola was ordered in 10 minim doses thrice daily with the salicylate. The dose was increased to ♏xv. on the 19th and stopped on the 24th. During this period (November 16 to 24), the average pulse-rate was fifty-two per minute. The arterial tone improved. The pupils were no larger than before the drug was given; the skin was acting normally, and the mouth was not dry. On November 24 the salicylate was reduced to gr. xx. daily with tinct. belladonnæ ♏xv. thrice daily. The average pulse-rate up to December 1 was fifty-two per minute with fair arterial tone. On November 30 the skin and mouth were rather dry, the pupils unchanged.

3. J. K., 25. Convalescence from rheumatic fever. The drug was given to quicken the pulse-rate, which was below 60 per minute. Tr. Scopolæ ♏xl. was administered daily for eleven days. The average pulse-rate during this period was sixty per minute with improved tension and volume. On the eleventh day tr. belladonnæ was ordered in place of tr. scopolæ, but as the patient left the hospital the second day after,

no comparison could be made. Unfortunately brandy ℥ii. was ordered daily at the same time as the Scopola was commenced. No dryness of mouth or skin nor dilatation of the pupils resulted from the use of the drug.

4.—H. M., 38.—Rheumatic Fever.

The left wrist was extremely painful and swollen. The right wrist was slightly tender and swollen. At 7 p.m. on November 23 the left wrist was wrapped in lint and soaked in warm linimentum scopolæ. At 9 p.m. the left wrist was scarcely painful. The right wrist, however, was as painful and swollen as the left had been at 7 p.m.; it was therefore treated in the same way, but with belladonna liniment in place of scopola. At 9 p.m. also the first dose of sod. salicylate was given. The following morning there was little pain in the left wrist, and the right wrist was much easier than it had been. The patient said that the liniment on the left wrist had eased the pain better and quicker than that on the right.

5.—E. M., 18.—Chlorosis with palpitations.

November 25. Cardiac pain with palpitation. 26th emplastrum scopolæ ordered, with relief in a few hours.

In the next two cases I employed Scopola to quicken and steady the circulation after the manner induced by belladonna, using similar doses of the tincture. The result was seemingly satisfactory.

In neither case did the pupils dilate, and one unpleasant symptom met with sometimes in using belladonna, dryness of the mouth, did not occur.

In the second case great benefit accrued from the use of the liniment of Scopola (made as belladonna liniment) in a painful joint in the course of rheumatic fever, and in this case, too, the plaster was found available to mitigate cardiac pain and palpitation.

So far as these few observations go, I think it justifiable to affirm that in Scopola we have a drug which proves itself equally effectual with belladonna, and if it can be supplied at a cheaper rate than the latter drug, it can hardly fail to prove a boon to a large class of sufferers who can ill-afford to pay for efficient local employment of belladonna.

I could have wished to adduce many more facts before this meeting, but I am still investigating the properties of Scopola, and may perhaps have the honour of adding to this communication at some future time.

I am anxious to know if the extract proves as effectual for arrest of activity in the lacteal glands as does belladonna, also to try its properties in some varieties of heart-disease.

THE NATURAL HISTORY OF SCOPOLA CARNIOLICA, JACQ.*

BY E. M. HOLMES, F.L.S.

The synonymy of plants has, by the gradual increase of botanical knowledge during the last three centuries, become so intricate, that systematic botanists have at last found it necessary to adopt some rule for the selection of the proper name of plants which already possess several names. The rule that is now adopted is, to return to names given by Linnæus, or in cases in which his names are not applicable, to the first binomial name to which a good description is attached published after the date of Linnæus' 'Species Plantarum' (1753). It may here be pointed out that up to the time of Linnæus descriptive names were in common use instead of a generic and specific name, and that it is partly for this reason that the names given to plants previous to the time of Linnæus cannot be utilized. Some confusion exists, even at the present day, concerning the correct botanical name for this plant, due to the various changes in nomenclature which it has undergone at different periods and from various causes. Those who are familiar with the history of systematic botany are well aware how complicated the synonymy of plants is apt to become when the same generic name has been given by botanists to different plants at different dates.

The earliest mention of this plant by old botanical authors appears to have been made in 1563 by Mattioli ('Matthiolus, Comm.,' ed. I., p. 465), who employed for it the name of *Solanum somniferum alterum*. Caspar Bauhin, A.D. 1622 ('Pinax,' ed. I., p. 166) referred to it under the name of *Solanum somniferum bacciferum*, and J. Bauhin, A.D. 1651 ('Hist,' ed. III., p. 612) under that of *Solanum manicum*, "quod secundo loco proponuimus." In the year 1761, Dr. John Antony Scopoli, Professor of Botany at the University of Pavia, published his discovery of the plant in Idria, in his 'Flora Carniolica' (ed. I., p. 288) under the descriptive name of *Atropa caule herbaceo, foliis ovatis, integris, fructu capsulari.*

In 1764, three years later than Scopoli's work, Jacquin, in his 'Observationes' (I., p. 32, t. 20), gave the plant the name of *Scopola carniolica* in honour of Dr. Scopoli. This, consequently, is the first binomial designation given to the plant; it is accompanied by an excellent description and illustration. Jacquin's name has unfortunately been several times altered by succeeding botanists, some of the names so given remaining in use even at the present day by horticulturists, whereby a good deal of confusion necessarily results. These changes of name demand a brief notice. Linnæus, in the year 1767 ('Mantissa, p. 46) altered the name of *Scopola carniolica* to *Hyoscyamus Scopolia*, probably because the capsule dehisces transversely in the same manner as in henbane.

In 1794, thirty years afterwards, Mœnch ('Methodus,' p. 462) referred it back to the genus *Scopola*, but altered the specific name to *trichotoma*, without assigning any reason for the change.

Schultes ('Oesterr. Flora.,' ii. 1794, p. 335, no. 846), observing that the name *Scopolia* had already been appropriated,* altered the name to *Scopolina atropoides*.

In 1821 Link ('Enum.,' I., p. 178) again altered the name to *Scopolia atropoides*, and lastly in 1837 G. Don ('Gen. Syst.,' iv., p. 470), gave it the name of *Scopolia carniolica*, and his name has been adopted by succeeding botanists, who have wrongly quoted Jacquin as their authority, for the latter repeatedly writes it "Scopola" in his published work.

His reason for this was probably that Adanson in the previous year had published the name Scopolia for a plant belonging to the natural order Cruciferæ,

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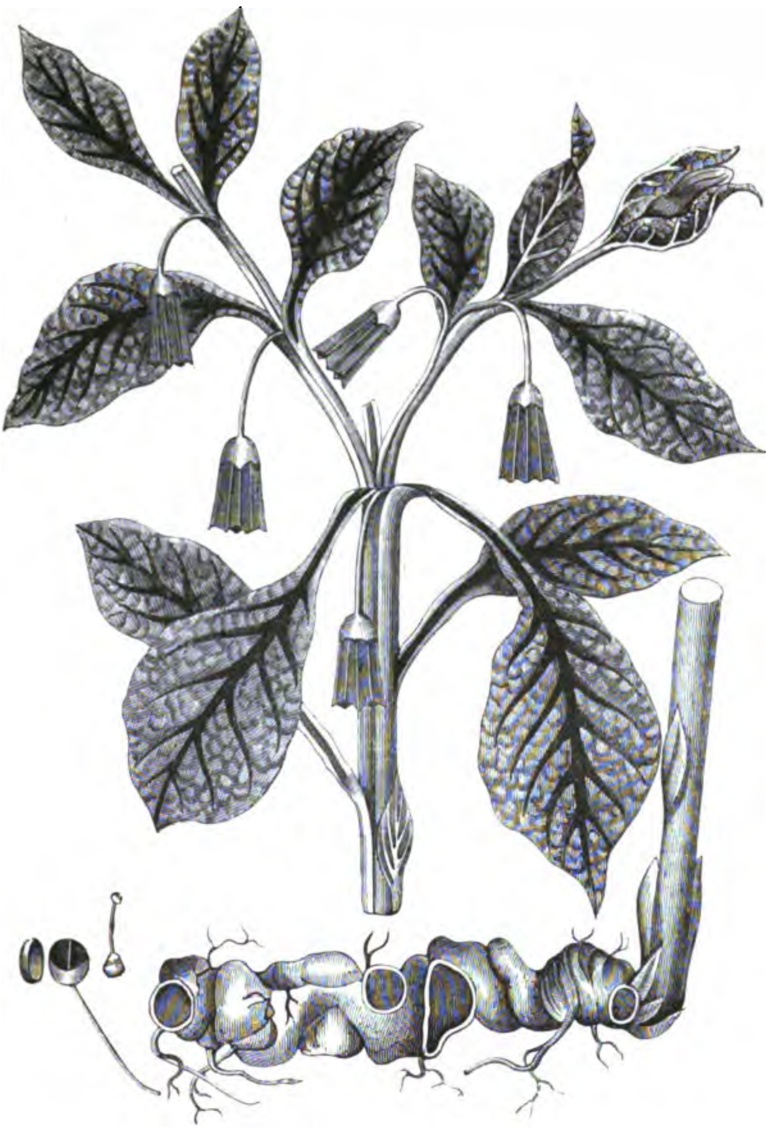
* Read before the Pharmaceutical Society of Great itain at an Evening Meeting in London, Wednesday, cember 11.

* Da eine andere Pflanzengattung den nahmen Scopolia tragt, und da nahme dieses unsterblichen mannes nicht genug geehrt werden kann, so nannte ich sie Scopolina. Schultes, l.c.



Scopola carniolica, Jacquin. From Jacq. Obs. Bot., i., tab. 20.

and Jacquin apparently wished to honour the name of Dr. Scopoli in another form, for he appears to have been highly esteemed by his contemporaries. Subsequently to Jacquin's publication of the name Scopola the generic name Scopolia was applied to plants of three other natural orders. The synonymy of the generic name Scopolia may therefore be represented as follows :—

A.D.			
1763	Adanson, for what is now		*Ricotia L.*, *Cruciferæ*.
1776	Forster	„ „	*Griselinia Forst.*, *Cornaceæ*.
1781	Linnæus	„ „	*Daphne L.*, *Thymelaceæ*.
1790	Smith	„ „	*Toddalia Juss.*, *Rutaceæ*.

And that of the name of the plant as follows :—

A.D.		
1563	*Solanum somniferum alterum*	Matticli.
1622	*Solanum somniferum bacciferum*	C. Bauhin.
1651	*Solanum manicum, etc.*	J. Bauhin.
1761	*Atropa caule herbaceo, etc.*	Scopoli.
1764	*Scopola carniolica*	Jacquin.
1767	*Hyoscyamus Scopolia*	Linnæus.
1794	*Scopola trichotoma*	Mœnch.
1794	*Scopolina atropoides*	Schultes.
1821	*Scopolia atropoides*	Link.
1837	*Scopolia carniolica*	G. Don.

The name given to the plant by Linnæus, *Hyoscyamus Scopolia*, is not applicable, inasmuch as botanists of the present day consider that the plant possesses sufficient distinctive characters for it to be placed in a separate genus ; and as Jacquin's name for the plant is the first binomial one published after the date of the first edition of Linnæus'

'Species Plantarum,'* it must for this reason supersede the later names given to the plant by Mœnch, Schultes, Link and G. Don.

The description of the plant given by Jacquin is as follows :—

Scopola carniolica Jacq.('Obs.,' 1764, tab 20, p.32–33.)

Scopola. — Atropa caule herbaceo, foliis ovatis integris, calycibus erectis, fructu capsulari. *Scop. carn.*, p. 288.

A Joanne Antonio Scopoli, Idriensi medico, et historicæ naturalis indefesso cultore, omnium, ni fallor primo hæc planta sponte nascens in sylvis umbrosis Idriensibus reperta fuit et descripta; quæ cum omnino mihi videdatur novum genus postulare, ab ipso inventore desumpto nomine Scopola appellata mihi est. Ex radice transmissa jam quartum annum in horto Vindobonensi perennat et flores produxit. Habitu admodum ad Atropam Belladonna accedit, a qua in fructus structura discriminatur quam maxime. Radix nodosa crassa et inæqualis est. Caulis herbaceus annuus, erectus, pedalis, glaber et subtrichotomus, sulco a foliis decurrente insignatur. Folia sunt obovata, vel lanceolata, integra, vel infima in cultis sæpe antice sinuato-dentata, venosa, rugosa, in petiolum decurrentia, inferiora opposita, reliqua sparsa nec ordinem servantia. Flos ex pedunculo solitario longiori pendulus inodorus, corolla ex purpureo flavescente, charactere gaudet sequenti.

Cal.—Perianthium monophyllum, hemisphæricum, quinque-dentatum, persistens.

Cor.—Petalum campanulatum, oblongum, magnum, quinque-dentatum, basi in tubum brevem angustatum, deciduum.

Stam.—Filamenta quinque, subulata, inæqualia. erecta, hirsuta, petalo breviora. Antheræ oblongæ, incumbentes, magnæ.

Pist.—Germen ovatum, obtusum, receptaculo insidens, in ambitu ad basin denticulis quinis nectariferis notatum. Stylus filiformis, staminibus longior. Stigma capitatum, obtusum.

Per.—Capsula subrotunda, calyce inflato excepta, bilocularis, una cum pedunculo et calyce decidens, post lapsum tandem transversim dehiscens. Semina reniformia, verrucosa nitida in quolibet loculamento circiter viginto tria affixa receptaculo orbiculari.

Lem.—Reniformia, verrucosa, nitida, in quolibet loculamento circiter virginto tria, affixa receptaculo orbicularo.

The geographical distribution of *Scopola carniolica* appears to be limited to S. W. Germany (Bavaria), Austro-Hungary (Styria, Carinthia, Carniola, Croatia, Banat, Transylvania), and S. W. Russia (Podolia and Volhynia). It grows in damp, stony places amongst bushes in beechwoods on calcareous soil, chiefly in hilly or mountainous districts.

In appearance it closely resembles belladonna in shape of leaf, shape, colour and position of flower, in the branching of the stem and in the floral leaves being frequently geminate. But it differs in its short stature (about 1 foot high) in the more reticulated thinner leaves, the capsular, transversely dehiscing fruit, and in the presence of a rhizome.

About eighteen months since I sowed some seeds of *Scopola carniolica* in my garden. The seeds came up readily, but made very slow progress during the summer, showing but few leaves. Thinking that perhaps the soil did not suit them, although planted on a chalky slope, I pulled up several of the plants and found that they had been forming rhizome instead of leaves. The flowers appear in March or April, according to the mildness of the season.

Two varieties of the plant were described by Koch ('Syn.,' ii, p. 585), the one having tubular, bell-shaped flowers of a brownish purple colour, and the other growing at a higher elevation, and having an obovate campanulate corolla of a green colour. The purple-flowered plant is the commoner form, the green-flowered variety being apparently recorded only from the neighbourhood of Schelimlje, near Auersberg, and Gerlachstein and Grimberg, near Laibach, in Carniola. This green-flowered variety was described as a species by Koch (l.c.) under the name of *Scopolina Hladnikiana*, this name having been given to Koch in a letter received by him from Freyer, who called his attention to the plant. But Freyer appears to have distributed the plant also under the name of *Scopolina viridiflora*, under which name Rabenhorst issued the plant in his 'Flor. Eur. Exsicc,' No. 2056.

It is apparently this variety, the rhizome of which, grown in the botanical garden at Marburg, has been examined by Professor Schmidt under the name of *Scopolina Hladnikiana*. A third variety, having yellow, conical campanulate flowers is mentioned by Decandolle ('Prodromus,' vol. xiii., ii., p. 556), under the varietal name, *β*, concolor.

As characterized in Bentham and Hooker's 'Genera Plantarum,' the genus *Scopolia* (or more correctly *Scopola*) differs from *Hyoscyamus*, which it resembles in the mode of dehiscence of the capsular fruit, in its solitary axillary flowers and inflated calyx, and in the entire leaves.

From *Atropa*, which it resembles remarkably in leaves and flowers, it differs in the fruit not being baccate, in the inflated calyx and the rhizome. It thus forms a link between the genera *Hyoscyamus* and *Atropa*. In the tissue of the rhizome it more nearly approaches the latter genus in having the peculiar sandy raphides present in both root and leaves of belladonna, but not in henbane.

Bentham and Hooker refer two other plants to the genus "Scopolia," viz., *Scopola japonica* and *S. lurida*.

The second species of Scopola was collected in Japan by Tschonoski, and was described by the celebrated Russian botanist, Professor Maximowicz, in the following terms :—

Scopolia Japonica (sect. Scopolia, Dun.) glabra, rhizoma horizontali nodoso crasso in radicem fusiformem longissimum desinente; caule tereti sulcato dichotomo basi squamis spathulatis membranaceis obsesso; foliis in petiolum longiusculum alato-decurrentibus, sparsis, ellipticis vel oblongis acuminatis, antice sæpe plus minus profunde dentatis, vel repando-dentatis; floribus axillaribus nutantibus solitariis; calycis dentibus inæqualibus acuminatis; corolla subobsolete 5-dentata, filamentis ad insertionem villosis; stylo declinato apice incurvo, fructu. . . . . Atropa Belladonna Japonensum ideoque etiam, 'Miq. Prol.,' 281. 'Ha shirido uro' Ykuma-yu-soai. 'Soo bokf,' etc., iii., fol. 18. In altissima alpe Nikkoo, ad rivulos florentem legit Tschonoski (Maximowicz, 'Melanges Biologiques,' xii., p. 629).

To this description the following observations are appended :—

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* The *Systema naturalis Plantarum* and the *Genera Plantarum* were published respectively in 1734 and 1737, ut these do not contain specific names. The *Species lantarum* was published in 1753.

Simillima *Scopoliæ carniolicæ*, Jacq., sed ob stylum curvatum neque rectum, calycis dentes, interdum valde, inæquales, et fructum hucusque ignotum, distinguenda videtur. Præterea folia constanter longius petiolata (in spec. 30 collectis) petiolis ½ vel ⅓ partem laminæ, rarius in superioribus, ¼ partem laminæ longus, in *Sc. carniolica* ad summum, ¼ partem nuncupans. In *Sc. carniolica* insuper folia sæpissime obovata et obtusiuscula atque rarius repanda. Corolla in sicco fusca, violacea, igitur videtur in vivo fere ut in planta europæa. Statura atque magnitudine partium planta nostra individua robusta stirpis europæa æmulatur.

From these observations it is evident that the difference (already recognized by Bentham, 'Gen. Pl.,' II., p. 902) between the two species is very slight, consisting, in the case of *S. japonica*, in the style being curved, the teeth of the calyx unequal, and the leaves less obovate and having petioles usually nearly twice as long as those of *S. carniolica*. The fruit of *S. japonica* does not appear to have been seen.

A specimen of the plant exists in the Kew Herbarium, collected in the above locality by Tschonoski in 1864, and another small specimen, apparently the same species, collected on the Soul mountains in Corea by Mr. W. R. Carles in 1885.

It is this species which yields the Japanese Belladonna root, offered in the London market a few years ago. See *Pharm. Journ.*, [3], p. 789.

In reply to my request for the loan of a specimen of the plant to illustrate this paper, Professor Maximowicz has most generously presented to the Museum of the Society the only duplicate specimen in his possession having the rhizome attached to it.

The similarity between this plant and *S. carniolica* is very great, and on inquiring of Professor Maximowicz if he considered it, in the light of present knowledge, to be a good species, he candidly states, "As to the value of *S. japonica* as a species I cannot but have my strong doubts about it. There are hardly any differences, and I am sure, were it found in Europe, one would not have thought it different."

The third and only remaining species placed in this genus by Bentham and Hooker is "*Scopolia*" *lurida*, Dun., a native of the Himalaya Mountains. It differs from the two plants already described in its hairy, toothed leaves, strongly ribbed, reticulated and inflated calyx, and broader evidently lobed corolla.

Its habit of growth is said to be exactly that of the *Scopola* genus, but the plant has a very large, somewhat fleshy fusiform root, quite different from the comparatively small rhizome of *S. carniolica* and *S. japonica*. Specimens of the plant exist in the Kew Herbarium, from Nepaul, Sikkim and Kumaon.

At different times this plant has been referred to five different genera, under the names respectively of *Anisodus luridus*, Link and Otto; *Nicandra anomala*, Link and Otto; *Physalis stramonifolia*, Wall.; *Whitleya stramonifolia*, Sweet; *Anisodus stramonifolius*, G. Don. The large root of this plant has never to my knowledge been sent to this country as a drug, but seems worthy of chemical investigation, since it is stated by the late Dr. E. J. Waring to be as powerful as belladonna, if not more so.

I find in a fresh root of the plant (kindly sent to me from the Botanical Garden at Edinburgh by Mr. Lindsay) the peculiar raphides common to the two other members of the genus, but less equally distributed, being abundant in the cortical portion of the root, whilst very few occur in the centre, yet I venture to doubt whether it is rightly placed in the genus *Scopola*. In the hairy apparently toothed leaves, more open flowers, and very inflated and strongly reticulated calyx, it recalls *Physalis* rather than *Scopola*.

I gladly take this opportunity of expressing my deep obligation to Professor Maximowicz; also to Professor Goebel, of Marburg, for fresh specimens of the root of *Scopola carniolica*, var. *Hladikiana*, which I have now under cultivation; to Mr. R. Lindsay, for similar specimens of *S. lurida*; to Mr. J. Hart, F.C.S., of Manchester, for kindly cutting the sections which I am thus enabled to place on the table to-night; and to Mr. B. D. Jackson, F.L.S., for kindly taking the trouble to examine and confirm the synonymy I have adopted.

HISTOLOGICAL CHARACTERS OF THE RHIZOME OF SCOPOLA CARNIOLICA COMPARED WITH THOSE OF THE ROOT OF ATROPA BELLADONNA.*

BY THOMAS GREENISH.

At the request of Professor Dunstan, histological examinations of the root of belladonna and the rhizome of *Scopola carniolica* were undertaken, with the view to determine if any, and what structural differences may exist between them.

Sections were made of each root. Immediately under the epidermis of the belladonna root there is a layer of cortical cells forming a dark line. On isolating the individual cells it is found that this cortical layer consists of from six to eight tabular cells deeply coloured. Next below on the drawing (fig. 1), but inward in the root, are several layers of thin cells, pressed or stretched in a tangential direction, long and narrow; and further down again several layers of cells not so long and wide, being subjected to less pressure they tend more towards the shape of the cell in its normal condition. These together constitute the bark.

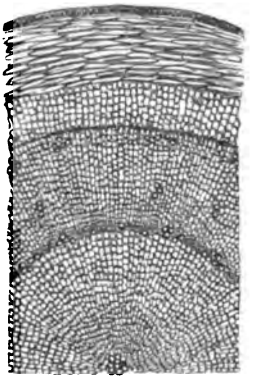

Fig. 1. Section of Belladonna Root.

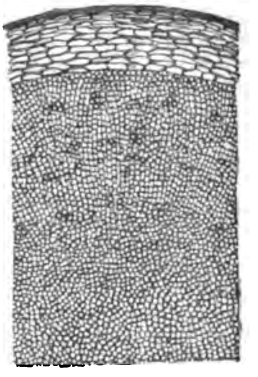

Fig. 2. Section of Scopola Rhizome.

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* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, December 11.

Within the bark there is a faint thin line, the cambium layer externally surrounding the vascular bundles, which are themselves imbedded in the cellular or fundamental tissue, and in somewhat definite lines. The cells of the bark within that dark line are of a faintly brown colour, and the same remark applies to the cells composing the fundamental tissue, but there is an entire absence of schlerenchymatous cells.

All the parenchymatous cells of the bark and from the bark inwards are more or less filled with starch grains, but these were removed to make the structure more visible. Most of them *in situ* are compound grains, being composed of two or more adhering together. The typical form is the muller-shaped grain. When the combination is a doublet they adhere by their truncated bases, and when a triplet they are muller-shaped with dihedral bases. A dark spot will be seen here and there in the fundamental tissue; these are cells of raphides cut in a transverse direction. Examining these raphides by a micro-chemical process, the application of acetic acid slowly permeating the tissue under the slide, there was no effervescence, and it was concluded that the raphides are not composed of a carbonate; most probably they are oxalates. Longitudinal sections of each were made, but they exhibited nothing special beyond the cells above referred to, in their length showing a long cell or sac filled with raphides.

Passing now to a description of the *Scopola carniolica*, the dark line under the epidermis (fig. 2) is narrower and less coloured than that of belladonna. The entire bark is not so thick; also, the vascular bundles are neither so large no so numerous, and the bundles of raphides are less bold than in the belladonna root. In fact much the same tissues are present, but less pronounced than in belladonna. The starch grains also are smaller, the typical grains being, as in belladonna, muller-shaped, but there is a large number which it is difficult to assign to any well-defined type of starch grains.

A root of *Scopola japonica* was also submitted for examination, but it was so very dark in colour and so friable that in endeavouring to get a sufficiently thin section great difficulties presented themselves. It seemed to have been at some time or other high dried, subjected to considerable heat without actually charring it. However sections were at last obtained, and the result showed the root to be identical in its general features with that of *Scopola carniolica*. To determine the probability of the colour and friable character of Japanese scopola being due to a high temperature, a piece of the *Scopola carniolica* in its normal condition was placed in a tolerably hot oven; after a time it assumed the colour of the Japanese drug, and with a high colour it was equally friable.

Very minute details, when they did not serve to elucidate any point in this investigation, have been avoided.

On the whole it will be evident from this histological interpretation that there seems a close alliance in anatomical structure between the rhizome of *Scopola carniolica* and the root of *Atropa Belladonna*.

[*The discussion on this and the preceding papers will be found on page* 477.]

ON THE ROOT BARK OF EUONYMUS (WAHOO) AND ON EUONYMIN.[*]

BY W. A. H. NAYLOR, F.I.C., F.C.S., AND E. M. CHAPLIN, F.C.S.

At the meeting of the British Pharmaceutical Conference held at Newcastle in September last we read a paper entitled "Chemical Observations on the Root Bark of Euonymus."[†] In accordance with an intimation we then made we have now the pleasure of describing further experiments respecting the chemical and pharmaceutical properties of the bark, which we have since instituted.

In the paper referred to we drew attention to a body which for the time being we named "atropurpurin," and described it as a white crystalline body possessed of glucosidal properties and having a fixed melting point of 182° C. The sample exhibited at the Conference was afterwards exposed for a considerable time on bibulous paper, with the result that it became somewhat discoloured, particularly at the edges, thus indicating that it still contained a certain amount of impurity. We consequently deemed it advisable to prepare a much larger quantity of the substance, which was purified by precipitating it from its strong aqueous solution by means of alcohol, the process being repeated several times. After treatment in this manner it was exposed for one month on blotting paper and at the end of that time was found to have remained perfectly white and permanent. This sample when examined was found to agree with that obtained previously with the one exception, that after being boiled for three hours with a 2 per cent. aqueous solution of sulphuric acid it failed to reduce Fehling's solution.

Portions were burnt with fused chromate of lead, and the following figures represent the mean of two experiments, expressed as percentage composition:—

C.	39·12
H.	7·81
O.	53·07

We consider that these results, when taken in conjuction with the characters already enumerated, and also the fact that the solution is optically inactive, afford ample proof that the body is either identical with or an isomer of dulcite. We are therefore glad to be able to substantiate the inferences drawn by Mr. Hooper in a letter which he communicated to the editor of the *Pharmaceutical Journal* of last Saturday's issue (Dec. 7).

Through the courtesy of Professor Dragendorff, of the Dorpat University, we have had the opportunity of perusing the dissertation of G. Romm upon euonymin, an extract of which we quoted in our last paper. Since reading it we find that the product we obtained by following the method which he adopted for the separation of his "euonymin" is similar in its characters to that substance as described by him, and also agrees with it in its reactions. Taking into consideration the properties of this body, amongst others its solubilities and the fact that it is precipitated by tannic acid, we are inclined to believe that it is essentially Wenzell's euonymin which Romm has succeeded in obtaining as a definite principle.

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[*] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, December 11.

[†] *Pharm. Journ.*, [3], vol. xx., p. 273.

It is interesting to note the common occurrence of dulcite in the different species of euonymus bark that have been chemically examined. Mr. Hooper states in his letter that he has proved its presence in two Indian varieties of the bark, *Euonymus pendulus* and *E. crenulatus*. Kubel also (*Journ. de Pharm. et Chemie*, 1862, p. 523) found in the bark of *Euonymus Europæus* a principle which he termed "euonymite," possessed, he states, of properties identical with those of mannite, with the exception of its mode of crystallization and melting point (182° C). We also note in Romm's dissertation that in a preparation of euonymin made by Schuchardt, Herr Merck found dulcite along with other substances.

We have recently examined a few specimens of *euonymin*, and they are interesting as showing the kind of proximate principles upon which manufacturers rely for producing the reputed effects of the drug. To the best of our knowledge these specimens may be regarded as fairly representative of the different makes supplied by wholesale druggists.

	(1).	(2).	(3).	(4).	(5).
Moisture per cent .	4·10	4·70	4·90	8·10	This sample was entirely soluble in cold water and consisted of the aqueous extract of the bark diluted with powdered liquorice.
Organic matter p.c. .	59·52	72·70	71·46	78·85	
Ash soluble in water p.c.	2·21	12·50	2·72	6·20	
Ash insoluble in water p.c.	34·17	10·10	20·92	6·85	
Silica, p c.	7·12	3·20	3·48	1·57	
Portion extracted with—					
(1) Cold water p.c.	25·20	55·60	14·18	56·26	
The marc then treated with—					
(2) Proof spirit p.c.	10·58	2·48	12·25	2·60	
and finally with—					
(3) Rectl. spirit p.c.	3·49	3·58	14·74	1·08	

No. 1. The insoluble matter consisted mainly of carbonate of barium. The proof spirit extract was chiefly composed of yellow resin and was slightly bitter to the taste. The rectified spirit residue consisted of fair proportions of brown resin and free fatty acids and was markedly acrid. Both extracts were of a green colour.

No. 2. The insoluble matter was chiefly alumina. The product obtained by treatment with proof spirit consisted chiefly of yellow resin and was distinctly bitter. That obtained by rectified spirit coloured bright green, was oily and markedly acrid and contained a small proportion of brown resin.

No. 3. The insoluble matter was mainly composed of carbonate of barium, together with salts of lime. The proof spirit extract was of a dull green colour, friable and faintly bitter and contained yellow resin. Rectified spirit yielded a bright green oily extract free from acridity and containing a good proportion of brown resin.

No. 4. The insoluble portion consisted of salts of iron, alumina and lime. The proof spirit extract was composed chiefly of yellow resin, which was coloured bright green, having an extremely bitter taste. The rectified spirit extract contained free fatty acids and was devoid of bitterness, but faintly acrid.

It may perhaps be well to point out that, in the above experiments, we do not pretend that the proof and rectified spirits used were capable of sharply separating the different principles. Of the diluents used in the preparation of the euonymins we may remark that, in our judgment, manufacturers should refrain from the use of carbonate of barium until assured that it is positively inert. The difficulty of obtaining an oily extract in the form of a permanent powder has most probably led to its selection. From a perusal of the above results, the fact which impressed itself most upon us, was the lack of uniformity exhibited between the different makes in respect of the relative proportions extracted by proof and rectified spirits, the respective preparations having been previously exhausted with water. The explanation is without doubt to be found in the circumstance that alcohol of different strengths has been used in effecting the extraction of the principles from the bark. Another point which arrested our attention was the relatively large and varied percentage of matter dissolved out by water.

Does water, cold or hot, withdraw from Wahoo bark those principles upon which its reputation as a hepatic stimulant is founded? This question is one of considerable importance, and we have not shrunk from an endeavour to contribute to its solution. For this purpose a quarter of a pound of the root bark of Wahoo in coarse powder was percolated with hot water until exhausted; the percolate was evaporated to 18 fluid ounces, and the volume made up to one pint with rectified spirit. Of this infusion one of us took one teaspoonful (equivalent to 11 grains of the bark) three times a day for ten days. Failing to recognize at the end of this period any effect traceable to the remedy, the dose was increased by one-half, and the morning one always taken before breakfast. Again no noticeable effects were produced. We then ventured to enlist the services of a few of our friends, most of whom were pharmacists. Teaspoonful doses were taken by them regularly for a week at least. In each case they reported no recognizable effect, save that they credited it with increasing the appetite.

Our next venture was to put to the test of personal experience alcoholic extracts of wahoo bark. These were obtained by extracting the root-bark, previously exhausted with water, with alcohol of 65 and 84 per cent. by weight. Of these portions, the extract from the weaker alcohol was taken in doses of two grains twice a day. It acted as an unmistakable laxative and on the third day there was evidence of an action on the liver. The 84 per cent. portion in similar doses differed only in that it acted as a more decided laxative. We feel bound to infer that while the aqueous extract of this drug may or may not possess valuable medicinal properties, its power to act as an intestinal or hepatic stimulant resides somewhere in the resinous and free fatty acid principles, which require for their removal alcohol of a strength not much below 65 per cent.

Proceeding upon these lines we have prepared a liquid extract of the drug, which we recommend for adoption by pharmacists.

Extractum Euonymi Liquidum.

Liquid Extract of Euonymus.

Take of—
Euonymus bark in No. 20 powder 20 ounces.
Rectified spirit }
Distilled water } . Of each a sufficient quantity.

Moisten the powder with 8 fluid ounces of a mixture of four volumes of rectified spirit and one volume of distilled water. Pack tightly in a percolator, and pour on sufficient menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop close the lower orifice and macerate for forty-eight hours; then allow percolation to proceed, gradually adding menstruum until the euonymus is exhausted. Reserve the first 17 fluid ounces of the percolate, and evaporate the remainder to a soft extract; dissolve this in the reserved portion, and add enough menstruum to make the liquid extract measure 1 pint.

Dose: 15 to 60 minims.

We are also of opinion that in the preparation of *euonymin* a weaker alcohol than 65 per cent. should not be used, and that the drug should be exhausted with water and dried prior to its percolation with this menstruum. The final product obtained after distillation of the spirit and desiccation of the residue, when mixed with an equal weight of sugar of milk, will be found to contain sufficient of the brown resin to powder with ease. The dose is from ½ to 2 grains.

As a tincture the process of the B.P.C. Unofficial Formulary yields an effective preparation; but, so far as our personal experience goes, the product is not more active than one which has been prepared with rectified spirit and water in the proportion of 4 to 1 by volume.

To any who may object that our statements are based upon inferences drawn from the use of methods unscientific, and too restricted in their scope, we simply ask that they will take the earliest favourable opportunity of testing our conclusions by the self-administration in suitable doses of the preparations we recommend.

[*The discussion on this paper is printed on p.* 478]

NOTES ON CALAMINE.*

BY W. MURTON HOLMES.

Although calamine cannot be said to be in very general demand, it is extensively prescribed by specialists in skin diseases, who seem to prefer it to the pure carbonate of zinc.

Whether or not its action is anything more than a mechanical one is hardly a subject for us to discuss. Our province is to endeavour to supply the demands of the medical profession.

With the object of furnishing a standard for the guidance of pharmacists, it has been re-introduced into the Pharmacopœia; but there are few substances which pass through the hands of a dispenser which exhibit greater variation.

This is very much to be regretted, and I venture to think that for the credit of pharmacy generally, there should be greater uniformity, as nothing tends more to create an unfavourable impression than different results being obtained from the same prescription when dispensed at different establishments, or even sometimes at the same.

Though well aware that several dispensing firms make a speciality of prepared calamine (no two samples of which have the same appearance), I have not found it possible to procure any in the ordinary way of business that would agree with the characters and tests of the Pharmacopœia, and it occurred to me that it might be a useful undertaking to examine samples obtained from various sources.

Before entering into detail I propose to make a few general remarks on calamine.

Calamine, or native carbonate of zinc, is found both in carboniferous limestone, and in dolomitic conglomerate, either embedded with the strata, or occupying depressions in them, and is one of the more important ores of zinc. It occurs in rhombohedral crystals, in nodules of concentric layers, in botryoidal and earthy masses, and as stalactites and stalagmites.

Its colour is equally variable, depending upon the nature of the other minerals associated with it. White, yellow, green, blue, pink, purple, and various shades of red, are all found. Its specific gravity is from 4·30 to 4·45.

Calamine is often intimately associated with heavy spar (barium sulphate); prismatic or electric calamine (zinc silicate); blende (zinc sulphide) and galena (lead sulphide). It receives its name from the reed-like appearance it presents after fusion.

The principal sources of calamine are: La Vielle Montagne, situated upon parts of the Belgian and German territories between Aix-la-Chapelle and Verviers, where the mines have been worked since 1435; Sardinia, Spain, Greece and Silesia.

"The Cantabrian coast of Spain is very rich in calamine, especially at Santander. It occurs with galena in dolomitic limestone of Jurassic age, partly in the form of veins, and partly in very irregular deposits. The ores are often found imbedded in clay, and the centre of large masses is sometimes formed of dolomite, thus indicating their origin. At greater depths crystallized blende is found in concretionary masses, covered by concentric layers of heavy spar, and near the surface it is partly converted into zinc carbonate" ('Memoirs Geological Survey,' 1876).

Messrs. Sullivan and O'Reilly ('Notes on the Geology and Mineralogy of the Spanish Provinces of Santander and Madrid,' 1863) suggest that the zinc carbonate was originally precipitated from solution either by calcium carbonate or dolomite, in some instances the replacement being so complete that calamine passes insensibly into dolomite. Both calcium and magnesium carbonates appear to have taken part in the decomposition, but the magnesium carbonate being more soluble has been removed, while some of the calcium carbonate still remains, filling joints, or forming a kind of conglomerate.

De la Beche ('Memoirs of Geological Survey,' 1876) thinks it extremely probable that calamine is derived from blende, sulphur having disappeared and being replaced by carbonic acid, the conditions under which it is found, especially in limestone districts, supporting this view.

The mines of Laurium, in Greece, which were worked 600 B.C., yield a large quantity of calamine. They contain a bed of it averaging 11½ feet thick. The ore is very rich, and is generally calcined before exportation. After calcination it averages 60 per cent. of zinc. 'Production in 1881—Roasted calamine, 36,665 *tonnes*; raw calamine, 101 *tonnes*.

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* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday December 11.

In Sardinia, calamine is found in large quantities in Silurian limestones containing masses of galena. The calamine of Lombardy is an almost pure carbonate of zinc, and was formerly used in the manufacture of brass (*Pharm. Journ.*, vol. xii., p. 460).

In this country it is found in Cumberland, Derbyshire and Somersetshire, also in Scotland and Ireland, but the production of zinc has been decreasing for some years. In 1859 the total quantity of zinc extracted from English mines was 11,556 tons; in 1872, 5191 tons.

It is impossible to state how much of this was from calamine, all the zinc ores in mineral statistics being arranged under one heading, but the quantity must have been very inconsiderable, as blende is the principal ore. Calamine was formerly so abundant in the Mendip Hills as to be used for ballast. Considerable quantities of foreign ores are brought to this country to be smelted.

The value of imports of zinc in 1886 was £1,163,665.

The Pharmacopœia description of prepared calamine is, "A native carbonate of zinc, calcined in a covered earthen crucible at a moderate temperature, powdered and freed from gritty particles by elutriation."

"A pale pinkish-brown powder without grittiness, almost entirely soluble, with effervescence, in acids."

Seven samples of prepared calamine were examined as to their solubility.

A. Prepared from a selected piece of ore. Left 6 per cent. residue after boiling in strong hydrochloric acid.

B. Obtained from a wholesale drug house. A heavy soft powder, free from grit. Said to be genuine, but artificially coloured. No effervescence on boiling with hydrochloric acid. Left 84 per cent. residue.

C. From a retail pharmacy. Pale brick-coloured, not very smooth, and rather dirty. Effervesced briskly, and left 64 per cent. undissolved.

D. From a retail pharmacy. Pale salmon colour. Effervesced briskly, and left 66 per cent. residue.

E. From same source as the last sample. Paler in colour, brisk effervescence on boiling with acid. 70 per cent. residue.

F. From wholesale drug house. Specific gravity, 3·8. Effervesced briskly, 60 per cent. undissolved. Suspecting the presence of prepared chalk, I carefully washed some and examined it microscopically. The presence of foraminifera confirmed my suspicions.

G. From a retail pharmacy. Very slight effervescence on boiling with acid. 76 per cent. residue.

The insoluble matter in a few cases was examined and found to contain barium sulphate and silica.

In March, 1887, a paper appeared in the *Pharmaceutical Journal*, by Mr. Bennet, on "The Calamine of Commerce," in which the results of the analyses of four samples were given. These showed that two of them contained a fair proportion of zinc, one four per cent. only, whilst in one zinc was conspicuous by its absence.

As the prepared calamine was so unsatisfactory I turned my attention to the ore itself, and procured some from Derby, a sample of which is exhibited. Unroasted ore, specific gravity 3·8, left 40 per cent. residue after boiling with hydrochloric acid.

Roasted ore, specific gravity 4·0. Effervescence brisk and long continued on boiling with hydrochloric acid. Residue 30 per cent., chiefly barium sulphate.

I am very much indebted to Mr. Grose, of Swansea, for the great trouble he has taken in procuring me a number of samples of calamine sent to that port for the purpose of being smelted, and which are now exhibited.

Up to the present time I have been unable to procure any of Belgian or Spanish origin. The La Vielle Montagne Company has two or three agents in London, neither of whom was able to supply me with the raw material.

1. Italian calamine. Roasted before importation. Beautiful pink colour. No effervescence on boiling with hydrochloric acid. Residue 20 per cent.

2. Italian calamine. Roasted before importation. Effervesced slightly on treating with acid and left 60 per cent. residue.

3. Calamine from Laurium. Unroasted. Said to be the finest imported and to contain 63 per cent of zinc, but too dark in colour for use in pharmacy.

Several other samples were sent, but either their origin was unknown or the colour unsuitable.

In calamine we have to do with a very variable substance—one that varies considerably in the same vein of ore, and it would be possible to produce a prepared calamine answering all the Pharmacopœia tests with but a small percentage of zinc in its composition, and containing instead calcium or magnesium.

In my opinion in the next edition of the Pharmacopœia the source of the calamine should be stated—a source whence not only a few isolated good pieces of ore can be selected, but one where the whole is of tolerably uniform quality, and the supply abundant.

Then again the percentage of zinc should be stated, and there should be something more definite with regard to colour than the description "a pale pinkish brown." Perhaps a slip of paper of the required tint of the calamine *when moist* could be inserted.* Better still would it be if something of a definite nature could be substituted. Possibly the white variety, which is also the purest, with a definite quantity of colouring matter, would answer the purpose.

There is no difficulty in levigating the ore when it can be obtained. My plan is to roast it gently on a gas stove for about a quarter of an hour. This makes it darker in colour and at the same time more friable, so that it is easily powdered. I then wash with plenty of water, pass the liquid through lawn, and allow the suspended matter to subside. The supernatant liquid is then poured off, the pasty mass allowed to drain on calico, then pressed and dried. It is finally passed through a sieve to break up any lumps.

[*The discussion on this paper is printed on p.* 478.]

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* I say "when moist" because the colour is then more decided.

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DEATH BY POISON.

THE publication of the Annual Report of the Registrar General furnishes opportunity for again taking a retrospective review of the extent to which death by poison continues to occur. According to the data contained in that report relating to the year 1888 the total number of deaths by poison in England and Wales was 710. In the Registrar's report these deaths are classed among those resulting from some form or other of violence, the total number of which was 17,534. It will be seen therefore that although the deaths from poison are slightly more numerous than in the previous year they constitute only a very small proportion of the classes under that head, and that altogether there is, relatively to other causes of violent death, but little reason to entertain much apprehension on this score from poison. It is reasonable to infer that the restrictions imposed upon the sale of poisons have been influential in bringing about such a state of matters, and that in this respect the Pharmacy Act of 1868 has really been very beneficial in the interest of public safety. Of the total number of 710 deaths by poison that are recorded as having occurred in the year 1888, some were cases in which poison was used with homicidal or suicidal intention, no less than 333 of them having been of that character. It may be useful to compare this number with the total number of deaths ascribed to homicide and suicide, which is 2609, those due to poison amounting to 12·38 per cent. of the whole. Here, again, it will be seen, that poison has been comparatively a danger that is much less to be feared than others, although the deaths from suicide have been relatively more numerous than they have ever been before. The remainder of the deaths from poison, amounting to 377, are ascribed to accident or negligence, and it is to cases of this nature that most interest attaches in considering this matter in connection with the protective provisions of the Pharmacy Act. Comparing the total number of cases of poisoning by accident or negligence with the total number of deaths from accident or negligence, amounting to 14,908, it will be seen that the proportion is very much less than in cases of homicide and suicide, or only 2·5 per cent., although the deaths from accident and negligence were fewer in proportion to the population than in any previous year. We are therefore justified in concluding, as on previous occasions, that the obligations attaching to the keeping, dispensing and sale of poisons within the meaning of the Pharmacy Act continue to have been efficiently performed by the persons authorized under that Act to sell poisons. But there is still room for the extension of those obligations to other articles that are not now comprised in the schedule of poisons within the meaning of the Act. For instance, we find that carbolic acid has been the cause of death by accident in no less than 27 instances, and mineral acids have been the cause of death in 13 instances. Among the cases of suicide also carbolic acid has been the cause of death in 64 instances, and mineral acids have been the cause of death in 28 instances, so that in all no less than 132 deaths have been caused by carbolic acid and the mineral acids, which are not poisons according to law, or in other words no less than 18·5 per cent. of all the deaths by poison have been caused by these substances. This brings the deadly effect of these articles very nearly to an equality with that of the narcotics, which always rank as the most frequent causes of death, either by suicide or accident and negligence, and this fact constitutes a strong argument for the need of additional precautions in the sale of carbolic acid and the mineral acids. Another of the causes of death by accident which occupies a prominent position is lead, 106 cases of death being ascribed to it. In the absence of further information most of these deaths may, however, be referred to the effects of lead upon persons engaged in the lead works.

In the adjourned discussion of the sale of poisons question at the Chemists' Assistants' Association on Tuesday, the resolution proposed by Mr. Blackham "That it was not the intention of the framers of the Act to preclude unqualified assistants from selling poison," was carried *nem. con.*; but the larger number of those present refrained from voting. Mr. Millard also moved "That the meeting of the Chemists' Assistants' Association is of opinion that no sale of poisons should take place except under the personal supervision of a registered chemist, who would undertake the responsibility." This was carried by a large majority, and there can be no doubt that it meets the real point of the case. It would be a stultification of the Act if the qualification to sell poison were made the means of authorizing unqualified persons to do so, except under the direct supervision of those who have the qualification.

* * *

The next meeting of the Chemical Society will be held on Thursday, the 19th inst., when a paper will be read "On Frangulin," by Professor Thorpe and Mr. H. H. Robinson.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, December 11.

An Evening Meeting of the Society was held at 17, Bloomsbury Square, on Wednesday, December 11. The chair was taken at eight o'clock by the President, Mr. Michael Carteighe.

The proceedings commenced by the reading of the following six papers, arising out of an investigation conducted in the Research Laboratory:—

"ON SCOPOLA CARNIOLICA." Introductory. By PROFESSOR DUNSTAN. [Printed at p. 461].

"ON THE CHEMISTRY OF SCOPOLA CARNIOLICA." By Professor DUNSTAN and Mr. A. E. CHASTON. [Printed at p. 461].

"ON THE PHARMACY OF SCOPOLA CARNIOLICA." By FRANCIS RANSOM, F.C.S. [Printed at p. 464].

"OBSERVATIONS ON THE THERAPEUTIC ACTION OF SCOPOLA CARNIOLICA. By Sir DYCE DUCKWORTH, M.D., F.R.C.P. [Printed at p. 466].

"ON THE NATURAL HISTORY OF SCOPOLA CARNIOLICA." By E. M. HOLMES, F.L.S. [Printed at p. 468].

"ON THE HISTOLOGICAL CHARACTERS OF THE RHIZOME OF SCOPOLIA CARNIOLICA COMPARED WITH THOSE OF THE ROOT OF ATROPA BELLADONNA." By THOMAS GREENISH, F.C.S., F.R.M.S. [Printed at p. 471].

The reading of the papers gave rise to the following discussion:—

The PRESIDENT having invited discussion—

Mr. GROVES said he was led to hope by what had been stated in Professor Dunstan's paper that scopola might turn out to be a valuable source of hyoscyamine. As to the cheapness of the liniment desired by Sir Dyce Duckworth he thought the price did not depend so much upon the raw material. Belladonna root was cheap enough, but it was in the making of the preparation that the cost was involved. He had not quite gathered from Sir Dyce Duckworth's remarks whether he had tested scopola with a view of ascertaining if it produced the physiological effects of hyoscyamus or those of atropa; but he believed it was understood that hyoscyamine had a decidedly different effect from that of atropine. He believed it had been maintained that the alkaloid of atropa in the natural state of the plant was really hyoscyamine, and that it was in some way converted into atropine. Possibly the root of atropa if treated with sufficient care might yield a larger proportion of hyoscyamine, and a less proportion of atropine.

Mr. MOSS said that if he remembered rightly, Will, in his work on hyoscyamine, stated that hyoscyamine and hyoscine, particularly in the presence of an alkali, readily change to atropine. Professor Dunstan had told them that scopola did not contain atropine at all, and also that he obtained this hyoscyamine from scopola by precipitation in the presence of ammonia. He did not know whether Will in his paper alluded to ammonia, or whether his observations applied only to the influence of fixed alkalies. If so, there might be no inconsistency between what he said and what Professor Dunstan had stated. It was difficult to discuss all round papers like these, but he was sure the Society was to be congratulated on the manner in which the work was being done in the Research Laboratory. It was just the kind of work that it should go in for, and if all its work were done as well as that had been done, the Society would have every reason to be proud of its success.

Dr. HARRISON wished to know, as a medical man, whether Sir Dyce Duckworth had found that the same dryness of the throat had followed the administration of scopola which was so often met with when giving tincture of belladonna. If its administration was not followed by that unpleasant symptom it would prove of greater value even than belladonna.

Sir DYCE DUCKWORTH said that in his search for facts he had been quite in ignorance as to what he was to expect to find. He was told that scopola was an atropaceous drug and might possibly be useful where belladonna or henbane were used. Perhaps he might be said to have started on the belladonna track; he certainly had used it in cases where he should have used belladonna. In no case had the extract, in doses he had used, produced any dryness of the mouth. If it should turn out to be constantly the case that the preparations of scopola did not produce that symptom that would be a decided advantage over belladonna.

Professor DUNSTAN said that scopola would undoubtedly be a useful source of pure hyoscyamine. There was on the table a specimen of the alkaloid in a perfectly pure condition, and there was no difficulty in extracting it from the plant if proper precautions were taken. In all their experiments dilute ammonia was used, which Will had shown to be without immediate action on hyoscyamine. With reference to Will's observations about the conversion of hyoscyamine into atropine Ladenburg had recently adduced evidence to show that they were, in part at any rate, incorrect, Ladenburg's conclusions differing considerably from Will's. From what had already been done it seemed probable that scopola was a drug which might be used in place of belladonna; whether it could be used with greater advantage than belladonna, perhaps remained to be proved. He hoped that Sir Dyce Duckworth would not only continue his observations with respect to it, but also make a few trials with the pure hyoscyamine which had been obtained. It was doubtful whether physiological or therapeutic observations had yet been made on the action of *pure* hyoscamine and *pure* atropine.

The PRESIDENT said he was sure that all present would agree that the contributions by the various authors on the subject of scopola were of a very comprehensive character, and as far as they went, as complete as it was possible to have them in one series of observations. The duty of a corporate body in carrying on a Research Laboratory was obviously to do work which an individual alone could not perform. There were many distinguished men in the Society who were competent to do original work, as far as circumstances and the surroundings of ordinary life would permit them, but in a corporate research laboratory it was of great importance that conjoint work of that kind, dealing with the chemistry, the pharmacy, the physiological action, and the therapeutic action of drugs should be all duly recorded. In that instance they had been fairly successful, and even if the result of all that investigation should prove that scopola was not a bit better than atropa for medicinal purposes, he did not think the work would have been in vain. It was exceedingly important in the interests of pharmacy and advanced therapeutics that these alkaloids should be obtainable in a definite state. Those who were chemists knew how little they could say about those bodies. Their complexity and want of definite characters rendered it difficult to speak with certainty of the alkaloids of that class. As chemists and pharmacists they had to call in the aid of the physiologist and the therapeutist to see if it was possible to confirm the results they had arrived at. In conclusion he moved a cordial vote of thanks to Professor Dunstan, Mr. Chaston, Mr. Ransom, Mr. Holmes, Mr. Greenish and Sir Dyce Duckworth for their contributions, which was carried unanimously.

The next paper was—

ON THE ROOT BARK OF EUONYMUS (WAHOO) AND ON EUONYMIN.

BY W. A. H. NAYLOR F.I.C., F.C.S., AND R. M. CHAPLIN, F.C.S.

The paper is printed at p. 472, and gave rise to the following discussion:—

The **PRESIDENT** said that this was essentially a practical paper. There was he thought no doubt about the value of the drug in the treatment of disease. It was one of the new remedies which had shown good cause for its establishment in this country.

Mr. **MARTINDALE** said that it sometimes happened that a drug would come into fashion for a time and then after a while drop out again, and he thought this had been to some extent the case with euonymin.

Mr. E. M. **HOLMES** said it was only fair to point out that euonymin was made in the United States, where it was much more easily prepared than in this country, the fresh bark being obtainable. He had had experience of euonymin and found it very valuable, but the quality of the preparations varied considerably, and Mr. Naylor had done well to point out the very great variations which existed in them. In his opinion the powder should not be used. The fluid extract which Mr. Naylor proposed was a far more satisfactory preparation than the powder.

The **PRESIDENT** quite concurred in the observations of Mr. Holmes. The Society was much indebted to Mr. Naylor for working out a process for a fluid preparation of that kind which could be made of a definite and uniform strength. Those eclectic remedies had done good service, but there was no doubt that the system adopted by the eclectics of converting everything into a powder was not a satisfactory one; and he must congratulate Mr. Naylor upon the courage with which he had come forward to propose that the so-called euonymin should be replaced by a preparation of definite strength.

A vote of thanks to Mr. Naylor was moved by the President and carried unanimously.

The next paper was entitled—

NOTES ON CALAMINE.

BY W. MURTON HOLMES.

The paper is printed on p. 474, and gave rise to the following discussion:—

The **PRESIDENT** said in his opinion calamine ought not to be in the Pharmacopœia at all. Those who were specialists in skin diseases preferred a soft impalpable powder such as could be obtained from the carbonate of zinc; and all the grinding in the world would not make calamine what they required. The difference was about as great as the difference between natural magnesite and the substance obtained in the ordinary process of precipitation. Magnesite might be ground to an exceedingly fine powder, and yet the particles would remain so hard that dilute acid had positively no action upon them; and the same remark applied to calamine. They could get a very fine powder but the particles were still so hard that it seemed to him they must necessarily be irritating. He thought the authorities of the Pharmacopœia had been somewhat misled in reintroducing a mineral which must in the nature of things vary in different parts of the world. He thought the reputation of calamine had been obtained from artificial preparations of carbonate of zinc.

Sir **DYCE DUCKWORTH** said he could confirm what the President had stated. To him calamine had always seemed one of the most inscrutable preparations in the Pharmacopœia. He was told many years ago that the average specimen of calamine consisted very largely of sulphate of baryta. At one time, having charge of a large department for the treatment of skin diseases, he had occasion to use calamine very largely, and he had long thought that it was introduced merely to produce a flesh-coloured tint in lotions. The finer powders were the better for the dermatologist; they could not be too fine. If anybody had been satisfied with calamine he took it that they had been supplied with a good preparation of carbonate of zinc, coloured in some way. There was a good deal of the conservative about him in these matters, and he was very loth to part with anything about which any good could be said, but he did think the time had come when calamine might be dropped out of the Pharmacopœia.

Mr. **MARTINDALE** said that calamine formed a denser powder than the factitious article manufactured from carbonate, and he thought much of its action was due to the fact that the powder would stick longer than that from the ordinary carbonate of zinc. There was a preference given to calamine, and he thought there was something in it. It was true it was difficult to obtain, but he personally should be sorry to lose it.

The **PRESIDENT** said he was afraid that a large part of the preference and love for calamine were purely sentimental. He did not think they knew what natural calamine was. His experience was that it was almost invariably prescribed with oxide of zinc. Experiments on his own skin showed that the difference between carbonate of zinc and calamine was very great.

Mr. **GROVES** said the reputation of calamine was acquired centuries ago, before the carbonate of zinc preparation was known. It must have had some beneficial effect or otherwise it would not have been adopted and retained so long.

Mr. **MURTON HOLMES** said the whole of his experiments tended to prove that a definite calamine could not be obtained, one that was almost entirely soluble in acids, and as it was generally used with oxide of zinc he thought it would be very much better if the Pharmacopœia ordered a definite mixture with a carbonate.

The **PRESIDENT** moved a vote of thanks to Mr. Murton Holmes for his paper, which was carried unanimously.

Donations to the Museum.

The **CURATOR** called attention to a fine series of minerals and other objects of interest presented by Mr. H. B. Brady, F.R.S.; to specimens of ouabain, crude and purified, presented by Messrs. Thomas Christy and Co., remarking that it had been stated in the Journal (*Pharm. Journ.* [3], xix., p. 162) to possess properties similar to but stronger than strophanthus; to two forms of botanical presses for plants, one exhibited by Mr. Thomas Christy, and the other by Mr. Helbing, both of which had the advantages of ventilation and portability. He then pointed out that a specimen of leaves of *Pilocarpus Selloanus*, presented by Mr. J. O. Braithwaite, showed that this species of jaborandi, which came from the Republics south of Brazil, was still in commerce, and said that it did not appear to be generally known that it contained less alkaloid than the Pernambuco kind. The specimen of Bissabol, brought by Mr. Umney, was now in the market in considerable quantity. It generally went to Trieste, and passed under the name of opopanax. True opopanax, however, had a much more disagreeable odour. The specimen of Johor ipecacuanha, presented by Mr. Mase, differed in appearance from what had been offered previously in its more starchy fracture, and in representing both the grey and red varieties met with in Brazil.

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held on Wednesday, the 4th inst., at 17, Bloomsbury Square, at 4·30 p.m.

Present,—Mr. Carteighe in the chair, Messrs. Atkins, Gerrard, Holmes, Martin, Professors Attfield and Green, Mr. Martindale (Hon. Treasurer), and Mr. W. A. H. Naylor (Hon. Gen. Sec.). The minutes of the previous meeting were read and confirmed.

The Chairman moved the resolution standing in his name. "That Mr. F. Ransom, F.C.S. (Hitchin), be appointed an Honorary General Secretary of the Conference." In speaking to the resolution he reminded the members that Mr. Ransom had already done good work in pharmacy, that he was loyal to the Conference, and that he had the business ability and could give the time requisite for the fulfilment of the duties that the Secretaryship demands. He had great pleasure, therefore, in moving that he be appointed.

Professor Attfield, in seconding the motion, referred to Mr. Ransom's progressive career from the scientific side, and Messrs. Atkin and Martin congratulated the Conference on his willingness to serve.

The motion was then put and carried unanimously.

The next business discussed had reference to the forthcoming edition of the 'Year Book.' Mr. Naylor stated that the final proofs had been passed by him, and that copies of the volume would be ready for distribution by the end of the year.

Provincial Transactions.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The first of a series of meetings for the purpose of reading papers and discussing subjects of trade interest which the Council of this Association purpose holding, took place on Thursday, December 5, in the Leicester Guildhall Library, under the chairmanship of the President (J. G. F. Richardson, Esquire, J.P.). Upon this occasion a paper was read on—

THE MEDICINE STAMP ACT.

BY W. THIRLBY.

I think it only right to say at the outset that I am not responsible for the choice of the subject with which to commence this series of trade meetings, nor yet for the selection of the writer.

It is no affectation to say that I had much rather the duty had been entrusted to someone more able than I am to deal with it, and I can only ask your indulgence while I endeavour to lay before you an important item in our business life, and one that is constantly demanding the utmost circumspection.

I venture to say that no Act of Parliament has been passed that causes (and has caused) so much trouble to those most concerned as the law we have to consider to-night. The fact is, no one understands it; not even those who have to administer it, or else how would they give such contrary ruling, as in the case of a diarrhœa mixture label submitted to them on February 15, 1889, which they say makes the medicine liable to duty, and when re-submitted on the 19th, four days later, they say is not liable. Again, on May 8, a label for anti-neuralgic mixture was marked "liable," but in July following the same label was marked "not liable."

We all remember the hard fight Mr. Lamplough had to get his saline exempted, although to a non-legal mind, the law seemed decidedly in his favour, the wording of the Act being, "and all compositions in a liquid or solid state to be used for the purpose of compounding or making any of the said waters," *i.e.*, aerated waters.

In view of this uncertainty on the part of those who administer the law is it any wonder that chemists sometimes make a mistake as to the liability of their preparations to duty? and would it not be reasonable on the part of the Inland Revenue to inflict no fine for the use of any label unless the same was continued to be used after they had given notice to the user that it involved liability to duty? At various times there have been agitations against the duty, but as the Revenue reaps such a rich harvest there is no prospect of any relief in that direction. In the financial year 1887–8 there was received from 21,600 vendors the sum £5,400 and the stamps sold realized £191,797 10*s.* 6*d.*, therefore it is not at all likely that any Chancellor of the Exchequer will be willing to forego a sum of nearly £200,000 from his annual Budget, especially as the amount is growing and costs so little to collect. The Act is now hoary with age, and although we have a great respect for what is venerable we should be quite willing to part with our old friend, for except for the money it brings into the Treasury it does no good but a great deal of harm, for unscrupulous persons try to make a capital out of this stamp by quoting it as a guarantee of good quality, when as we know it is only a convenient way of hiding defects and covering a multitude of sins; *e.g.*, quinine wine with too little quinine in. The tax upon medicines was first imposed in 1783, rather more than a century ago, when an impecunious Chancellor of the Exchequer, looking about for some new tax by which to raise the wind, fixed on the quack medicines which were then, as now, having a large sale, and he estimated the revenue would be about £15,000. This Act remained in force two years, and in 1785 was replaced by another Act which in 1802 gave way to another which has been the basis of all subsequent legislation.

All the earlier Acts provide for a graduated license. Vendors in London, Westminster, or Edinburgh paying £2, and those in country places only 5*s.*, but about fifteen years ago this was altered to a uniform charge of 5*s.* in all places. I have always thought this was a mistake, as greengrocers, hucksters, or anybody else in any back street can now take out a license and compete with the chemist in an important part of his business. It is not often people want to be taxed, but for my part I would rather the tax had been raised instead of lowered, and so the trade kept in the hands of the chemist.

As matters now stand a person can go to a shop in a side street and buy one Beecham's Pill for a farthing, and it is currently reported stamped medicines are sold in a large number of shops in this town without any license being held by the vendor, the officers of the Inland Revenue giving as a reason for non-interference that the sum of 2*s.* 6*d.* which they would receive as their part of the fine, not being equal to the trouble and annoyance involved.

It is sometimes urged that as the public pay the tax, we ought not to complain; others say "Agitate against the stamp and get it removed;" but I have tried to show that this is impossible. It has been tried before and always resulted in failure and would do again. The only practical suggestion I can offer is that where any doubt exists as to the liability of a label, submit it to the authorities and act according to their ruling.

I have tried this recipe. Another plan that has been recommended to me, which I give for what it is worth, is do not push the so-called patent medicines, but give prominence to your own preparations. (Surely we can make a purifying pill as well as a cobbler can?) And then always discount those things that require such a large amount of advertising to make them go, being assured that what professes to cure everybody of everything will end in curing nobody of anything.

The President, in inviting discussion, said he hoped that this subject would be well thrashed out, as he was sure the Council of the Pharmaceutical Society would be glad to receive the opinions from provincial Associations.

Mr. J. Young said that he had listened to Mr. Thirlby's paper with pleasure, but that he was slightly disappointed, insomuch as he had not attempted to define the Act more closely. He was of opinion that a higher fee for the licence would be gladly paid by chemists, but he doubted whether it would be of much avail, as then the large dealers would still be on a par with chemists, and they would pay for their customers. On the whole he would prefer the Act to stand as it is, but would like to see an alteration in its administration.

Mr. W. Rowe said that having himself been a sufferer under the Act he could quite appreciate its importance, but he thought it decidedly unfair that confectioners should be able to advertise their cough drops and such like preparations, as was done in Leicester, and yet get off scot free.

Mr. Lloyd said that in his opinion the chief difficulty was the obscurity of the Act, which not only was not thoroughly understood by chemists, but not even by those very people who were called upon to administrate it. He also considered that the sale should be limited to qualified persons, and that as there seemed no probability of ever removing the Act itself, he thought that some preparations might be exempted for dispensing and such like purposes.

Mr. W. Thirlby then briefly replied, mentioning the case of cod liver oil with the possessive case being taxed, stating that not long since he had seen an advertisement in the local paper of a "quinine wine protected by Government Stamp." He had had customers inform him that the stamp implied a guarantee of the purity and efficacy of the drugs enclosed, and he again urged his brother chemists to send their labels to Somerset House, as they would be sure to get a reply as to whether they were liable or the reverse.

The President, in thanking Mr. Thirlby for his paper said, I regret the small attendance of chemists in business, as the Council of this Association are initiating such meetings as the present, differing as they will from the educational branch which is being carried on with such success in the hope of arousing their interest. But everything has a beginning, and I hope that when other subjects come forward there will be a larger attendance. I deeply sympathize with the trade concerning the method in which the Stamp Act is carried out, and the way in which chemists throughout the country are harassed by the Somerset House authorities. It is such an easy matter for an inspector to go into a chemist's shop and purchase four or five articles and then submit them to Somerset House and obtain his share of the fine imposed. My views to a considerable extent are in accordance with those expressed by Mr. Thirlby, and I should like to see the fee for the license raised to a guinea in the provinces, but you must remember that chemists themselves are to blame for its being originally lowered. The question is, Are you in favour of the total abolition of stamp duty, or are you in favour of its retention, but with a modification of its administration? Personally I am in favour of the latter course. Originally it was only intended to apply to quack medicines, but as you have seen it has grown to such an extent that probably the Revenue will soon be deriving a quarter of a million per annum, and as it costs so little to collect there is no likelihood of its repeal. Indeed, I should be sorry to see it abolished, as there would be immediately a perfect flood of quack nostrums. But that pharmacists, who are often called upon to cater for the public by giving them simple remedies, should be taxed is an insult to an educated body of men. I must here, however, allude to the courtesy always shown by the Somerset House authorities, for if you only send them a label you may, as Mr. Thirlby has said, always depend upon receiving an answer stating whether it is liable or not. But where I fear chemists often make a mistake (and this is a point I notice has not been touched upon at the recent Newcastle meeting) is in not also sending up the hand bill or the newspaper advertisement in which the medicine is more fully described. I feel strongly that some steps ought to be taken to obtain an amended Act whereby retail chemists should be exempt from this obligation. I should like a small committee formed to memorialize the Council of the Pharmaceutical Society on the subject; and accordingly I propose that Messrs. Thirlby, Butler, Rowe, and Burford, together with the Secretary, be requested to draw up a memorial.

This was seconded by Mr. J. Young, and with the addition of the President was duly carried.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE SALE OF POISONS BY UNQUALIFIED PERSONS.

Sir,—There is a point in connection with the Society's action against unqualified men, which deserves more consideration than has hitherto been given to it, *i.e.*, the way in which the question bears upon "qualified" assistants.

When I was an assistant I remember I used to be very angry because after I had taken the trouble and pains to study in the Society's school and to pass my examinations I had as competitors for nearly every berth I sought men who had taken no such trouble, and who were, in consequence, prepared to accept lower rates of pay than I expected.

The Society's action may therefore, in this connection, be of considerable service.

1. By making qualified men worth more, *cœteris paribus*, than those who have not passed their examinations.

2. By giving unqualified men a stimulus to work. We all know that one of the great difficulties we have with apprentices and unqualified assistants is to get them to study. Perhaps if we put a premium upon qualified men this difficulty will be somewhat lessened.

Let us remember that it is the young, qualified men of to-day who will constitute the Society of the future. They will be the pharmacists of a few years hence, and if we can get them when young to attach themselves to the Society the probability is that they will grow up in its best traditions, and will carry these on to the time when they will be in business for themselves. And anything we can do to benefit their present position is likely to attract them to our ranks.

I fancy I hear somebody saying, What is to become of the unqualified "juniors," "improvers," and "chronics"? Well, they may improve into "qualified men!" But if not, they must take their right place behind those who have passed the Society's examinations, *i.e.*, they will be worth less, *cœteris paribus*, than the latter are.

EDWARD CULLINAN.

Westminster Hospital Medical School, S.W.

Note.—In consequence of the unusual space taken up in this week's journal by the report of the proceedings at the Evening Meeting on Wednesday, we are compelled to defer the publication of the proceedings of the Pharmaceutical Society of Ireland and several other communications.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hill, Fraser, Morrison, Baxter, Aston, Cripps, Reynolds, Proctor, Wright, Oxen, Abraham.

THE DETERMINATION OF THE DIASTASIC POWER OF EXTRACT OF MALT.

BY R. A. CRIPPS, F.I.C.

The above title indicates the scope of this brief note; it is not my intention to enter into the question of the value of extract of malt as a nutrient, but simply to record a fact of considerable importance in connection with the determination of its value as a digestive of starchy foods.

Considerable importance is attached to the estimation of this digestive power; it is therefore very strange that published results should show such extraordinary differences, *e.g.*, Messrs. Dunstan and Dimmock (who were, I believe, the first to introduce a ready method for making this determination) state that the best malt extracts of the market should completely digest *one-seventeenth* of their weight of starch in several (three?) hours (*Pharm. Journ.*, [3], ix., p. 733). Carl Jungk, in a paper in the *American Journal of Pharmacy*, June, 1883, and *Pharm. Journ.*, xiv., p. 104, describes a method whereby the effect of malt extract upon starch mucilage is tested at intervals of one minute, and says that good extract of malt should convert *its own weight* of starch within ten minutes at 100° F. Later still, *Pharm. Journ.*, xv., p. 236, T. S. Dymond compares the two methods above referred to, and after condemning Jungk's method, states that a good malt extract should completely digest one-fifteenth of its weight of starch in half an hour at 140° F.

I think the key to these divergencies will be found in the experiments recorded below. It is evidently not in the fact that malt extract has improved during late years, for Mr. Dymond's experiments are of later date than those of Herr Jungk. Nor do I think that the English-made extracts of malt are inferior to those of foreign manufacture, as might be suggested by the low results of the English experimenters; on the contrary, from the experience of large numbers of determinations, I am strongly of opinion that (generally speaking) English extracts are distinctly superior to either American or German ones.

In the first place I will describe the method I am in the habit of using, for which I do not claim any originality, it being simply a modification of the foregoing processes:—

1. Prepare a mucilage by mixing 1 grm. of potato starch or arrowroot (dried in an oven at 212° F.) with 10 c.c. of cold water, add 100 c.c. of boiling water, and boil the whole for half an hour; allow to cool to about 100° F., and make up the measure to 100 c.c.

2. Dissolve 5 grms. of the sample of extract of malt in water sufficient to produce 50 c.c. of solution.

3. Dissolve ·1 grm. iodine in 100 c.c. of water by the aid of ·2 grm. of iodide of potassium.

50 c.c. of starch solution is introduced into a flask or bottle and kept in a water-bath at a temperature of 98° to 100° F. until it has attained that temperature, when 5 c.c. of the malt solution is added (also at 98°-100° F.), gently shaken to mix thoroughly, and replaced in the water-bath; after five minutes and at intervals of five minutes (or less if found desirable) 4 c.c. of the liquid is poured into a test-tube containing 1 c.c. of the iodine solution. A good extract of malt will give no indication of starch or dextrin after ten, or at most, fifteen minutes, while one which still gives a distinct coloration after thirty minutes should be rejected as quite unfit for use; that is, *extract of malt should completely digest its own weight of potato starch in 10-15 minutes at 98°-100° F.*

It will be remarked that I have selected potato starch or arrowroot for this test, other starches giving widely differing results. The accompanying table will indicate the importance of using one or other of these kinds of starch, and, as mentioned above, probably suggests an explanation of the widely differing results of other observers.

The different mucilages were all prepared as described above, and quantities of mucilage representing ·05, ·1 and ·5 grm. of each starch (dried) introduced into the bottles, the bulk of each being made up to 50 c.c. with distilled water, and ·5 grm. of extract of malt added to each.

	0·5 grm.				0·1 grm.			0·5 grm.			
	5 min.	15 min.	30 min.	45 min.	5 min.	15 min.	30 min.	5 min.	10 min.	15 min.	30 min.
Arrowroot . . .	Done.	—	—	—	Done	—	—	Bht brn	Palebrn	Done*	—
Maize	Bluish	Bluish	Done	—	Indigo	Indigo bl	Violet	—	—	—	Clear bl‡
Potato	Done.	—	—	—	Done	—	—	Bht brn	Palebrn	Done†	—
Rice	Bluish.	Pale bl.	Done	—	Blue	Bluish	Pale vlet. bwn	—	—	—	Cl. vlet.‡
Wheat	Brownish violet.	Violet brown.	Violet tint	Very pale violet	Brown-violet	Violet	Purple	—	—	—	Cl. vlet.‡

CHEMICALLY PURE NARCEINE.*

BY E. MERCK.

In a note entitled "Narceine and its Salts,"† D. B. Dott refers to the contributions to the knowledge of narceine that have appeared during the last three years. As the results to some extent of my work are spoken of in terms of unfavourable criticism I feel called upon to bring forward the following facts:—

Chemically pure narceine was not hitherto obtainable in commerce. I have, on the contrary, pointed out that the samples of English narceine examined by me during a series of years did not consist of the free base, but were basic salts—hydrochlorides, acetates and sulphates—and that in addition they contained other substances in varying quantities.

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* Completed in twelve minutes.

† Completed in twelve and a half minutes.

‡ These colours refer to the liquid five times diluted; the colour was too deep to be seen before dilution.

* See the communication under the same title in the *Chemiker Zeitung*, 1889, p. 525, translated in the *Pharm. Journ.*, [3], vol. xix., p. 1034.

† Read at the Newcastle meeting of the British Pharmaceutical Conference (*Pharm. Journ.*, Oct. 26, p. 335).

Since a theory has value only when it is supported by experimentally proved facts, I have not, in the absence of such experiments, spoken more definitely upon the chemical nature of these samples of narceine containing acid, but in print have only stated that they are "probably to be considered as basic salts."

Dott appears to have overlooked this, since he ascribes to me that I look upon these substances as mixtures of free base and normal salts. However I willingly concede that the expression selected by me in one place might furnish opportunity for an error in the sense indicated, though my intention was to mention in that place the results of an analysis showing the presence of hydrochloric acid in narceine, simply because that very interesting fact was thus brought under notice in the most drastic manner.

As to the collision with Wright's investigations upon narceine hydrochloride, I may remark that my object was to illustrate the difficulties attending the attempt to remove the whole of the acid from commercial narceine. With that object I selected a sample of narçeine containing hydrochloric acid, and in that respect corresponding to the majority of the preparations tested, but the same results hold good for narceine containing either acetic acid or sulphuric acid.

The fact then observed was that narceine crystallized out from 50 per cent. alcohol, and even in the presence of free ammonia, still contained hydrochloric acid, and that fact was at any rate so surprising and so new that a closer investigation appeared to be justified.

It can easily be ascertained by experiment that, contrary to Dott's statement, narceine containing hydrochloric acid cannot be perfectly freed from the acid by recrystallization.

In the case before us I cannot agree with the views of Dott upon the limited importance of the melting point as a means of establishing the purity of certain alkaloids, for it is only when narceine is absolutely free from acid and other foreign admixtures that it melts above 170° C.

In respect to the use of the alkaloid it was expressly stated that "good commercial narceine might fully suffice for therapeutic use;" but the chemist must be more thorough-going in his requirements as to the purity of narceine, and the object of my communication was to show that.

There has also come under my notice the communication from P. C. Plugge,[*] which I am equally unable to leave unanswered.

Herr Plugge appears to be annoyed because I have left unmentioned his work upon narceine, the chief point of which is the not very novel classification[†] of the opium alkaloids into strong and weak bases. But there was no ground for me to quote Plugge's results, as I occupied myself with the preparation of chemically pure narceine, and in doing so could not mention all the communications that have appeared upon that alkaloid, but only those standing in direct connection with my subject.

However, it is by no means the case that I have anywhere asserted in opposition to previous authors that narceine is not a weak base. The purport of the passage which Plugge quotes from my communication is to some extent distorted through the absence of subsequent passages and an opinion is attributed to me which I never held and have never expressed. What I wished to bring out was that chemically pure narceine, contrary to previous statements, possesses a *weak alkaline reaction*, and that it manifests quite a *peculiar affinity for acids*, on which account it holds an exceptional position among the opium alkaloids.

The assumption by Plugge that narceine and acetic acid do not combine chemically is a false one; presumably he could not have worked with chemically pure narceine. In a water solution certainly decomposition does take place; but if chemically pure narceine be moistened with acetic acid, allowed to dry, and the residue powdered, the odourless powder so obtained does not either by weeks of exposure to the air or by four hours' heating to 70° C., lose the acetic acid to which its strong acid reaction is due, a certain proof that this is chemically combined.

Because this fact cannot be brought into accord with one of Plugge's conclusions, he contents himself with describing this experiment as "*somewhat strange*, and one to which no value is to be ascribed." I feel myself compelled to declare in this place, once for all, that in future I shall not be induced to take seriously into consideration any statements as to the chemical nature of narceine, if they are not based upon experiments with chemically pure narceine.

The extremely contradictory results which I have myself obtained through a series of years with the commercial narceine formerly accepted as pure, was the occasion of my taking part in the settlement of the chemical properties of chemically pure narceine, and in this sense I hoped to interest chemists by my small communication.

In conclusion I would take this opportunity to mention that I have succeeded in obtaining two of the rarest opium alkaloids, namely, *laudanine* and *protopine*. I found their properties to correspond essentially with the statements made by Hesse at the time he discovered them. Laudanine, especially, on account of its analogy to morphine, appears to be of great interest. It is soluble in caustic soda solution and can be converted by methylation into a new base, which chemically resembles codeine.

CHANGES PRODUCED IN LYCHNIS VESPERTINA BY A PARASITIC FUNGUS.

Messrs. Magnin and Giard describe the remarkable changes produced in the flower of the common wild white campion by the attacks of a parasitic fungus, *Ustilago antherarum*. *Lychnis vespertina* is diœcious, and the male and female plants are essentially different forms, differing not only in the presence or absence of the male and female organs respectively, but also in the size of the flower (those of the male plants being smaller), the venation of the calyx, etc. Hermaphrodite individuals sometimes occur, but are simply female plants in which stamens are produced by the presence of *Ustilago antherarum*. This fungus can develop its spores only within the anthers of a flowering plant. In such plants of *Lychnis vespertina* its only visible outward effect is a slight deformation of the anthers and shortening of the filament. In the female plant it brings about (1) the production of stamens; (2) atrophy of the style and of the upper part of the ovary; (3) a greater or less elongation of the internode between calyx and corolla, this being also characteristic of the male plant. It also frequently causes tetramery or pentamery of the flowers, lobing of the margin of the petals, and a change in the venation of the sepals. M. Magnin traces a similarity between these phenomena, and those of the castration of animals caused by parasites.

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[*] *Pharmaceutical Journal*, Nov. 23, 1889, p. 401.

[†] See Hesse's classical papers, *Annalen*, cliii., Suppl., i., etc.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 21, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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POISONING BY "WATER GAS."

THE death of two men at the Leeds iron works last month, which appears to have been regarded as a somewhat mysterious occurrence, has again been the subject of inquiry before the coroner. In the interval Dr. STEVENSON has been engaged on behalf of the Home Office in conducting a special investigation as to the cause of death, and as to the suggested possibility that it was the result of some other cause than the carbonic oxide gas, which is a prominent constituent of the "water gas" used as fuel at the Leeds forge. Dr. STEVENSON's report has now been made, and it is decisive in attributing the death of men to poisoning by carbonic oxide. The evidence in support of this decision is so strong that the further question as to any other poison is disposed of by the simple statement that the bodies did not contain alcohol or any other poisonous substance besides carbonic oxide. The presence of the last-named substance in sufficient quantity to account for death was directly ascertained in both cases. The verdict of the jury was accordingly that the two men died from inhaling water gas and at the same time an opinion was expressed that the gas was not at the time sufficiently odorized to have enabled the men to detect its presence in the air of the room where they were. The death of these men furnishes an illustration of the danger attending the use of gaseous fuel made by the decomposition of water by carbon at a high temperature. On several occasions this danger has been referred to in this Journal as being one of the great obstacles to the use of such gas for fuel. Within the last few years the introduction of "water gas" for that purpose in the United States has been followed by such an extraordinary increase in the number of deaths from gas poisoning that in Massachusetts its manufacture is now prohibited. Most of our readers will be aware that what is termed "water gas" is by no means a novelty, and that for at least fifty years past it has been used in various metallurgical operations. The attempts to employ it as an illuminative agent and as fuel for domestic purposes are more recent, and in both cases the inodorous character of the highly poisonous carbonic oxide admits of a leakage in the pipes being overlooked until fatal effects are produced. This seems to have been what happened at the Leeds forge.

Mr. Blair, of Cork, requests that publicity should be given to a correspondence that has passed between him and the Board of Inland Revenue in reference to the notices which have lately been given that chemists are liable to a penalty of £100 if they sell methylated spirit between the hours of 10 p.m. on Saturday and 8 a.m. on Monday. Mr. Blair urges that with chemists the sale of methylated spirit is principally confined to the use of the spirit for burning under bronchitis kettles and inhalers used by invalids suffering from congestion of the lungs, bronchitis or diphtheria, and he submits to the Board of Inland Revenue the question whether when the use of a bronchitis kettle is ordered by a physician on a Sunday, or at midnight on Saturday, he is to refuse to supply the spirit necessary for that purpose and thereby endanger the life of the patient. Mr. Blair adds that it is to meet such emergencies as these that he keeps an assistant on duty from Saturday until Monday, and he desires to have the opinion of the Board, as he thinks it is the duty of all good government to insure the welfare and health of its subjects. The reply of the Board is not consolatory, being simply to the effect that it has no power to modify in Mr. Blair's favour the provisions set forth in section 26 of the Revenue Act, 1889.

* * *

In the *British Medical Journal* for December 7 (p. 1288) reference is made to some tabloids of "prepared saccharin" which upon examination proved to be "chiefly composed of common sugar." They were received from a Nottingham medical man, who obtained them "from a patient who in spite of the most careful treatment still passes a large quantity of sugar." The label assumed to have belonged to the package is described as bearing the name of "a drug company" of "cash price dispensing chemists," and the following words: "Prepared saccharin (Dr. Fahlberg's), or sugar substitute, takes the place of sugar for all sweetening purposes, and especially in the case of persons to whom the use of sugar is forbidden or undesirable. It has proved an inestimable boon to sufferers from diabetes, Bright's disease, and other kidney affections," etc. Our contemporary very justly stigmatizes such tabloids as a "particularly cruel fraud," and regrets that through the culpable negligence of local authorities the Sale of Food and Drugs Act is applied to so limited an extent as to allow of the widespread sale of such a preparation. We would remark, however, that the power of setting the law in motion is not confined to local authorities, but extends to any person who is aggrieved by being supplied with an article not of the nature, substance and quality demanded.

* * *

The present mayor of Birmingham, Mr. Francis Corder Clayton, has a record which presents several features of pharmaceutical interest. After serving his apprenticeship with the firm of Harvey and Reynolds at Leeds, he became a student at the School of Pharmacy, and figured among the prizemen for the year 1865. Subsequently he was engaged by and eventually became a partner in the firm of D. and S. Sturge, of Birmingham.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 4th inst., at No. 11, Harcourt Street, Dublin, at three o'clock.

The President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President, Mr. Wells, Messrs. McCormack, Merrin, Beggs, Hodgson (Treasurer), Hayes, Dr. Burnes and Professor Tichborne.

A letter was read from Mr. F. W. Smith, Registrar of the Pharmacy Board of New Zealand, acknowledging the receipt of a copy of the Society's Calendar for 1889.

Letters were read from Mr. Harry Carter Draper, Dr. Tweedy, and Dr. Whitla returning thanks for their re-election as Examiners.

A letter was read from Dr. Burnes acknowledging the receipt of an intimation of his election to a seat on the Council.

A letter was read from Mr. James T. Watterson acknowledging receipt of letter from the Registrar in reply to his former communication.

A letter was read from Mr. J. J. Sewell requesting that his name should be struck off the list of members of the Society.

The Registrar, Mr. Ferrall, mentioned that he was in communication with Mr. Sewell and he thought it likely that he would withdraw his resignation.

Mr. Ferrall was directed to write to Mr. Sewell stating that the Council regretted his resignation and trusted that he would reconsider it.

A letter was read from Mr. F. W. Hatton, a member of the Society who had gone to reside in Dorchester, forwarding two guineas, the amount of his subscription to the Society for the years 1889 and 1890.

On the motion of Mr. Hodgson, seconded by Mr. Hayes, the thanks of the Council were voted to Mr. Hatton for continuing his subscription to the Society, notwithstanding his non-residence in the country.

A letter was received from Mr. William Cooper Newbold requesting that his name might be replaced on the Register.

On the motion of Mr. Hayes, seconded by Professor Tichborne, it was resolved that the name of Mr. Newbold should be restored to the Register upon his payment of the guinea fee, as required by the rules of the Society.

A letter was read from Mr. John Scanlan, of 6, Longford Road, Cork, applying to be placed on the Preliminary register, and enclosing University certificates.

The Registrar was directed to write to Mr. Scanlan stating that the Council had not power to accept the certificates which he had forwarded, as they did not include all the subjects that were required by the General Medical Council.

A letter was read from Mr. Patrick Kelly, a member of the Society, in reference to the one hundred hours' chemistry course. The writer urged that the resolution adopting that course was only carried by the casting vote of the Chairman. In the course of the discussion on it the mover had stated that the schools would arrange days and hours to suit the students; but in place of this happening, the schools were now closed against them altogether, except in the day and on payment of a double fee. What employer, it was asked, could allow his assistant out for three hours in a day, even on three days of the week? And even if a night-school should be opened it would be hard on a young man whose ordinary work was from perhaps nine in the morning until ten at night to have to spend three hours on three evenings of the week in an atmosphere of sulphuretted hydrogen. It might be said by some that the one hundred hours' system had not yet got a fair trial. The late President, in his address of October, 1888, congratulated the Society on the efficiency of its candidates, saying that only 33 per cent. of them had failed that year as against 50 per cent. in the preceding year, and he attributed this improvement to the one hundred hours' system. But the fact was that the system had only been compulsory from the July of 1888; and the candidates at the July examination had previously taken out their chemistry. He wrote to the President, pointing out his mistake, and the President acknowledged the letter, but did not correct his statement. Now, in 1889, after the system had come into full work, according to the President's address of October last, the failures during the year had been 46 per cent. So much for the one hundred hours' system. In conclusion the writer submitted that the Council should leave the safety of the public in the hands of the Examiners.

Mr. Hayes said this system pressed very hardly upon young men, while he did not think it would make any difference in the quality of the candidates presenting themselves. The examination was quite good enough as a test without the 100 hours' bench work or lectures. If the Council could with a good grace withdraw from this rule now, he believed that it would be beneficial to the Society, for the effect of the rule at present was to prevent young men who could not put in the 100 hours from presenting themselves at the examination, though they would otherwise be willing to do so.

Mr. Hodgson stated that at the time the rule in question was under discussion he asked two or three persons who were authorities on the subject of chemistry, what period of study was requisite in order to give the student such a knowledge of chemistry as would make him a good and safe compounder, and all were of opinion that 100 hours was not an excessive period, while one was in favour of a larger amount of time. The consensus of opinion was in favour of the 100 hours' bench work; and if the Council were to reduce that now, it might lead to the impression that they wanted to lower the standard of education, which it was not the desire of the Council to do at all. If it was unnecessary, no doubt it was a hardship on the young men. If eighty hours were sufficient to make a safe compounder and licentiate of the Society, well and good; but on the other hand, where the change had been so recently made and approved of by the Privy Council, if they were to seek to alter it so soon, the impression would be produced that they were not stable.

Mr. Merrin said he thought too much importance was attached to the chemistry lectures and not sufficient importance to those in pharmacy. He would like to see the pharmacy examinations far stiffer than they were. He could not see the importance of so much chemistry at all. It did not turn up at the compounder's counter.

The Vice-President suggested that the report of the Committee, to whom a former letter of Mr. Kelly's had been referred, and also a motion of Mr. McCormack on the subject of the establishment of a night school of chemistry in connection with the Society, should be considered now.

The Report was read. It stated that the Committee consisted of the President, the Vice-President, Professor Tichborne, Mr. Hodgson, Mr. McCormack, Mr. Beggs and Mr. Merrin. They came to the resolution of addressing a letter to the Board of the Apothecaries' Hall, asking them whether they could place their class room and chemical benches at the disposal of the Society for the purpose of holding evening classes for instruction in chemistry and pharmacy, and on what terms. The subject of Mr. Kelly's letter was deferred for the present.

The Vice-President said the Committee were impressed by the consideration that the one hundred hours' rule had been only recently passed into law, and had in fact hardly come into action yet, as only a few certificates under it had been presented up to the present. It was nonsense therefore to say that it had been a failure. Give it a chance: and if they should afterwards find that the candidates could not get one hundred hours they could reduce the number of hours. But the Council were now trying to establish a school that would meet the requirements of their students, and if they should succeed in doing so, he did not see what difficulty there would be in getting the one hundred hours. He was informed that there was a school in Dublin at present that was well suited for their purposes. If they were now to change a system which they only adopted twelve months ago it would look as if they did not know their own minds.

Mr. Merrin said that at the time when the rule was adopted, the Medical Schools of Dublin were in a different state from what they are at present. Now the Ledwich and Carmichael Night Schools were closed.

The Vice-President: Two members of the Council were sent to examine the Technical School, which is now in existence, for the purpose of seeing whether it would meet our requirements, and they have reported that it would.

Mr. Merrin: Did we represent to the authorities of that school what we require?

The Vice-President: They applied to us in the first instance, and we sent the two members to inspect the school. They reported to us that certain things were necessary, and that the school authorities were prepared to meet us in every way,—in fact guaranteed that our requirements would be carried out.

Mr. Merrin: Has that school been added to the list of those whose certificates we receive?

The Vice-President: It has.

Mr. Merrin said that according to present arrangements at that school students there would be able to get only one hour a week.

Dr. Burnes: The practical work there covers more than one hour a week. I sent one of my young men there to make inquiries, intending to pay his fees, and they said they would be able to give the hundred hours in three months—certainly during the winter session.

The President: Night work?

Dr. Burnes: Night work.

Mr. Hayes: That is exactly what we want.

Mr. Hayes moved that the report of the Committee be adopted; that the subject of Evening Classes be referred back to the Committee; and that the subject of Mr. Kelly's letter be deferred for the present. They might continue the existing system for twelve months; and if they should then find it to be impracticable they could reasonably go before the Privy Council, and say that the thing had broken down and required to be re-adjusted.

Dr. Burnes seconded the motion.

Professor Tichborne remarked that originally he did not vote for the hundred hours' system, but he was inclined to let the question rest for the present.

The motion was unanimously agreed to.

The Vice-President moved that a Committee called the "House and General Purposes Committee" be appointed. Matters were constantly cropping up in order to deal with which a standing committee of the kind he proposed was requisite.

Mr. Beggs seconded the motion, which unanimously passed.

On the motion of the Vice-President, seconded by Mr. Beggs, Messrs. Hodgson, Hayes, Grindley, McNaught, Beggs, McCormack, and Professor Tichborne were appointed the House and General Purposes Committee for the present year.

A report from the Law Committee was adopted.

The Vice-President called attention to a report which appeared in the *Chemist and Druggist* of November 9, of what took place on the occasion of a deputation from the Druggists' Society waiting on the Solicitor General for Ireland in reference to a Pharmacy Bill. A number of statements were made on that occasion which were absolutely untrue. Of course, they might not have a full account of what was said, but the statements that appeared in the report were certainly contrary to the fact. At first he thought that it would be better to take no notice of these statements, but he afterwards came to the conclusion that passing them over would look as if they were indifferent to the interests of the licentiates. It was stated that: "In 1888 a measure was brought before the House of Lords, referred to a Select Committee, and subsequently brought on to the House of Commons, where it was so unanimously rejected that not one member could be found to propose its adoption." How any man in his senses could have made a statement like that he was unable to understand. They all knew that the Bill went to the House of Commons, was read twice there unanimously, and referred to a Select Committee. Yet they were told that it met with such opposition in the House of Commons that a member could not be got to propose it. The report proceeded: "Amendments were afterwards brought forward by different Members of Parliament, embracing the requirements of the traders throughout the country; and so strong was the feeling on the subject that the pharmaceutical party felt it impossible to do aught but yield to public opinion, and through the agency of their President, came to an agreement with the chemists and druggists to adopt the provisions of the amendments, and the Bill being thus revised, would certainly have become law but for the session being almost ended, owing to which the amended Bill was slaughtered with a number of other innocents." He (the Vice-President) was not aware that their Bill was at any time in the House of Commons when there was not present a member to propose it; but if it did come to such a position in the House of Commons it was after it had become the Druggists' Bill and not while it was the Bill of the Pharmaceutical Society. They were all glad that the amended Bill did not pass; and there were members of the House of Commons prepared to oppose it. He therefore moved — "That the report in the *Chemist and Druggist* of November 9 of a deputation from the Druggists' Society having waited on the Solicitor General in reference to a Pharmacy Bill be referred to the Law Committee to report to the Council on."

Mr. McCormack seconded the motion.

Mr. Hodgson said it was desirable that the Law Committee should communicate with Messrs. Clay and Close, in London, as to what passed in connection with the Bill.

The Vice-President: Do you know, Mr. Hayes, was it the case that we had no member ready to propose the Bill when it came on in the House of Commons?

Mr. Hayes: The member who was to have proposed it was not there and it was taken up by some one else.

Mr. Beggs: Sir James Corry was to have proposed it, but he was not present. That was the amended Bill.

The Vice-President: The Bill was so well cut up that we were glad that it did not pass.

Professor Tichborne: The Bill that left the House of Commons did not resemble the original Bill as promoted by this Society at all.

Mr. Hayes: Our original Bill passed the House of Lords, and was read a second time in the House of Commons.

The motion passed unanimously.

On the motion of the Vice-President, seconded by the President, Mr. William Hanna, of Main Street, Bangor, co. Down; Mr. Charles Marshall, of 39, Hamilton Street, Belfast; and Mr. John Smiley Anderson, of 47, Market Square, Lisburn, were elected members of the Society.

On the motion of Mr. Baxter, seconded by Mr. Doran, Mr. W. H. I. Madden, of 2, Gloucesterville, Fitzroy Avenue, Belfast, was elected a member of the Society.

On the motion of Mr. Whitla, seconded by the Vice-President, Mr. E. P. Murray, of Clones, co. Monaghan, was elected a member of the Society.

On the motion of Mr. McCormack, seconded by the Vice-President, Mr. Thomas William Robinson, of 112, Upper Georges Street, Kingstown, was elected a member of the Society.

Some financial business having been disposed of the Council adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eighth general meeting of the fortieth session was held at the Royal Institution on Thursday evening, December 12, 1889. The President, Mr. A. H. Samuel, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed and several donations announced.

Dr. Symes exhibited a specimen of synthetically prepared pure phenol which he said had been put in the market by a German firm at a price but little over that of ordinary phenol from tar, against which it possessed the advantages of freedom from all tarry odour, a higher melting point (106° to 107°) and a greater solubility in water. A 5 per cent. aqueous solution was almost odourless. He could not say if it were equally antiseptic with the ordinary acid; on receiving a further supply he would be pleased to present a specimen to the museum, where members could examine it at their convenience. He also called attention to a specimen of a new antipyretic, phenyl-urethan, which had been introduced by Professor Giacomini, of Turin. It was a white crystalline powder, insoluble in water, the dose being 8 grains.

The President now called upon Mr. Buck to read his note on—

INFUSUM SENEGÆ CONCENTRATUM.

BY A. S. BUCK.

It is not my intention to say more than is necessary for the purpose of bringing to your notice a preparation which may be of interest in local pharmacy at this season.

I claim nothing original, but simply introduce it to you as the outcome of incidents which have cropped up recently in the ordinary routine of a small business.

The rule in all first class pharmacies will be to have infusion of senega and all other infusions and decoctions freshly prepared.

During the day this may generally be done with ease, though occasionally the patient may not be able to grant you the time necessary for its production. At night there will be greater difficulty in adhering to this rule, and hence the need for having at hand an article which will keep well and be as nearly as possible equivalent to what is ordered. Medical men are now ordering concentrated infusions as component parts of mixtures. Only last week I had ℥x. inf. senegæ conc. ordered in a six-ounce mixture. It is for these occasions that I intend the preparation to which I am calling your attention this evening.

My attention was first drawn to the concentrated preparation during an engagement where 1-7 strength was the law, and I suppose almost every medical man who dispenses his own prescriptions, and perhaps four-fifths of the chemists make their infusions in the same way.

The concentrated preparation was dark coloured and produced an infusion darker than it should have been.

It had little or none of the aroma of senega.

The acrid or soapy taste was wanting. In fact, the impression conveyed to my mind was that senega had not been used in its manufacture, and that a decoction of prunes would have produced as good results.

The sample I bring forward to-night seems to me to have all the requirements of a good aqueous solution.

1. The colour is not too deep.
2. The aroma is perfect.
3. The taste fully bears out my statement, and if the appearance is not quite so elegant as that of some of the bought samples, I think it will justify itself on dilution, and where gentlemen make it for home use the heavy deposit of saponin will not matter.

The process I employ is simply the percolation and repercolation process with cold water, mentioned in the *Pharmaceutical Journal* some two or three years since, and the simple apparatus shown will fully illustrate the proceeding.

The percolators are 1*d.* lamp glasses, which answer very well. The stand I had made for the purpose, but I now think that one of the little stands used for keeping eggs on end would answer all the purpose. These glasses and the stand I find most useful on the dispensing counter for many purposes, in fact, there are few days when they are not put into some use.

The quantity of water used is little in excess of the volume of products; no evaporation or heat is required, and to these reasons I put down the light colour and better aroma.

In making, say, 1 pint of product, I take 8 ounces of the root, grind to a uniform coarse powder, and distribute through five glasses. This seems to be the lowest number which can be employed for the thorough exhaustion of senega root by this process. Into No. 1 glass I put, say, 3 ounces of water; any percolate collected is passed into No. 2. More water being put into No. 1, and so on until 16½ ozs. is collected from No. 5. By this time the water is passing through the marc without taste and almost colourless, the marc itself being tasteless. To the 16½ ozs. I add 3½ oz. s.v.r. A precipitate is immediately thrown down, and this deposit goes on increasing for some days. Of this solid matter I take no notice, as I find that upon dilution, and on the addition of only a small quantity of ammonia, a very elegant mixture is produced. The saponin which appears to be present in such large quantities is not noticeable when the concentrated infusion is simply diluted without any added drug.

I have three samples here which will best show the slight difference between fresh and concentrated, and to further prove my case as to the value of an infusion made in this way being equal to and almost identical with one made by the official process, I took 100 c.c. each of fresh infusion, fresh decoction, infusion from this process and infusion from a bought preparation, evaporating all to dryness and with the following results:—

No. 1 = solid extract, grams 1·09
No. 2 = „ „ ·79
No. 3 = „ „ 1·23
No. 4 = „ „ ·645

With these results I am very well satisfied, as they tend to show the advantage of cold water. No. 4 was received into stock bright. I presume it must have been poured off or filtered. Hence the low percentage.

The dried marcs from 1, 2 and 3 were treated with spirit in the B.P. tincture proportions. The small tinctures were pressed off, filtered, and small quantities evaporated to dryness.

The tinctures were almost without taste or colour, and the residues very small.

100 minims of fresh inf. marc = ·03
100 „ „ dec. „ = ·025
100 „ conc. inf. „ = ·045

The fresh infusion marc and decoction residues were very resinous. The concentrated infusion marc yielded a residue less resinous.

From the dried extracts of the 1st, 2nd and 3rd infusions I prepared a powder on the lines of the abstracts of the United States Pharmacopœia. The strength is 3 root = 1 powder. It may be of service where it is desired to give senega in powder form. It seems to be satisfactory in aroma and taste. When made on a large scale this powder could be made more cheaply from the tincture.

I think now that concentrated infusions are so much used it is time they had some official recognition either in the B.P. or B.P.C. formulary, so that chemists who wish to make their own preparations could have some definite lines to work on, instead of each operator using his own process and with such different results.

A discussion ensued, in which Messrs. A. C. Abraham, M. Conroy, Dr. Symes and J. Bain took part, and a vote of thanks, proposed by Mr. Conroy and seconded by Dr. Symes, was unanimously accorded to Mr. Buck for his communication.

Mr. A. C. Abraham then read some "Notes upon some of the papers read at the recent meeting of the Pharmaceutical Conference," in which he confirmed Mr. Proctor's results respecting tincture of senna, and defended the B. P. test for pepsine, which he considered by far the best yet suggested, leaving but little to be desired for practical purposes. He mentioned in illustration of the solubility of glass that the ground necks of both English and German bottles would sometimes colour solution of phenol-phthalein, and shortly alluded to several other papers, and among others to Mr. Proctor's upon "A Scale of Small Residues," urging that some guide either of that nature or possibly a colorimetric one should be given in the Pharmacopœia, as a means of determining when exhaustion was sufficiently complete.

A discussion followed, and a vote of thanks proposed by Mr. M. Conroy, and seconded by Dr. Symes, was unanimously accorded to Mr. Abraham for his paper.

Dr. Symes, in seconding the vote of thanks to Mr. A. C. Abraham, said the paper was an exceedingly useful one, as it directed attention to points of interest. For some years before the publication of the last Pharmacopœia he had used a temperature of 120° F., for comparative experiments on pepsines, because the process was considerably shortened thereby. He thought that was a safer temperature than the one adopted by the Pharmacopœia, as if by accident the temperature rose much over the 130° therein recommended, the pepsine was spoiled; in other respects the official test was a good one.

The President now read his valedictory address—

VALEDICTORY ADDRESS.

BY A. H. SAMUEL, F.C.S.

In terminating my period of presidentship of this Association, at this, the last meeting of the Session, I take this opportunity of expressing to the members generally, my thanks for the support so heartily accorded to me during my term of office. A retrospective glance at the work accomplished by the Association during that period will, I venture to say, show that in point of new and original matter it will favourably compare with any similar period since our Association was established.

On the amalgamation of the Liverpool Registered Chemists' Trade Association with us, fears were expressed in some quarters that the papers and communications of the Association might suffer in point of scientific interest, and that the original objects of the Association, namely the advancement of chemistry and pharmacy, might possibly be prejudiced by the admixture of questions of purely trade interest. I think the work of the past two sessions has shown that these fears have proved quite groundless, and that there have been as valuable technical papers read before us and as interesting discussions thereon as during previous sessions. We have adopted that admirable motto that in union there is strength.

Great changes have taken place in the calling of a chemist and druggist during the past quarter of a century. The force of competition has compelled all chemists who desire success to keep themselves fully *au courant* with all trade questions affecting them, as well as those of a scientific character.

They have not only to acquaint themselves with the most recent remedies and their nature and applications, but they have to carefully watch day by day that their trade interests are not unjustly encroached upon.

The increased stability given to our Association since the amalgamation has proved that the extension of its objects to the furtherance of the trade interests of its members has been a most wise and judicious step. The Curriculum Bill; the desirability of regulations for the keeping of poisons and of adding carbolic acid to the schedule of poisons; the proposed amendment to the Pharmacy Act, 1868, in reference to unqualified assistants in branch shops; the question of the proposed railway rates as to carriage on drugs, chemicals and empty packages; the question of licences for the sale of medicated wines: all these questions of trade interest have been dealt with, and the members' views expressed being published in the trade journals, have exercised their due share of influence in conjunction with those of other kindred associations throughout the country.

It would be out of place, in these few valedictory remarks, that I should refer in further detail to the papers of the past session. These will doubtless be fully commented upon by the able and accomplished pharmacist who succeeds me in this chair; but I would just like to say one word in regard to our annual Society gatherings which have latterly proved so increasingly successful.

The vocation of a chemist necessitates close application to business at those hours when the rest of his friends are usually enjoying periods of recreation and amusement. The Liverpool chemists' yearly social gathering began very modestly some years ago with an annual supper. It increased in numbers year by year, and has during the past two years developed into a public dinner of considerable dimensions, strongly and heartily supported by most of those connected with pharmacy in this city.

I trust that such gatherings may continue, and, if possible, be further increased, as they have for their only object the interchange of good fellowship. It only remains for me now to bid you adieu, and trust that the new year may in every way enhance the prospects of our Association.

Dr. Symes, in moving a vote of thanks to the President for his address, said he wished also to include the thanks of the Association for the able manner in which he had filled the office for the past two years. Although not actively engaged either in chemistry or pharmacy, Mr. Samuel had given considerable attention to the requirements of the office and to every detail of their work.

Mr. A. C. Abraham said he had much pleasure in seconding the vote of thanks, which was supported by Mr. Conroy, and carried with acclamation.

The meeting then terminated.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The ordinary monthly meeting of this Association was held in the rooms of the Chemical Club, Victoria Hotel, December 11, Mr. W. Wilkinson, Vice-President, in the chair. There was a large attendance.

The proceedings opened with the following paper on—

OUR ASSOCIATION AND ITS FUTURE PROGRAMME.

BY H. KEMP.

There is, I think, no need for me to apologize for having pushed myself forward and volunteered to introduce this subject to-night. It is one upon which I have long held advanced (perhaps some would say radical) views, and after waiting long in the hope that someone better fitted would open up the question, I finally decided to break the ice and give all a chance in the swimming.

I take a great interest in this Association; I feel convinced that it is not what it ought to be, that is, a Society representative in any degree of the legitimate drug trade in this populous district.

Other trades and professions have their organizations in our midst exerting a power—good or bad: there are a Medical Society, a Legal Society, a Society of Professional Musicians, besides a great many more congregations of professional gentlemen. The grocers, the butchers, the bakers, and even the barbers, have their trade associations, and their influence is seen and felt; and the fact of these, or most of them, being active—not merely existing—bodies makes me wish to see ours in a more flourishing condition, more thoroughly representative, and exerting an influence which shall be felt throughout the trade of which the chemists and druggists in and around Manchester form no small part. It is therefore with a view to this end that I have asked you to come this evening and join with me in discussing the best methods of bringing about this much-desired end—of promoting good fellowship among our brother pharmacists, securing a large accession to our ranks and arousing an interest in the doings of the Association generally. I wish, if possible, to elicit some expression of opinion as to the best lines of conducting it in the future.

This, then, being my main object, I shall not trouble you with much of our past history, but will refer briefly to it for the purpose of showing what the Association was in its earliest years, to contrast it with the Association as it is, and then perhaps we may be able to gather from it something which will enable us to predict what the Association may be, or is likely to be, in the future.

When the Pharmacy Act of 1868 became law the leading spirits of the trade in Manchester—in common with those of other large centres such as Liverpool, Birmingham and Sheffield—thought it only right that a society should be formed to look after the trade's interests and promote measures for the education of rising pharmacists. By pharmacists, gentlemen, you will understand me to use the term in its broadest and most rational sense, *i.e.*, all engaged in the science or practice of pharmacy.

Well, a preliminary meeting was called, and the Manchester Chemists and Druggists' Association was launched into existence with much *éclat* and promises of a glorious career, for I believe it included amongst its first subscribing members nearly the whole of the light and leading of local pharmacy.

Apart from its labours in the direction of education, which do not now concern us, the Association met monthly or at more frequent intervals throughout the winter months (sometimes in the evening and sometimes in the afternoon) and discussed matters with more or less bearing upon pharmaceutical science. And at the evening meetings the members generally prefaced their business with a discussion of the exhilarating and tonic properties of "the cup that cheers, but not inebriates."

Once during the session our grave and reverend seigneurs did unbend; *pro tempore*, they put aside the serious solemn half of their visages and dined together, afterwards cracking jokes and making merry till far on towards midnight. Gradually change, and shall I say "decay," began to show itself. Year by year its members grew less, interest in its proceedings seemed to wane, and after a few years this Manchester Chemists and Druggists' Association, which meanwhile had changed its title to that of the Manchester Pharmaceutical Association, had almost ceased to exist.

All honour to the men, I say, who at this time remained true to their trust; who stood round the smouldering ashes and by their loyal devotion to pharmacy managed to keep a spark alive till more workers were brought in and helped to fan the few glowing embers once more into a flame.

I pass now to the year 1886. The anticipated visit of the British Pharmaceutical Conference to our city in the year of our Queen's Jubilee roused the fraternity to take a particularly pleasing interest in matters pharmaceutical. The chemists, almost to a man—at least I should say, the more intelligent of them—were suddenly roused to enthusiasm, each vieing with another to do his best to make the coming visit a grand, a memorable success. They had at last found a common source of pleasure, an event was about to happen in which they could all take an interesting part, and they met together in good sensible numbers to propound and discuss plans for the entertainment of their visitors, and of themselves too, for did it not prove as great a pleasure to the entertainers as to the entertained?

Well, gentlemen, it was this Association which took the initiative in collecting the forces on that occasion. If somewhat dormant, it needed but the stimulus to waken into life and vigour once again; the machinery existed, and the workers consequently found everything ready for organizing and carrying out their schemes.

The Conference came and went, and with its departure the great mass of interest exhibited by local chemists in their brethren of the pestle seemed to subside, and our Association once more became what it now is, a small band of subscribing members within whose narrow limits may be found a still smaller band of active members anxiously working to maintain vitality; whilst others outside are waiting for some fresh startling event to turn up which shall bring excitement into the ranks of the trade generally, assailing their trade interests and causing them to seek safety in combination. To wait until a panic stirs their fears before throwing in their lot with us is not a noble spirit, and I could wish, nay, I *do* heartily wish that an increasingly large number of them would see the wisdom of giving us the benefit of their counsel now, instead of waiting till self interest prompts their action.

We have seen what our Association was, we know what it is, and now, gentlemen, let us turn to the main question which concerns us, and see if we can agree about its immediate future. "What it may be" and "what it will be" are not necessarily one and the same thing. It does not require the wisdom of a Solomon to know that "it will be" what its members make it, but we have to consider what "it may be," and the best methods of making it what it ought to be.

And, before expressing any opinions of my own upon its futurity, I would draw your attention to our second rule, as lately revised.

You will note that no mention is made of education; we need not now concern ourselves about the education question. Private schools and public colleges in our midst are more than sufficient to meet the necessities of young pharmacists; and are able, moreover, to maintain themselves without either our patronage or interference. Consequently, we find the fundamental bases of our Society are "the promotion of pharmacy," and "the protection of legitimate trade interests." Here are the purposes for which we are associated. To bring about, to further these laudable objects, there must first exist good fellowship, good feeling among the members of the trade, and how best to bring about this good fellowship is what, I think, you will have to consider and decide.

Perhaps the necessity for a local pharmaceutical association is not admitted; but I think when you consider how we are badgered about between stupid excise regulations on the one side, new and previously unthought of readings of old Acts of Parliament on another, illegitimate and illegal opposition on another, tossed about like a straw by cruel winds, first this way and then that, you must see the necessity for combination, you must see how, in a great measure, this unsatisfactory state is the result of a want of unity. We are as the shingle of the sea-shore, moved by every ebb and flow; were we united in a bond of unity—fraternity—we should be more like that shingle when cemented into conglomerate blocks of concrete, capable of offering resistance and maintaining our rightful position.

This may be but dreaming, yet I think you all acknowledge the truth and force of the old adage, "union is strength," and it demonstrates, to my mind, the necessity for the existence of our Association—vigorous and active.

And here I would temporarily diverge from my path to point out one application of my argument. If half the chemists and druggists of this district were members of this Association, and they could discuss and agree upon a policy, they are sufficient in numbers to very materially affect the result of an election to the Pharmaceutical Council, and to exert a distinct influence upon the policy of that body. There would be much more sense in such a proceeding than in the silly cry of those who are constantly grunting, grumbling and bewailing the sad condition of our lot, yet never by word or act do anything to alter affairs. Instead of this, however, our apathy has left us without representation. The gentleman who sat upon that Council to take care of the interests of pharmacy in this immense district was allowed to retire, without a single finger being stirred to prevent him or appoint a successor until too late. Practically we allowed ourselves to be disfranchized.

Apologizing for this digression and turning again to the discussion of "our future," this Association, as I said before, will be whatever the members make it, and to those of you who are present I put the question What do you wish to make it? Are you satisfied with its present condition? If not what are you doing or what are you willing to do to alter it?

In conversations with some usual absentees and with some outsiders, I have been much concerned with the reasons offered for a want of interest in our Society. One (and this a gentleman for whom I have the greatest respect) says, "I prefer to read science at home, the *trade* want matters of *trade* interest." Another, "You should make your meeting more social, less formal in character." Another asks me, "What good will it do me to join?" This gentleman evidently looks to receive value for money, but to such my answer is, "See how much good you may do others." Yet another says—worse than all—"I do not care to bow to a clique." Gentleman, this last contains an insinuation as unkind as it is untrue, and I only mention it here to refute it. No member of this Society has more power or weight than another, if other members like to exercise theirs. It is "one man one vote;" *but* (and here's the rub) if one man takes an interest in the Association, and by his voice and vote influences its proceedings, he is more than equal to a dozen who never use one or other of their privileges.

To those who desire more matters of trade interest I say, "Introduce them! or if you feel incompetent or are deficient in confidence, suggest them to others." By all means let us have trade subjects, as often as you please, and as many as we can get, but we can scarcely expect some dozen or so members to do all the work. Share it! and the honours too.

To those who wish the social elements developing more I say, "I am with you," but we must not fall into the error of thinking that we exist solely for levity and conviviality. There are times, however, when we might relax a little—a good player is often the best worker—and without losing our dignity we might sometimes fraternize and frivol, even as our predecessors did. Besides, does not our parent Society have its dinner and its annual ball? Do not the sedate members of the British Pharmaceutical Conference induct with a conversazione and soiree, and when their more serious work is over do they not turn with boyish enjoyment to the variety entertainment of the smoking concert? Why then should not we have our dinner, our soiree, our cinderella, and our smoking concert? Who will say, after our recent experiences of the last-mentioned form of frivolity, that any of us are the worse for it, either as pharmacists or citizens?

By these means we may perhaps attract additional members to our ranks, and in these social gatherings may learn to know one another better, and in fraternity and freedom of intercourse bury our petty jealousies, remove misunderstandings, and find in our fellows some good qualities we never gave them credit for possessing.

I have heard it asserted that chemists are a short-sighted, narrow-minded set of men, and that it is owing to the constricted character of their mental and visual faculties that they succeed so well in misunderstanding one another. Sometimes one hears it said of a brother, "He cannot see further ahead than the end of his nose." "He takes an interest in nothing beyond his till and himself." And the speaker then raises himself upon an imaginary eminence of superiority, and we can imagine we hear him ejaculating his thanks that he is not as these men are, reminding one very much of a well-known character mentioned in ancient history. But seriously, gentlemen, though there may be narrowminded and shortsighted members of our fraternity,—and over-conceited ones, too,—I think the average chemist is a man of more than average intelligence, and the large number of chemists who occupy positions of honour in the public service testify that their intelligence, at least, is appreciated. It is possible that many in these days do keep their noses so close to the grindstone, and keep them there so long, that their penetrative power is considerably blunted, but I am not sure that this applies any more to chemists than to other classes of tradesmen or professional gentlemen. Perhaps, however, the nature of our calling, requiring as it does a concentration of brain power upon minute quantities of things, and carrying with it, as I fear it often does, the contemplation of minute quantities of reward in the form of "cash received," perhaps the nature of our calling does tend somewhat to diminish our power for participating in or even appreciating anything beyond what is little; but ought we not to try and induce one another to come out from our narrow spheres—from our little worlds—awhile and occasionally? Perchance we may prevent, or at least, postpone the dulling of our brighter intelligence, and, by promoting in this way the well-being of the pharmacist, it may ultimately lead to the "promotion of pharmacy."

Come to our meetings, and if you hold views on one or other of these questions give them expression, then if you are supported by a majority you will make the Association just as you want it, whilst the minority will loyally give way and fall in with and assist you to carry out your proposals. On the other hand, if you should find yourself in a minority, do not set your back up and go away in a huff, but submit with good grace to what may be the better judgment of your fellow members, waiting your opportunity to again air your opinions.

Gentlemen, I have said a great deal more than I at first intended, and some of you will perhaps think I ought to have taken a text (I am sure my remarks must have sounded very sermonizing), but my apology must be that I feel deeply concerned about this "stand-offishness" of the trade generally and am anxious that, with the view to its removal, opinions should be freely expressed as to the lines upon which it is most desirable to form our future programme.

Mr. W. Elborne, Mr. W. Lane, Mr. Botham, Mr. J. Wheeldon, Mr. Pratt, Mr. Wild, Mr. Smith and others joined in the discussion which followed.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual dinner in connection with this Association was held at the Masonic Hall, the President, Mr. Councillor R. Fitzhugh, J.P., in the chair. There was a good attendance.

Mr. J. S. Radford proposed the toast of "Continued Success to the Pharmaceutical Society," coupling with it the name of Mr. W. H. Parker (Local Secretary), who made a few well-chosen remarks in response. He alluded in terms of regret to the apparent indifference which the Society looked upon matters which were to the advantage of its members and the trade generally.

Dr. C. Haydon White, who was cordially received, proposed the "Nottingham and Notts Chemists' Association." He explained that its object was to promote the education of their apprentices, and that unless they had such facilities as this Association afforded, their chances of success in examinations were not so good. He also referred to the excellent working of the Association by its officers and Council, and the success which had attended their efforts. The names of Councillor Fitzhugh, Mr. J. Wilford (Treasurer), and Mr. William Widdowson (Hon. Sec.), were coupled with the toast.

Mr. Fitzhugh observed that the Association generally was in a satisfactory condition; he had always desired to advance the interests of chemists, and this in one way might be done by attending to the wants of the younger members. He had been President for many years, during which time the Association had helped to qualify many students for the profession. He had a most harmonious Committee to work with, and whilst they had such a Committee and officers he was quite sure the Association would continue to flourish.

Mr. Wilford, in responding, endorsed the remarks of the Chairman.

Mr. William Widdowson also responded, thanking Dr. White for the able manner in which he had proposed the toast of the evening. He also alluded to the social aspect of the Association, observing that the members had their annual picnic in the summer and the dinner in winter, both of which were always enjoyable.

Mr. C. A. Bolton, in proposing "The Professor and Teachers of the Classes," alluded to the advantages derived from the valuable classes held in connection with the University College. He had seen students from these classes make their way in the world, and one of his late apprentices was now assistant analyst for Birmingham. He felt sure all would use their endeavours to place those classes within reach of their apprentices and assistants. In coupling the name of Professor Clowes with the toast, he spoke of the earnest work of that gentleman in connection with their Association. He also made similar remarks respecting Dr. White.

Professor Clowes, in responding, was most cordially received. He thanked Mr. Bolton and those present for their kind reception, alluding also to the generosity of Dr. White in undertaking a class on Materia Medica, in spite of the increasing demands made upon his time by his own private practice.

Dr. White also responded, observing that it would perhaps be years before outsiders would realize the benefits accruing to students at the College. He also spoke in praise of those who attended his lectures, adding that by their regular attendance and diligence it enhanced the pleasure of his work.

Mr. Parker, of Liverpool, proposed "The Town and Trade of Nottingham," Councillor J. Lees responding.

"The Visitors" was next proposed by the President, and responded to by Councillor F. Farrands.

The health of the Chairman was also toasted with musical honours, and suitably responded to.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth fortnightly meeting of this Association was held on Wednesday evening in the Mosley St. Café, Mr. J. Pike, President, in the chair.

The minutes of the previous meeting were read by the Assistant Secretary (Mr. M. Bell) in the absence of the indefatigable Secretary (Mr. S. F. Merson), who was confined to his room through illness. The minutes having been adopted, the President called upon Mr. F. Park, Vice-President, to read his paper on "Fermentation," at the close of which specimens of yeast, etc., were shown under the microscope.

The address, which was very interesting, was listened to very attentively by the members. Mr. J. Pike proposed and Mr. D. H. Oxen seconded a hearty vote of thanks to Mr. Park for his able paper.

This was carried unanimously.

A moot question in dispensing was raised by one of the members (Mr. M. Bell) which elicited an amount of interesting discussion.

The usual vote of thanks brought the meeting to a close.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The first students' night of the present session was held on Wednesday, December 11, the President, Mr. A. W. Fox, occupied the chair.

The Honorary Secretary, having read the minutes of the last meeting, three members and ten associates were elected.

The following papers were then read by students in the Society's school: "Botanical Rambles Around Sheffield," by Mr. J. Austen; and "Pills and their Excipients," Mr. A. S. Smith. The papers will be published in a future number.

After the reading of the papers a discussion ensued, in which Messrs. Grierson, Learoyd, Morrison, and Twelves took part. A vote of thanks to the essayists brought the proceedings to a close.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the twelfth session was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, December 11, at 9·15 p.m., Mr. Donald McEwan, Vice-President, in the chair.

The minutes of last meeting having been read and approved, the following communication was read:—

EXTRACTUM CASCARÆ SAGRADÆ LIQUIDUM.

BY JOHN FINDLAY.

For the preparation of liquid extract of cascara sagrada very vague directions are laid down in the Pharmacopœia. It directs the bark to be boiled with three or four successive quantities of water, but makes no mention of the quantity necessary, whether pints or gallons. From experiments made I would suggest that the official directions should read thus:—

"Boil the bark in six pints of the water for half an hour. Strain off the liquor and repeat the operation until the bark is exhausted, using four pints of water each time. Mix the strained liquids and evaporate by a water-bath to 12 fluid ounces; when cold add the spirit, allow the mixture to stand for twenty-four hours, filter, and make up the volume of 16 fluid ounces with distilled water."

The official process is, however, not very satisfactory. After the spirit is added a large quantity of mucilaginous matter is precipitated which renders filtration a rather tedious and difficult operation. And even when this has been accomplished there is a further deposit after the preparation has stood for a few days. I have prepared a sample according to this method, and the following are the details of the operation. Each of the liquors was kept separate, allowed to cool, the requisite proportion of spirit added, and after standing, filtered. I then took the specific gravity and amount of dry extractive of each. The following are the results:—

	Specific gravity.	Extractive per cent.
1st straining	1·016	4·1
2nd "	1·010	3·4
3rd "	1·004	3·1
4th "	1·002	0·9
Finished product	1·062	26·

It is considered by some that by the action of heat and air the active ingredients are more or less altered, and by the evaporation necessary the original flavour is dissipated so that the preparation does not fully represent the drug. It is also said that there is a ferment in cascara sagrada which causes griping, and that when heat is used this ferment is destroyed and the griping obviated. I have found, from experiment, that it is quite impossible to exhaust the bark with a quantity of water which does not require evaporation, and the ferment which causes griping may be got rid of by keeping the bark for one year before it is used.

As I have already said the official process is not satisfactory. I have tried various ways in order to find a better, and the following are my results:—

The first I tried was as follows:—

Take of—

Cascara sagrada, in coarse powder .	1 pound.
Rectified spirit	4 fluid ozs.
Distilled water	a sufficiency.

Macerate the bark in 30 ounces of water for forty-eight hours, transfer to a percolator, and continue the percolation with more water until the bark is exhausted, reserving the first eight ounces. Evaporate the remainder to 4 ounces, allow to cool, and add the reserved portion together with 4 ounces of spirit. After standing for twenty-four hours filter if necessary, and make up to 16 fluid ounces with distilled water. The finished product has a specific gravity of 1·061, and yields 25 per cent. of dry extractive.

The next method I tried was the following:—

Macerate the bark in a mixture of 4 fluid ounces of rectified spirit, and 12 fluid ounces of distilled water for 48 hours. Transfer to a percolator, and continue percolation with distilled water until the bark is exhausted, reserving the first 10 ounces. Evaporate the remainder to 5 fluid ounces, allow to cool and add the reserved portion and 1 fluid ounce of rectified spirit. After standing for twenty-four hours filter, if necessary, and make up to 16 fluid ounces with distilled water. The product has a specific gravity of 1·100, and yields 30 per cent. of dry extractive.

I have also tried the following formula, which is American, but, as can be seen at a glance, the quantity of spirit is excessive. The bark is, however, very thoroughly exhausted:—

Take of

Rhamnus Purshianus bark . . .	1 pound
Alcohol	6½ ozs.
Water	3½ ozs.

Percolate with mixed menstruum until 10 ounces have passed. Reserve this portion and continue the percolation until exhausted. Evaporate to 4 ounces and add 1 ounce of spirit. The specific gravity of this preparation is 1·050 and yields 30 per cent. of dry extractive.

With regard to the physiological action of these preparations, the one prepared by macerating with the mixture of 4 ounces of spirit and 12 ounces of water was found to be the most active. Ten drops taken before breakfast had a decided effect on a person suffering from habitual constipation, and twenty-five drops acted as a powerful laxative. The one prepared by percolation with water alone is also very active, in fact almost as much so as the preceding. From this we may infer that although resins have been found to be the active principles in cascara sagrada there must be something else possessing laxative effects, as we know that resins are insoluble in water.

I have experimented with a view to construct a formula for tasteless extract of cascara sagrada, but without a satisfactory result. I have here, however, a sample made in a retail establishment and I think it is as good an example of this preparation as can be found in the market. It is prepared, I believe, by adding a small proportion of liquor potassæ to the ordinary commercial fluid extract and sweetening and flavouring to taste.

As I think retailers ought to be encouraged in the preparation of such articles I would recommend it to those who are in the habit of purchasing their tasteless fluid extract of cascara.

While working with cascara it occurred to me that I might be able to separate some of the resins to which the bark is said to owe its activity. In none of the literature I have seen is there any mention of how these may be prepared. Following the eclectic process I made a rectified tincture of cascara (1-in-8) evaporated to one-tenth of its volume, and poured it in a gentle stream into water acidulated with hydrochloric acid. By this means a substance was precipitated which acts as a laxative in doses of 6 grains. It is evidently a resin.

I next prepared a proof spirit tincture, and proceeding in the same way obtained a resin, but not in such large quantity, though evidently more active. I therefore concluded that some inert body was extracted by the rectified spirit and not by the proof, so that the first resin is a mixture of two.

I then percolated the marc from the rectified tincture with boiling alcohol and on concentrating and precipitating as before a whitish brown resin separated. Just when I had got so far with my experiments I found that an American gentleman had been working at the same subject and had prepared his resins in a similar manner. I have samples of the resins here, but as I have been anticipated I need not pursue the subject further.

An interesting discussion followed, during which it was stated than an elegant and active fluid extract could be prepared by using water alone, and also that the fact that water exhausted the bark did not prove that the active constituent was not a resin, as the resins might be combined with ammonia which had been found in the bark by Park, Davies and Co.

The discussion was taken part in by Messrs. Arthur, Coull, Dougall, Duncan, Hill, Lothian, Lunan, McEwan, and Macpherson.

The next communication was on—

SEIDLITZ POWDERS.

BY J. H. HOSBASON.

My objects in bringing this subject under your notice are to point out the great differences which exist in the composition of ordinary commercial samples, and to suggest some means of overcoming this fault. The only feasible plan to obtain uniformity, I think, is the introduction of a formula for their preparation into the Pharmacopœia. It will seem surprising to many, I have no doubt, that the present Pharmacopœia does not contain such information, since it is no unusual thing for the editors of that work to introduce formula imitating some of the more popular patent medicines such as chlorodyne or fluid magnesia. That we should have a recognized formula is obviously desirable, since doctors very often order these powders by prescription. It will be seen by a perusal of the tabular statement which I have drawn up, that a patient ordered to use them would seldom or never get two powders alike.

Sample	Strength.	Contents of blue paper.	Contents of white paper.
1.	Single	82·5 grains	37 grains.
2.	"	101·0 "	25·5 "
3.	"	152·0 "	52·5 "
4.	"	156·0 "	35·5 "
5.	Medium	163·5 "	46·5 "
6.	Double	286·0 "	115·0 "
7.	"	318·5 "	41·0 "
8.	"	299·0 "	46·0 "

The average weight of the single size was blue paper contents 122·8 grains, and white paper contents 37·8 grains. In the double size blue paper contained an average of 301·1 grains, and white 67·3 grains. It is evident that a doctor prescribing such powders would never know definitely what his patient had been supplied with, and this is very undesirable.

Not only does the weight of the powder vary, but I hope to be able to show you from the results of a few analyses of samples obtained in the usual way that the seidlitz salt itself also varies to a considerable extent and that a uniform seidlitz salt is at present nonexistent. Attfield and Squire both give formulæ corresponding to 75 per cent. of tartarated soda and 25 per cent. of sodium bicarbonate, and wholesale houses seem to follow this formula more or less, though it is different, apparently, with retail chemists.

The method of analysis which was found to yield the most satisfactory results by experiments on mixtures of tartarated soda and sodium bicarbonate, and on mixtures of these two with sugar was the following:—

Mix the sample in a mortar to ensure uniformity, as in some cases equal measures of rochelle salts and seidlitz salts are merely thrown together and wrapped up to form the contents of the double sized powder. Weigh 50 grains, dissolve by gentle heat in 1 ounce distilled water, titrate with standard oxalic acid, using litmus as indicator. This indicates the quantity of sodium bicarbonate in 50 grains. To another 50 grains dissolved in as little warm water as possible add acetic acid, in small quantities, to excess. Effervescence having ceased, boil, redissolving the precipitate which formed; then pour into cold methylated alcohol, to cool, stir, filter through a tared filter paper, vith methylated alcohol, dry and weigh the pre- From the weight of this precipitated cream of tartar, of which 188 grains correspond to 282 grains of rochelle salts, the quantity of the latter in the 50 grains of seidlitz salts can be readily found. Sugar was calculated by difference. The percentage composition is found by doubling the results. Sugar does not interfere with the precipitation of the acid tartrate of potassium in such a mixture to any appreciable extent, if at all.

Another method of estimation found to give good results and entirely volumetric was the following. Estimate the sodium bicarbonate present in a given weight of seidlitz salts by standard oxalic acid, using litmus as indicator. Ignite a known weight of seidlitz salts at a low red heat for fifteen minutes, dissolve out the alkaline carbonates by lixiviation with boiling water, filter and estimate the total quantity of carbonate by titration with standard oxalic acid, using litmus as indicator; deduct a quantity of sodium carbonate equivalent to the quantity of sodium bicarbonate already found from the total sodium carbonate and calculate the remainder into rochelle salts. Sugar when present was calculated by difference. Eight seidlitz powders and two seidlitz salts were examined with the following results:—

Sample.	$KNaC_4H_4O_6$ per cent.	$NaHCO_3$ per cent.	Sugar per cent.
1	55·0	25·0	20·0
2	47·5	52·5	——
3	37·5	30·5	32·0
4	79·0	27·5	——
5	76·5	13·0	10·5
6	72·0	28·0	——
7	77·5	12·5	10·
8	70·0	15·0	15·
9	74·0	26·0	——
10	76·0	24 0	——
Average	66·5	25·4	——

The numbers on this table correspond with those on the previous one. Fifty per cent. of the powders examined contained sugar, and in each case where sugar was present oil of lemons was used as a flavouring agent. No. 4 contained less water of crystallization in its rochelle salts than is required by the molecular weight of the official salt which was taken as standard. It therefore adds up a little over the hundred.

The very natural question now arises, what should a seidlitz powder contain? Should it be sweetened and flavoured or should it not? The majority of the public seem to prefer one so sweetened and flavoured.

It has, however, the disadvantage of caking. I do not think this will spoil it in any way except in appearance. An official seidlitz powder should be based on the type of the present small size and should contain neither sugar nor flavouring.

Saccharin would make an ideal sweetener for seidlitz powders, being in an alkaline medium. Care would need to be taken to allow of sufficient alkali being left after neutralization to keep the saccharin in solution and give it full scope for its sweetening powers.

In the event of our having an official formula what would be the best technical name to adopt? Should we follow the United States Pharmacopœia and call them "Pulveres Effervescentes Aperientes," or should they be called "Pulveres Sodæ Tartaratæ Effervescentes." I think the latter name is best, as it gives an idea of the composition of the powders.

The wrapping and general put up of these articles require criticism. Some were exceptionally neat, but I am sorry to say others were very slovenly. Those wrapped in machine-cut paper looked far and away better than those in hand-cut, or rather, I should say, hand-torn paper

In the *Pharmaceutical Journal* for the 7th inst. it is announced that the General Medical Council intend publishing an addendum to the present Pharmacopœia next year, and since suggestions regarding articles deemed worthy of insertion are invited, I would propose that the following formula should be adopted:—

Tartarated soda. . . . . . . 120 grains.
Sodium bicarbonate . . . . . 40 „
Mix and wrap in a blue-coloured paper.
Powdered tartaric acid . . . . 40 grains.
Wrap in a white paper.

I would further suggest that tests for purity, and a process for purity and a process for estimation should also be inserted. I hope I have been able to show that an official formula would be an advantage to all parties concerned, viz., patient, doctor and compounder.

The reading of the paper was followed by a discussion taken part in by Messrs. Bell, Coull, Duncan, Findlay, Hill, Lunan, McEwan and Rawlinson, and on the motion of the Chairman, cordial votes of thanks were awarded to the authors of both papers.

The meeting then closed.

THE ANNUAL CONVERSAZIONE.

The sixth annual Conversazione took place in the large hall of the Literary Institute, South Clerk Street, on the evening of Friday, December 13, at 8.30.

Mr. A. Russell Bennet occupied the chair, and there was a very large attendance, among others present being Mr. William Gilmour, Chairman of the Executive of the North British Branch, Mr. J. B. Stephenson, Chairman of the Board of Examiners for Scotland, Mr. D. McEwan, Vice-President, Mr. Wm. Aitken, Mr. W. L. Howie, Mr. D. Maclaren, Mr. W. Smith and Mr. Thomas Thompson.

The Chairman intimated apologies from Messrs. William Ainslie, D. Storrar, Vice-Chairman of the Executive of the North British Branch, and Provost Watt, Haddington.

The first two hours were most agreeably spent in listening to an excellent and well rendered programme of songs, recitations and instrumental pieces contributed by Misses Macdonald, Gordon and Wright and Messrs. Davidson, Dow, Duncan, Hartley, Hogg, Lunn, Ruthven, Thompson, Waterstone, and Whyte, Mr. J. Ewart acting as accompanist.

On the motion of the Chairman a hearty vote of thanks was awarded to the contributors, and on the motion of Mr. Gilmour, a similar vote of thanks was awarded to the Chairman.

Under the management of Messrs. R. Butchart and J. H. Hoseason a dance programme, taken part in by about eighty couples, was then proceeded with and kept up with great spirit till 4.30 a.m.

The platform was very tastefully decorated with plants kindly lent by Mr. James Buchanan and Messrs. Bailden and Son, Duncan, Flockhart and Co., Mackay and Co., Macfarlan and Co., Jas. Robertson and Co., and T. and H. Smith and Co. sent an ample supply of aerated waters.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The tenth meeting of the first session was held in the Association's Rooms, 74, Commercial Street, on Thursday evening, December 5. The President, Mr. John Forsyth, in the chair. There was a good attendance, and the appearance of the room was greatly enhanced by the presence of herbarium specimens hung on the walls and specimens and microscopes on the table.

The Secretary read the minutes of the previous meeting and these were duly adopted; after which Mr. George Young was elected Assistant Secretary in place of Mr Adam, who has gone to fill a situation in Aberdeen. Some other matters of business having been attended to the Chairman called on Mr. William Mair to read his paper "Botany and its Relation to Pharmacy."

The author took as a suggestion for thought the following passage, written by the late Professor Edward Forbes:—"The classical and mathematical studies of our youth are not so much intended to teach us classics and mathematics, but to train us to the business of life and to right judgment in the higher pursuits of men."

He thought these words contained in a nutshell the ideal relation of the science of botany to the practice and profession of pharmacy; that is, not simply as a means to a very definite end, and that end our examinations, but as an important part of our equipment for actual service in the ranks of Pharmacy, and as an acquisition that will be useful to us throughout our whole pharmaceutical career. He hoped that some mutual practical benefit might result, and that some encouragement might be given, particularly among the younger members, but also among their more advanced members, to the study of the beautiful science they had met together to study that evening.

Taking, in the first place, the historical relation of botany to pharmacy, Mr. Mair stated that botany as a science had in a large measure originated through the wants of pharmacy. It was possible to trace from the earliest times a distinct relationship between all that might be called botany and all that might be dignified by the name of pharmacy in the application of the productions of the vegetable kingdom to the uses of mankind.

Thus it was common to find, even to-day, among the uncivilized tribes a sort of rough, general acquaintance with the wholesome and poisonous properties of the plants with which they are surrounded. Some of the earliest botanical writings (a few interesting extracts from which were quoted) showed that botany had always been in a large measure subservient to the needs of pharmacy.

With the advance of the science, botanical gardens were established, the first of these on record being that of Matthœus Sylvatium, established in 1309, a provision which has since become an indispensable adjunct of our medical schools, but which, now that pure medicine is becoming more and more dissociated from pure pharmacy, was coming to be recognized as a no less important association of schools of pharmacy. Meanwhile a class of herbalists had arisen, and a very striking contrast was given in a formula of about two hundred years ago for an aqua pectoralis, in which all the vegetable ingredients, to the number of about twenty, were to be "gotten green that can be," in comparison with the tendency of to-day towards the dispensing of valoids, equaloids and the like. Mr. Mair then went on to speak of the value of the science to the pharmacist, especially in these days, when the pharmaceutical pericranium is regarded as a sort of consummate encyclopœdia, when the pharmacist is expected to possess a general knowledge of all the properties, sources, etc., of the various organic and inorganic substances retailed by everyone of his commercial neighbours.

The importance of botany as a study was next referred to. The author wished to dispel, to some extent, the impression, a growing one unfortunately, that there is such an inseparable dryness connected with botany as a study, that it constitutes at once the most obnoxious and most-to-be-avoided subject of the pharmaceutical student's curriculum, compulsory or otherwise. He reminded them that every one of the varied organisms of their study must be regarded as a life, and that this, together with a true conception of the external form, was the true idea of the study of modern botany. A more general application to the physiological aspect of the study was advocated. He thought that it was a fault with a great majority of text-books, to which Bentley's was no exception, that this important aspect of the subject was inserted as an additional chapter at the end. He was confident that even pharmaceutical students would find their introduction to, and subsequent study of, the science much more easy and interesting. They were encouraged to read the life history of the plants from the plants themselves. They had first however to learn the "alphabet," then the facility for reading was unlimited. For this purpose Bentley's work was recommended. Proceeding Mr. Mair referred to the want existing in Dundee of a botanical garden, and he hoped that with the assistance of the Medical School this want would be supplied. After a number of interesting details calculated to stimulate interest among the students, he proceeded to speak of the advantages and possibilities of botanical studies. He referred in glowing terms to the science of botany as a pleasurable study, a mental training and a healthful training, and to the incalculable profit intellectually which was derivable from it. There were many possibilities for ardent students in all departments of the science. Bacteriology as a branch practically of the science, the selection of adulterations by botanical and microscopical features, and the isolation of alkaloids were mentioned among others as directions in which botany had an important bearing on the profession of the pharmacist.

He advocated that greater attention should be paid on all hands to the prosecution of botanical study, and he was confident that this would produce better and more successful pharmacists, while the application of our knowledge to the business would be advantageously extended. In conclusion he quoted a passage which had been made use of by Professor Bentley in the course of a lecture which he delivered in Dundee as President of the British Pharmaceutical Conference in 1867, when, curiously enough, he chose as his subject, "Botany, and its relation to Pharmacy," although the author was not aware of this until several months after his subject was handed in.

On the conclusion of a very interesting paper Mr. Mair invited the members to examine several microscopes which he had arranged in connection with his paper, and also several samples of drugs, the botanical character of which he proceeded shortly to describe. He expressed his indebtedness to Professor D'Arcy Thompson, University College, Dundee, for the use of several microscopes, also to Messrs. Burroughs, Wellcome and Co., T. Christy, and to E. M. Holmes, J. Moss and Co. and the Editor of one of the trade journals for the specimens of drugs on the table, most of which were for presentation to the museum, and he had much pleasure in handing them over to the Association.

Some discussion thereafter took place on the paper, and, on the motion of Mr. Henderson, a hearty vote of thanks was accorded

On the motion of Mr. Lamont, seconded by Mr. Skinner, a vote of thanks was given to the various gentlemen who had presented specimens, and the Secretary was instructed to write and thank them for their respective gifts.

Mr. W. Gilmour, of Edinburgh, and a number of local chemists who had subscribed to the funds of the Association were afterwards elected honorary members.

A vote of thanks to the Chairman concluded the proceedings.

On Friday evening the 6th, the microscopic objects were again exhibited and a few interesting details were given as to the construction and use of the microscope.

The eleventh meeting of the session was held on Thursday evening, December 12, the Vice-President, Mr. Skinner, in the chair. The Secretary read the report of the Committee on the Apprentices' Prize competition, from which it appeared that the prizes had been awarded as follows:—1st prize, Mr. Charles T. Duncan; 2nd prize, Mr. Fred David; 3rd prize, Mr. James Fernie.

The remainder of the meeting was devoted to the reading of short papers on "Infusions," by Mr. Lindsay; "Pill Coating," by Mr. Hislop; and "Improved Formulæ for (*a*) Lotio Hydrargyri Nig., and (*b*) Lotio Plumbi c. Opio," by Mr. T. C. Henderson. These papers will be dealt with in a future number.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of this Association was held in the Silver Street Hall on Friday evening, December 13, the President, Mr. Curtis, in the chair.

The minutes of the previous meeting having been read, and some business matters discussed, the President called on Mr. James Clark to read his paper upon "Volumetric Analysis."

Mr. Clark first compared volumetric with gravimetric analysis, showing the superiority of the former method over the latter in all cases where applicable. After exhibiting and describing the necessary apparatus, the volumetric solutions of the B.P. were mentioned and their preparation explained, samples of all being shown on the table. Several estimations were made to illustrate the various processes. Mr. Clark was of opinion that the burette was too little known, and contended that every chemist ought to be able to prove the genuineness of his preparations by volumetric analysis when so ordered in the B.P.

A vote of thanks having been accorded to Mr. Clark, the meeting terminated.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

This Association held its usual fortnightly meeting on Wednesday the 11th inst. The President presided. After approval of minutes Mr. Colvin Gates was called on to read his essay on "The Chemistry of Silver." He noticed the names under which the metal has been known in various countries and at different times; its history as gathered from references in Scripture, in classic authors and in more recent authorities; its geographical and geological sources; the various methods of extraction—as by amalgamation from its ores and crystallization from lead. The uses of silver, as a medium of exchange, in the manufacture of plate, jewellery, etc., were then touched on. The different salts of silver were considered in detail; note being taken of their chemical and physical characteristics, and of their uses in the laboratory and in the arts.

After a discussion, in which Messrs. Harley, Gilmour, McKellar, Fisher, Watson and others took part, Mr. Gates replied, and a vote of thanks was awarded to him on the motion of the President.

The Committee appointed at a previous meeting to endeavour to procure for the use of the Association the library, microscope, etc., belonging to the late Glasgow Chemists and Druggists' Association, reported the successful termination of their labours and received a vote of thanks.

A motion declaring the recent interpretation of the "Pharmacy Act, 1868," to be at variance with the intention of its framers, was carried against the previous question by a small majority.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, on Thursday, the 28th ult., Mr. T. A. Ellwood, President, in the chair, the following papers were read:—

A Portable Botanical Press.

BY H. HELBING, F.C.S.,

Apotheker of the German Hospital, Dalston.

Although the season for collecting botanical specimens is over, I should like to draw your attention for future excursions to a herbarium press, much used in Germany, which is superior in many respects to those commonly used in this country.

As you see from the specimen I show you, this press consists of two separate iron frames, each about 16 inches by 10. Each frame is filled with a network of iron wire, with meshes about an inch square. Two catches jut out from each side of one frame, small brass chains being fixed at corresponding points on the other, so that the links can be slipped over the catch.

As soon as gathered, the fresh plants are laid on paper in the frames, and when the necessary quantity has been obtained, the frames are placed together with the plants between, and connected, the chains being pulled on to the teeth. Owing to the elasticity of the paper and plants a pressure is produced more than enough to keep the links of the chains on the teeth.

Such a press is cheap, can be made by any smith, is neat, always ready for use, occupies very little space, and having a handle, can be easily carried about, so that the plants can be prepared and pressed at the place where they grow, thus giving the best chance of preserving them so as to retain their natural appearance. Drying goes on very quickly, the air passing freely through the wires, especially when hung up, while if it is necessary to apply heat, the moisture readily escapes, a great advantage over the presses with solid frames.

I have used such presses for many years, often having three or four going at the same time, and I can strongly recommend them.

To prove to you how satisfactory they work, I would ask you to examine the plants shown here. They were collected by myself near the Rhine several years ago and pressed and dried by one of these presses, with a result that I think you will agree is perfectly satisfactory.

The President and Messrs. Salter, Stark and Williams commented upon the comparatively simple and efficient nature of the press and its portability.

Mr. Stark asked if the bent wires did not tend to injure delicate or brittle specimens, and Mr. Ellwood inquired if any irregularity in drying was noticeable.

Mr. Helbing, in reply, said experience would teach the collector how best to arrange his plants to ensure uniform pressure; the lattice-work arrangement facilitated the drying process, and by a proper disposition of the paper and the specimens no fear of misshapen or discolored specimens need be anticipated.

Commercial Surgical Gauze.—A Quick Method of Preparing Gauzes.

BY H. HELBING, F.C.S.,

Apotheker of the German Hospital, Dalston.

Although gauzes are not in this country so much handled by chemists as is the case abroad, a few remarks on them and their preparation may nevertheless be of interest. There is no doubt that such articles are of an entirely pharmaceutical character, and as such, should be monopolized by the pharmacist, instead of being in the hands of persons frequently incompetent to judge of their quality and purity. Strange to say, although we have plenty of tests for ascertaining the purity of ordinary drugs and chemicals, few people ever test the purity of a gauze, which is the more surprising when we consider the wide differences in quality of the antiseptic dressings in commerce.

Cheapness is certainly no proof of purity, rather the contrary, for if we go into the details of manufacture we shall often find that the actual cost of preparing an article in any way reliable, that is from proper raw material and the requisite quantity of antiseptic agent, exceeds the prices at which some houses offer their goods. Good raw material is of the first importance in preparing gauzes. This should be perfectly free from fat, should have at least thirty threads each way in a square inch, and should weigh about 10 drachms to the square yard. This is about the average for good stuff, though if we examine the various gauzes on the market, we shall find that only the very best houses furnish a material of this standard. I have myself examined a number of samples and give a few of the figures:—

Samples.	Weight of square yard.	Number of threads per square inch.
1	12 drachms	44 × 44
2	10 ,,	31 × 31
3	7 ,,	15 × 15
4	6 ,,	17 × 17
5	5½ ,,	26 × 26
6	5 ,,	27 × 17

Gauze is sold here by measure, an entirely wrong principle, as unless the buyer knows the weight and the number of threads he cannot tell what he gets for his money. Supposing the samples I have given you were all made into 10 per cent. iodoform gauze. Nos. 1 and 2, as you will readily understand, would contain nearly double the amount of iodoform in each square yard of any of the others, and if when finished they were charged at double the rate of the others, it would only be a fair price. This shows how important it is when procuring such articles to ascertain the weight of the gauze and the number of threads. Of course the gauze should also be tested to see that it contains the percentage of antiseptic claimed.

Gauzes are usually kept ready by the chemist, but it may sometimes happen that a medical man may want a gauze for a case of emergency, and if the chemist have none in stock he cannot supply, as he is unable to procure it in time. In such urgent cases it is an advantage to be able to prepare the gauze oneself, and this can be done in a few minutes by following these directions. Take the necessary quantity of raw material and then weigh out a corresponding amount of the antiseptic.

The material is now saturated with ether or a mixture of alcohol and ether, in which the antiseptic has been dissolved, 1 ounce of the material requiring about three ounces of liquid. The gauze is several times wrung out and again saturated, so as to ensure uniform impregnation, and for drying the gauze is now simply unfolded and shaken a few times, when it is ready for use.

In this manner all the different gauzes may be prepared, carbolic, corrosive sublimate, iodoform, thymol, eucalyptol, or any other.

To show you the practical working I will now prepare you a small quantity of 10 per cent. creolin gauze, which has gained great favour in Germany, owing to the non-poisonous but strong antiseptic properties of its constituents. I do not say this is a cheap process but that it is of great utility in urgent cases.

Mr. Ellwood said the note was a very useful one. It was not customary, he believed, for chemists to test their gauze; they commonly retailed it without question. Nevertheless gauze of guaranteed purity was to be had; that there was a great disparity in commercial samples was apparent from Mr. Helbing's remarks.

Mr. A. C. Stark said he did not think the relative weight of the gauze of so much importance as the number of meshes to the inch, since some gauzes were much coarser in fibre than others; the strength of the antiseptic would of course be measured by weight. He should like to point out that very many gauzes in the English market were made with a waxy or oily medium. Such gauzes were, he thought, quite useless; they were non-absorbent, and owing to their oily nature, the antiseptic did not come into contact with any discharge that took place. Carbolic acid and oil had for this reason been found useless as an antiseptic.

Mr. Salter said he could confirm Mr. Helbing's statements as to the great differences that existed between gauzes; he had had occasion to examine some samples but a few days before the meeting, and pieces which were identical in length scaled 3¾ and 7 ounces respectively.

Mr. A. H. Mason said the members present were indebted to the author, who possessed such facilities for becoming acquainted with the subject as to enable him to speak authoritatively. The chief consideration with hospital authorities, who were the principal consumers, was that of cheapness, and no doubt that element was answerable in great measure for the variable qualities of gauze. He advocated the adoption of a standard, a proposition which he stated had already met with pretty general adoption on the continent, and in one case had been introduced into the Pharmacopœia, and Mr. Helbing's standard approximated closely to this. He indicated that it was a matter of great importance that the executive of large hospitals should be educated up to the fact that cheapness was not the only desideratum; too often every other point was sacrificed to this.

Mr. Richards inquired if any definite information could be given respecting the new "antiseptic," which had been mentioned incidentally, and of which they had heard so much recently. He also expressed the opinion that much gauze took as its source the "shoddy" works rather than the spinning mills.

Mr. Helbing said in reply that the number of threads in the square inch corresponds pretty regularly with the weight of the gauze, and the continental authorities generally stipulated the number of threads and the weight. The question of wax in gauze was a medical point; he thought it was not of any use. He knew that gauze was almost monopolized by the wholesale dealer, and his object had been to direct the attention of the pharmacist to a legitimate extension of his business. It was necessary that the antiseptic material should be, if possible, applied in solution; the fibre of the cotton thus became impregnated. The process he recommended for the extemporaneous production of medicated gauzes was applicable in the case of any antiseptic that was soluble in ether, alcohol or chloroform.

Ointment Bases.

BY H. HELBING, F.C.S.,

Apotheker of the German Hospital, Dalston.

So many improvements have been made of late years in almost every branch of pharmacy, that it is all the more surprising we should still be so behindhand as regards ointments. I will not give you a long dissertation on the various ointment bases. Their merits and drawbacks are too well-known, but we will just glance oven them, comparatively.

There is no doubt that lard is an excellent base when fresh and free from water, or in other words when it is not rancid; but unfortunately we all know how difficult it is to keep lard, whether simple or combined, and especially when made up into ointments or mixed with watery solutions, for any length of time unchanged.

Vaseline, under which term I include all the different paraffin compounds, has failed to fulfil the hopes entertained when it was brought out. It has been proved that it does not mix with water.

The various compounds of starch and glycerine were found to be too easily decomposed to be at all reliable, and the only bodies left are mollin and lanolin.

Mollin, which is the so-called superfatted soap, has not proved at all satisfactory as an ointment base, from either the medical or the pharmaceutical standpoint. Lanolin, however, still maintains its reputation.

On its first introduction lanolin was of course very different to the refined product of to-day, but even in its crude condition medical men and chemists thought it likely to become a very valuable ointment base.

To the medical man, it had several excellent qualities, easy absorption, etc., while the pharmacist soon recognized that it never turned rancid and was miscible with more than double its weight of water. The chief, practically the only drawback to its use, was its viscidity, though this has not prevented its being included in the new Austrian Pharmacopœia.

Many attempts to overcome this stickiness were made, during the process of manufacture, for instance, as well as in other ways. I myself have spent much time in trying to improve its usefulness as an ointment base, and after numerous experiments believe I have succeeded in producing a compound which I think is satisfactory, and which I have called "Unguentum Lanolini." It is prepared as follows:—

65 parts anhydrous lanolin
30 „ liquid paraffin
5 „ cerasin

are melted together and 30 parts of water beaten into the mixture.

Ungt. lanolini has, as you see from the sample exhibited, a smooth, almost white appearance, and is quite free from any stickiness. It mixes readily with its own weight of water, and in my opinion is an ideal ointment base for either official or non-official preparations.

I had a few ointments prepared with it several weeks ago, and shall be glad if you will examine them and convince yourselves of the elegance and the advantages of this product.

I have specially brought this matter to your notice, as I think that the article is not as well known as its merits deserve, and there can certainly be no better means of introducing such an article, than to submit it to the members of this Association, as they are constantly engaged in practical dispensing, and will accordingly be better able than anyone else to judge of the merits of an ointment base such as "Unguentum Lanolini," which is readily miscible with water, easily compounded, has an elegant appearance, and does *not* turn rancid.

Mr. Ellwood remarked that ointment bases had long formed a bone of contention amongst pharmacists. He was of the opinion that if lard could always be obtained pure and could be preserved in that condition, it formed the most satisfactory ointment base they possessed. The difficulties in the way, however, were well nigh insurmountable. He believed the disappointment arose not so much from the lard itself as from the impurities it so often contained. The mixture of lard and soft paraffin as used in what might be termed the "antiseptic" ointments of the Pharmacopœia had many commendable points, the great disadvantage was its non-absorbent character. Lanolin had always been remarkable for a characteristic stickiness, which was still apparent in Mr. Helbing's specimen. He thought this undesirable quality might possibly be removed by paying attention to the chemical composition of the fat and trying the action of various solvents in the light of the chemical knowlege that would be thereby acquired.

Mr. A. H. Mason said he thought the question of lard had been settled for ever after the Bath Conference.

He would like to know if Mr. Helbing had treated lard and vaseline in the same fashion as he had experimented with lanolin, and, if so, were the results in any way comparable. He also remarked upon the sticky nature of lanolin, which had not been overcome by Mr. Helbing, for it was perceptible in the specimen submitted, and stated that it might be obviated to a considerable extent by the addition of "cimolite," and such a preparation was easy to wash off and found favour with many dermatologists.

Mr. A. C. Stark said he considered the question of the best ointment base to depend entirely on the ointment to be made. All ointments were not intended to act by absorption (and, indeed, medical authorities were not agreed as to the value of absorption by the skin). In cases where local action only was required, there was no better medium than the B.P. mixture of hard and soft paraffin, and where absorption was to be aimed at, unquestionably lanolin was the most suitable. It was impossible to get an ointment base that would answer every requirement, both medical and pharmaceutical, in every case. While congratulating Mr. Helbing on his mixture, he did not regard it as by any means perfect, and if the idea was to rid lanolin of its stickiness the author certainly had not succeeded. In May of two years ago there appeared some researches by Dr. Guttman, in which the absorbing power of the skin for lanolin was denied; perhaps Mr. Helbing, as a compatriot of the author's, could tell him something about this.

Mr. W. L. Williams said the absence of the property of being saponified was disadvantageous to the use of refined petroleums.

Mr. Richards objected to the name lanolin; he did not see why the article should not be called by its proper name of sheeps' wool fat; in certain skin diseases of the scalp he had not found "sheeps' wool fat" to give results which were nearly as satisfactory as he had obtained with lard.

Mr. Helbing said lanolin was a purified sheeps' wool fat, and as the medical profession were anxious to obtain pure products he thought the term might still be used to designate the purified article. Another advantage in a special name was that it tended to secure a more uniform article. He had not conducted comparative experiments with lard and vaseline. Anhydrous lanolin was sticky and not easily worked, but the lanolin ointment he introduced was readily manipulated. The Austrian Pharmacopœia had sanctioned the making of mercurial ointment with lanolin, and Liebreich supported its application in the same connection. Gottstein proved also that it was easily absorbed, and that no microbes could exist in it.

A vote of thanks to the author was proposed by Mr. Mason and seconded by Mr. Stark.

At the meeting of the Association on the 5th inst., Mr. T. A. Ellwood, President, in the chair, a paper was read on—

THE PREPARATION OF MICROSCOPICAL SECTIONS FROM BARKS AND ROOTS USED IN PHARMACY.

BY M. J. COLE.

Barks and roots that have been dried must be cut into small pieces and soaked in water for several hours; this will cause the tissues to swell up and regain, to a certain extent, their natural shape. They are then to be transferred to methylated spirit, which should be changed every twenty-four hours until no colour comes away from the tissue. They will then be ready for cutting into sections, or they may remain until required.

Fresh specimens should be cut into small pieces and placed in methylated spirit, which should be changed as above until no colour is given off from the tissue. The hardening will usually be complete in a week, or they may remain for any length of time until required for cutting.

Some barks will be found too hard to cut; they may be softened by soaking for a time in liquor potassæ, then wash well in water until all trace of potash is removed.

Section Cutting.—Fairly good sections may be made by hand with an ordinary razor. Hold the piece of tissue in the left hand, keeping the forefinger straight so that it may form a rest for the blade of the razor to slide on. A good strong army razor answers very well. Hold it firmly in the hand and keep the handle in a line with the blade and draw it from heel to tip through the tissue towards yourself. Keep the blade well wetted with dilute methylated spirit, and as the sections are cut place them in a saucer of spirit or water.

Section-cutting with a Microtome.—If really good sections are required, a microtome of some kind should be employed. A very good and complete instrument, capable of being used for making all kinds of microscopical sections, can be obtained from Messrs. W. Watson and Sons, of 313, High Holborn. Screw the microtome to a firm table, and with the tube supplied with the machine, punch out a cylinder of carrot to fit the well of the microtome. Cut this in half longitudinally, and scoop out sufficient space in one-half to take the tissue to be cut. Put the other half of carrot in its place, and make sure that the tissue is held quite firmly, but it must not be crushed. Now place the whole in the well of the microtome, and commence to cut the sections with a strong razor or the section knife that is supplied with the machine when desired. Keep the blade of the knife well wetted with dilute spirit, and as the sections are cut, place them in a saucer of spirit or water.

Bleaching.—Vegetable sections generally require bleaching before they can be properly stained. A solution of chlorinated soda is usually used. Soak the sections in distilled water to remove the alcohol. Pour off the water and add a quantity of the bleaching solution, and allow it to act for from three to twelve hours, or until all colour has disappeared from the sections, then transfer to water, which must be changed several times until all trace of soda is removed.

Staining Sections.—The best staining fluid for general purposes is logwood. Take 2 ounces of ground logwood chips, place them in a calico bag and run water through it until scarcely any colour comes away. Drain away as much water as possible, remove the logwood from the bag and spread it in a thin layer on a tray to dry. Dissolve 2 drams of potash alum in 12 ounces of distilled water. Put the logwood into a vessel, pour on the alum solution and let it stand for forty-eight hours. Strain through muslin, and add 4 ounces of glycerine and 1 ounce of rectified spirit, mix well together, filter through paper, and add a small lump of camphor to make the mixture keep. Place the section in distilled water.

Add from thirty to forty drops of the logwood solution to an ounce of distilled water, filter, and immerse the section for three or four hours. Wash well in distilled water and then soak for a short time in ordinary tap water to fix the colour.

Transfer to methylated spirit for ten to fifteen minutes to dehydrate.

Take a small saucer or watch-glass full of clove oil and carefully float the section on to the surface of the oil and let it soak for five or ten minutes. When quite clear, wash in turpentine and mount in Canada balsam.

The logwood solution may be used undiluted for quick staining, but better results are obtained by the slower process.

Mounting in Canada Balsam.—Take 4 ounces of dried canada balsam and dissolve in 4 fluid ounces of benzole, filter, and keep in a good outside-capped bottle.

Clean a slide, place some balsam on its centre, take the section from the turpentine with a lifter, and place it in the balsam on the slide. Now clean a cover glass, and with a pair of forceps bring its edge in contact with the balsam on the slide; ease it down carefully so that no air bubbles may be enclosed, and press down until the section lies quite flat. Now put the slide away for a day or two so that the balsam may set, and then take a soft brush and with some benzole wash away the exuded balsam from round the edge of the cover. Allow the slide to dry and apply a good coat of gold size, and when this has dried wash the slide with some soap and water; dry well with a soft cloth and add a coat of asphalt.

Double Staining.

Aniline Acid Green Stain.

Acid green	2 grains.
Distilled water	3 ounces.
Glycerine	1 ounce.

Mix the water and glycerine well together and dissolve the green in the mixture.

Carmine Stain.

A.

Borax	10 grains.
Distilled water	1 ounce.
Glycerine	½ ounce.
Alcohol	½ ounce.

Dissolve the borax in the water and add the glycerine and alcohol.

B.

Carmine	10 grains
Liq. ammonia	20 min.
Distilled water	30 min.

Dissolve the carmine in the ammonia in a test tube, with the aid of heat, if necessary, and add the water. Mix A. and B. together and filter.

Place the section in the green stain for five to ten minutes. Wash well in distilled water. Place in carmine stain for ten to fifteen minutes, wash in methylated spirit in which the section must remain for at least ten minutes. Clear in clove oil and mount in C. balsam.

Mounting Sections in Glycerine Jelly.—Place the section in distilled water and soak until all trace of alcohol is removed. Warm the jelly and place a few drops on the centre of a clean slide and put the section in it. Clean a cover glass and apply it in the same way as directed for balsam. Allow the slide to cool and then the exuded jelly may be scraped away with a penknife and the slide washed with water. Dry well with a soft rag and apply a coat of gold size, and when this has dried, add another of asphalt.

I am indebted to Mr. Fawsett, of Messrs. Evans, Lescher and Webb, for the specimens used to illustrate this paper.

A brief discussion followed the reading of Mr. Cole's paper, in which Messrs. Ellwood, Rogers, Bird, Richards and Tompsett joined.

Mr. Davis proposed and Mr. Chattaway seconded a vote of thanks to the author, who acknowledged the compliment in a few graceful words.

A discussion as to the position of unqualified sellers of poison, introduced by Mr. Blackham, then followed, and was eventually adjourned to a special meeting on the following Tuesday. The result of the discussion has already been published in this Journal.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, December 12, Mr. E. White, Vice-President, in the chair.

A paper on "Titanium and its Compounds," by Messrs. A. J. Simons and A. O. Scrivener was read, and will be published in a future number of this Journal.

The paper was fully illustrated by specimens of the metal itself and its salts, which had been prepared by the authors, and by an extensive collection of the minerals which contain this element.

It was followed by a discussion, in which the Chairman, Secretary, Messrs. Norman and Sherlock took part.

Mr. R. H. Norman then gave a Report on Botany. The first part of the report consisted of a *résumé* of recent researches on karyokinesis, and was explained and elucidated by means of a series of coloured diagrams, showing the appearance of the nucleus at different stages of the process, and as seen from different sides. The subject of classification, especially with regard to cryptogams, was next discussed, the author upholding the argument of Goebel, that the absence of chlorophyll in the fungi is not a sufficient reason for separating them from the algæ into a distinct division. Lastly, the author commented on the loose way in which the terms "spore" and "gonidium" were used, sometimes even interchanged, and defined the proper use of the words.

A discussion followed, in which the Chairman, Secretary, Messrs. Pears, Sherlock and Shepheard joined.

Mr. Sherlock then called attention to the fact that in preparing ammonio-citrate of bismuth a dark-coloured flocculent precipitate, or residue, is often observed, when the citrate of bismuth is dissolved in the ammonia. This, on examination with the microscope, proved to be a fungus, which had probably grown on the bismuth citrate, and was rendered evident on the salt dissolving. If the solution was effected while being watched under the microscope, the filaments of the fungus could be observed coming into view as the opaque salt disappeared.

The meeting then adjourned.

Obituary.

JAMES ABBOTT.

A name, which has for many years stood alphabetically first upon the Register of Pharmaceutical Chemists, has been removed by the death, on December 2, of Mr. James Abbott, of Leeds.

Mr. Abbott was born in Leeds, and after serving an apprenticeship there, passed two or three years as an assistant with Messrs. Corbyn, Stacey and Co., High Holborn. He then opened in his native town a business which he retained until his decease. An early-developed taste for the pursuit of botany gave the bias to Mr. Abbott's employment of his leisure time, if such a term can be applied to long morning excursions, sometimes commencing before daybreak, in company with an equally zealous pharmaceutical friend. Such energy brought a thoroughness in the knowledge gained that fitted well with Mr. Abbott's strongly-marked individuality. He was not accustomed to take for granted demonstrable facts in relation to his own science, and he thus accumulated a large store of familiar acquaintance with plants and their life-history that made him a very interesting companion alike to skilled naturalists and to those on the threshold of botany. His enthusiasm was often exhibited in the study of some of the forms of pond-life, so familiar to him, when he would call in a passing friend to observe the revelations of the microscope, that was his constant companion in his pharmacy.

Mr. Abbott was one of the earliest provincial teachers of natural history science to avail himself of the special summer course of practical work organised by Professor Huxley at South Kensington under the designation of assistant studentships in biology. The systematic training thus acquired was of great value subsequently. For a short period Mr. Abbott acted as demonstrator in biology in the Yorkshire College, under Professor Miall.

In relation to pharmacy Mr. Abbott lectured for several sessions on botany and materia medica to students of the Leeds Chemists' Association, and often received medical and pharmaceutical students for private instruction in these subjects. Papers read before the Leeds Chemists' Association, "On the Extracts of the British Pharmacopœia," and "The Preservation of Syrups," are reported in past volumes of this Journal.

About three years ago, Mr. Abbott underwent a surgical operation, since which time his strength had slowly failed, limiting his capacity for work, but hardly lessening the interest which he took in natural history studies.

The attendance at the funeral at St. Mark's Church on December 5 was large, and indicated the esteem felt for the deceased. The Leeds Chemists' Association was represented by Messrs. Brown, Reynolds, S. Taylor, and Yewdall, as well as by some of its Associates. The Leeds Naturalists' Club attended in the persons of Mr. Fairley (Borough Analyst), Mr. Washington Teasdale, Mr. Roebuck, Mr. Pocklington, Mr. Hainsworth (School Board), etc., and several members of the medical profession were also present. Mr. Abbott leaves a widow and one son who has nearly completed the curriculum for the medical profession. Aged 58 years.

Notice has also been received of the death of the following:—

On the 28th of November, Mr. Thomas Waters, Chemist and Druggist, Caerphilly, Glamorganshire. Aged 75 years.

On the 2nd of December, Mr. Daniel Morrison, Chemist and Druggist, West Bow, Edinburgh. Aged 54 years.

On the 4th of December, Mr. Page Dewing Woodcock, Pharmaceutical Chemist, High Street, Lincoln. Aged 69 years. Mr. Woodcock had been a Member of the Pharmaceutical Society since 1853.

On the 6th of December, Mr. George Gray, Chemist and Druggist, Castle Street, Edgeley, Stockport. Aged 75 years.

On the 6th of December, Mr. James Alexander Mackay, Chemist and Druggist, Spittal Street, Edinburgh. Mr. Mackay was an Associate of the Pharmaceutical Society.

On the 7th of December, Mr. Henry James Blackbourn, Chemist and Druggist, late of Liverpool. Aged 45 years.

On the 7th of December, Mr. Benjamin Goddard, Chemist and Druggist, London Street, Southport. Aged 45 years.

On the 8th of December, Mr. Edwin Preston Carlton, Chemist and Druggist, High Street, Doncaster. Aged 43 years.

On the 10th of December, Mr. John Henry Elmitt, Chemist and Druggist, Bull Ring, Horncastle. Aged 38 years.

On the 12th of December, Mr. Richard William Frizell, Chemist and Druggist, Cranbourn Street, Leicester Square, W. Aged 51 years.

On the 16th of December, Mr. Henry Edward Goddard, Chemist and Druggist, Northgate Street, Great Yarmouth. Aged 73 years

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE NEW PHARMACY BILL.

Sir,—Having watched the movements of the pharmaceutical body for forty-five years, I do not look with great expectations upon the prospect of another Pharmacy Bill. Looking at the report of the discussion in the journal, the first thought is, "What does the President say? Nothing!" and I repeat it, "What does the President say? Nothing!!"

Perhaps he thinks the more, and finds matter for his philosophical study in the words that fell from his unruly team. Viewing the matter as an outsider, *i.e.*, outside the Council, there are many points that strike me as worthy of being noted.

A Bill which will meet with no opposition, will excite no enthusiasm and do no good—perhaps I should say "little" rather than "no"—such a Bill would be the Curriculum Bill pure and simple. It would not be a bad thing to accomplish, but the good in it is so microscopical that the slightest opposition would swamp the enthusiasm, if a spark of such existed, and failure to carry it would likely result. There are many, like myself, who would accept it with much indifference and little hope. I believe there are more who would see such a measure pass with a feeling of doubt, much indifference and a little fear. There are many who would sign a petition either for or against such a measure if asked by a neighbour who could in a few words plausibly display his pros or cons.

The prospective speedy decay and death of the Pharmaceutical Society is a matter to excite attention, but not much either of wonder or alarm. The President is building its monument in Bloomsbury Square. The decay need not cause any surprise, because the Pharmacy Act makes the vitality of the Society depend upon a class of men, the existence of whom the preamble of the Bill does not declare to be expedient and the provisions of the Bill do not take care to foster. The Bill holds out no inducements to Major graduation except that pharmaceutical chemists are exempt from juries, and most disinterested witnesses would say that there was as much or more ground for this exemption applying to Minor graduates, men who as a rule feel more keenly the struggle of existence and whose businesses are less generally in the hands of qualified assistants while the principal may be away; consequently through whose absence the interests of the individual and the safety of the public are more likely to suffer.

To make the Bill consistent with public good, the exemption should be extended to those who for the safety of the public are qualified to keep open shop; or if this is not necessary for the public safety, those who hold the ornamental degree should cease to have this exemption from a public duty and this advantage over their less favoured brethren.

The decay of the Society is not a cause for alarm so long as it is evidently for the public good. The chief danger to its existence is the evidence of selfish motives, with the professed aim at public safety: the evident aim at personal advantage, the petty jealousy of small honours, the striving of incompetent men to acquire the stamp of qualification. If it be evident that the existence of the Society is for the public good, the public will take care that it does not cease to exist.

In my young days the Preliminary examination was considered the apprentices' degree, the Minor was for assistants, and the Major was the qualification for a principal. When examination ceased to be optional with those who wished to carry on the drug trade, the Minor became the qualifying examination, and should have carried with it all the powers required for the maintenance and management of the Society.

I agree with several of the speakers that the sooner this is put right the better, whether the change involves the extension of the title Ph.C. or not. The objection of those who do not like to see their title of Ph.C. made too com-man is unworthy of anyone professing to seek the good of the public, the good of the trade at large, or even the narrower good of the Society. I am surprised that Mr. Martindale ever felt that objection. It was one of the follies of his youth. At the present day Ph.C. adds nothing to the glory of his name, but rather the good work he has done adds lustre to those titular letters.

I am glad to find various of the speakers acknowledge the truth that the only way to effectually combat the co-operative stores and limited liability companies is to let it be seen by the public that public interests are better cared for by the pharmacist than by the large organizations. In this particular the public have a great deal to learn, a great difficulty in seeing with the eyes of the pharmacist, and the pharmacists have great difficulty in seeing with the eyes of the public. If the board could institute an examination in this species of binocular vision, they would do a good work in pharmacy.

The great slur upon the examinations is that the holders of the degrees, Minor or Major, are constantly found to be wanting very much in "competent practical knowledge of their business."

Whille examination alone fails to secure the desired competence, examination following a curriculum more than doubles the probability that the graduate will have that species of knowledge which the curriculum is calculated to supply and the examination to test. But the two together are far from insuring the "competent practical knowledge" which is desirable for public safety.

One of the great weaknesses of the whole system lies in the tendency to underrate the value of thoughtful attention to daily work. This underrating results from the constant pushing to the front of the fictitious though legalized qualifications.

During the last twenty or thirty years I have had many assistants, Major and Minor, graduates who have astonished me by their want of the practical knowledge which their degree was supposed to guarantee. Men who were distinguished by their ability in their classes or examinations, failing in their ability to put their knowledge to use as a practical guide in their daily work; a modified man who did not know the meaning of 5 per cent.;" a Major man who thought the adult's cough mixture containing laudanum would be all right for children, if he put the children's cough mixture label upon it, and so on with many other cases. My conviction is that the common sense of assistants has diminished, in consequence of the fictitious value set upon book knowledge and examinations. These latter, if superadded to the development of practical knowledge derived from experience, would make men successful either as assistants or principals. That the passing of examinations does not guarantee the graduate's competence to conduct his business is a discovery likely to be made by a generation of Minor men. Another fact which should not be lost sight of is that a man who has acquired a competent practical knowledge of his calling will not retain that knowledge unless he finds it useful in his daily life, and this the majority will scarcely do till there is pharmacy for the pharmacist. In this particular the public advantage coincides with increased business to the pharmacist, but this implies that our numbers must not be in excess of public requirement.

We have heard often enough about opening the doors of the Society to admit the outsiders. Those who propose to do this again must do it with caution, remembering the saying that through the open door the steed was lost. Some of the Ph.C.'s finding the door open again might feel tempted to trot out. And the outsiders have never shown much desire to trot in. Why should they? They might earn the name of a more humble animal if they trotted into a stable where there is so little corn. So long as the druggists are in any way governed by regulations of the Pharmaceutical Society, it would accord with the principles of constitutional government that they should have the power of influencing the election of Council. It would be reasonable that the legally qualified man should be qualified for membership and all the little privileges of the Society. Altogether I fear the privileges are too small to tempt any considerable number of outsiders to walk into our parlour. The chief difference to the Society would be that one source of discontent or jealousy would be removed.

Newcastle. BARNARD S. PROCTOR.

ALCOHOLIC EXTRACT OF SCOPOLA.

Sir,—Will you kindly insert the following correction of an obvious error in the formula suggested for alcoholic extract of scopola, which appears in my paper on "The Pharmacy of *Scopola Carniolica*" in the last number.

As then stated, it was found that the official rectified spirit was best suited for the preparation of this extract, but in the formula a weaker spirit is inadvertently directed to be used.

The amended formula should read as follows:—

"EXTRACTUM SCOPOLÆ ALCOHOLICUM.
Alcoholic Extract of Scopola.

Take of—

Scopola rhizome in No. 20 powder .	1 pound.
Rectified spirit	3 pints.
Distilled water Sugar of milk	of each a sufficiency.

"Macerate the scopola in 2 pints of the spirit for forty-eight hours, agitating occasionally; then transfer to a percolator, and when the fluid ceases to pass continue the percolation with the remainder of the spirit. Afterwards subject the contents of the percolator to pressure, filter the product, mix the liquids, and evaporate over a water-bath to the consistence of a soft extract."

This is estimated and adjusted to standard strength as directed in the paper.

Hitchin. F. RANSOM.

SCOPOLA CARNIOLICA.

Sir,—About thirty years ago I remember seeing in an old fashioned garden in Essex a number of plants which I could not then determine; but the plate in the *Pharmaceutical Journal* of December 14 enables me to recognise them as *Scopola carniolica*. The gardener called it a root of mandrake, and very poisonous. Salmon, in the 'English Herbal,' 1710, gives a fairly good plate of it under the name of "the other kind of deadly nightshade." He says, "Its root is great and spreads it self out into many branches underground, with many fibres adjoining to them. It has an upright crested or cornered stalk, with many leaves thereon, being longer and narrower than those of the true sleepy nightshade, and more inclining downwards to the ground, full of veins running longwise and traverse therein. At the joints of the stalk from the middle part upwards come forth several pendulous flowers, hanging by very long stalks, being long and hollow like unto a bell flower, of a purplish colour, each of them set in a large green husk, dented or cut into five parts at the edges, but not very deep: in which after the flower is past, comes forth a round berry, of a deep blackish purple colour, and having a crown-like form at the head of the berry, which has a wine-like juice and many small white seeds within it."

OCTAVIUS CORDER.

Re GORSE SEEDS.

Sir,—Permit me to suggest, in reply to a letter which appeared in your issue of November 16 from Mr. Octavius Corder, of whom, I regret to say, I have no personal knowledge, that he should look further afield before he so boldly assigns motives for the actions and conduct of other people, and that, too, in the total absence of any knowledge of facts or circumstances.

I may remind him that there was no reason whatever to put up at any wayside inn, and also, that there was no such place to trust to, and, moreover, that as I was close to my own residence, where dinner was already prepared for me, it may perhaps occur to Mr. Corder there was not the least occasion to do so, even had there been the modest accommodation referred to.

I cannot think that it shows the best possible taste to treat in a spirit of levity that which nearly cost me my life, nor do I consider that he has been very successful in his effort to appear facetious or turn into a jest that which undoubtedly was a very serious matter.

It would perhaps assist to clear Mr. Corder's faculties if he were compelled to "make" a few meals of no greater gravity than the eighty seeds he so kindly introduces into his very silly and uncalled-for letter.

Woolsthorpe. G. WELBORN.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Smith, Sawer, Wood, Robb, Morrison, Tubby.

"THE MONTH."

What is Saccharin?

In a thesis published a short time since, Dr. Dohme stated that having occasion for a supply of orthobenzosulphonic acid he sought to prepare it from commercial saccharin, which was supposed to consist of orthosulphaminebenzoic acid, or as he prefers to call it, benzoic sulphinide (*Amer. Drug.*, July, p. 140). On examining, however, a sample obtained in commerce he found that it was far from being a homogeneous compound and that in fact it contained only about two-fifths of its weight of benzoic sulphinide, the actual sweet principle. An approximate analysis showed it to consist of from 30 to 40 per cent. of benzoic sulphinide, mixed with 50 or 60 per cent. of parasulphaminebenzoic acid, and about 10 per cent. of orthotoluenesulphamide and the acid ammonium and potassium salts of orthesulphobenzoic acid. According to Dr. Dohme saccharin may be easily tested as to the proportion of the sweet principle it contains by treating it with ether, which dissolves out the benzoic sulphinide, so that all that remains undissolved may be considered foreign matter. A writer in the *Archiv der Pharmacie* (Dec. 15, p. 1100), in commenting on the foregoing, says that he has had a similar experience with a German sample of saccharin, which contained only about 40 per cent. of benzoic sulphinide soluble in ether. For its solution a large quantity of hot water was required, and the first products of crystallization appeared to be a mixture of at least parasulphaminebenzoic acid and benzoic sulphinide. In addition, similar statements have been made by Messrs. Remsen and Burton, who draw a conclusion to the effect that the sweetening powers of commercial saccharin do not represent more than half the full capability in this respect of benzoic sulphinide (*Chem. Zeit.*, *Rep.*, Nov. 16, p. 305). The correctness of this latter statement especially is now practically admitted by Dr. Fahlberg, who in a communication to the *Chemiker Zeitung* (Dec. 4, p. 1603) takes the position that "saccharin" is not sent out as a homogeneous preparation, but as one that is standardized to have a sweetening power equal to three hundred times that of cane sugar. He alleges that benzoic sulphinide itself possesses a sweetening power equal to 500 times that of sugar, and says that commercial "saccharin" contains pretty constantly 60 per cent. of this compound. The presence of the potassium salt of orthosulphobenzoic acid he denies, on the ground that it is excluded by the conditions of manufacture, but he suggests that about 0·5 per cent. of chloride and sulphate of potassium that is usually present has given rise to the mistake of reporting its presence. Lastly, Dr. Fahlberg states that for those who require it a "saccharin. puriss." is prepared, which is 500 times as sweet as sugar. The foregoing illustrates one of the difficulties that may attend the introduction into pharmacopœias of substances that are the subject of patents under trivial names, since it would often lie with the manufacturers to determine within considerable limits the characters of the compound that should be supplied under a particular name. It is only fair to Dr. Fahlberg to state that he says the physiological experiments credited to saccharin have been made with the mixed article.

Phenyl-urethan.

"Phenylurethan" is the name given to a new compound that has been commended for its antipyretic, antirheumatic and analgæsic properties by Professor Giacomini in the Turin Academy of Medicine (*Pharm. Zeit.*, Dec. 4, p. 740). It is represented as being a compound belonging to the aromatic group, resulting from the combination of aniline with chlorocarbonic ethyl ether, and occurring as a white crystalline powder, insoluble in water and freely soluble in concentrated alcohol. Phenylurethan is claimed to act as an energetic and certain antipyretic, while at the same time exercising a beneficial influence on the general system. A dose of 0·5 gram is said to be equal to 1 gram of antipyrin, and to be sufficient to produce a fall in the temperature of from one to three degrees Celsius, lasting from nine to twelve hours. In acute and chronic articular rheumatism it is said to relieve the pain and reduce the swelling of the joints, for which purpose it is given in doses of 0·5 gram. As an analgæsic it produces in some cases a favourable result, whilst in others the result is negative. The form recommended for its administration is as a solution in Marsala wine, which is said to prevent collapse, cyanosis and other unpleasant symptoms.

Diuretin.

Under the name "diuretin" a sodio-salicylic compound of theobromine, corresponding to one of the so-called soluble salts of caffeine, has been introduced as an advantageous diuretic (*Apot.-Zeit.*, Dec. 14, p. 1338). According to Dr. Gram, of Copenhagen, theobromine is a diuretic, acting directly upon the kidneys, differing from caffeine in not affecting the central nervous system, and therefore not causing sleeplessness and restlessness. It is said to have produced satisfactory diuresis in cases of renal and heart disease in which digitalis and strophanthus have been without effect. But as the free alkaloid requires about 1600 parts of water for its solution it is not readily absorbed, and gives rise to disturbance of the stomach. Diuretin, on the other hand, is alleged to produce the beneficial effects of theobromine without the unpleasant symptoms. It is described as occurring as a white powder containing 50 per cent. of theobromine, dissolving with the aid of heat in less than half its weight of water, and remaining in solution after the liquid has cooled. It is administered to the extent of about six grams daily in one gram doses.

Naphthalene.

Dr. Tichborne suggests that the powerfully antiseptic and germicide properties of naphthalene might be utilized in the treatment of typhoid fever (*Med. Press and Circ.*, Dec. 11, p. 603). He has found that one crystal of this compound placed in three or four ounces of urine will delay the conversion of urea into ammonium carbonate for days, and even weeks, although it is not more soluble than camphor in water. Its relative insolubility in most solvents would, he thinks, be an advantage in typhoid, as the naphthalene would pass through the bowels undigested. The proper dose would have to be settled by experiment, but Dr. Tichborne states that he has himself taken two grain doses every hour without any other observable result than the deodorization of all fecal matter. For this purpose he points out that the hard crystalline form in which naphthalene is usually met with would be advantageously replaced by a fine precipitate that can readily be obtained by pouring a solution of the compound in strong alcohol or glacial acetic acid into cold water while stirring, collecting and washing the precipitate and drying with a gentle heat. If necessary that it should be given in a liquid form he suggests that it should be dissolved in some fixed oil and an emulsion made. It may be remarked that about five years ago Professor Rossbach reported that he had found naphthalene useful in chronic diarrhœa and intestinal catarrh and cystitis, the quantity administered being two to three grains per day (*Pharm. Journ.*, [3], xv., 344).

Diiodosalicylic Acid.

At the recent congress on therapeutics and materia medica, held in Paris, a communication was read by Dr. Calalb, of Bucharest, upon the therapeutic employment of diiodosalicylic acid, which has now been published (*Nouv. Rém.*, Nov. 24, p. 595). The compound, which was introduced as an antipyretic some time since, is represented by the formula $C_6H_2I_2OH \cdot COOH$, according to which it would be salicylic acid in which two atoms of hydrogen in the benzene residue have been replaced by two atoms of iodine. Dr. Calalb reports that in his hands diiodosalicylic acid, when administered in cases of acute polyarticular rheumatism, has produced effects comparable to those following the use of salicylic acid or salicylates, with the advantage that it has succeeded as a remedy in some cases where they have been powerless. Besides its analgæsic and antithermic properties, diiodosalicylic acid is said to act upon the circulation, modifying the systolic action of the heart and the number of beats until it stops in diastole. At the commencement of treatment the doses were limited so as not to exceed 1·5 gram daily, but this quantity was increased cautiously, in some cases to as much as 4 grams daily. In addition, as might be expected, diiodosalicylic acid is claimed to be a powerful antiseptic.

Natural and Artificial Salicylic Acid.

Some experiments as to the comparative action of natural and artificial salicylic acids and their salts by Dr. M. Charteris and Mr. W. Maclennan are recorded in the *British Medical Journal* (Nov. 30, p. 1208). From the symptoms observed the authors conclude that the samples of artificial salicylic acid and sodium salt used by them contained an impurity or impurities, to which they attribute the restlessness, confusion, delirium and greatly protracted prostration sometimes observed as following their use. In corresponding samples of artificial salicylic acid Mr. G. A. Henderson, of the University of Glasgow Chemical Laboratory, found a small quantity of another acid, which is never present in samples of the natural acid, and which he thinks may be derived from cresol or some other impurity in the phenol from which the salicylic acid has been made. It is well known that nearly a dozen years since the late Mr. John Williams called attention to an impurity occurring in artificial salicylic acid at that time and exhibited some crystals that are still in the Museum of the Pharmaceutical Society. Although the exact nature of the compound was not then determined it was ascertained that it differed in its chemical reactions from salicylic acid, and Mr. Williams named it provisionally cresylsalicylic acid, as suggestive of its probable origin. It should be stated that the artificial salicylic acid employed in Dr. Charteris and Mr. Maclennan's experiments was a white satiny powder in fine silky crystals resembling quinine, but that the salicylate of sodium was in small crystalline plates with a slight pink colour. A somewhat sweeping statement of the authors that unless otherwise indicated the artificial acid is invariably used for dispensing purposes has naturally drawn forth some reclamations.

Sulphoricinic Acid.

In a recent communication to the Société de Thérapeutique (*Journ. Pharm. Chim.*, Dec. 15, p. 573), M. Berlioz referred to the value of sulphoricinic acid in pharmacy as a vehicle for certain compounds when required for topical application. Naphthol, salol, creosote and carbolic acid all form with it solutions which give with water a perfect emulsion comparable to milk. In this way, without heat, 10 per cent. solutions of naphthol and carbolic acid can be made, which yield by simple dilution with water antiseptic liquids that have been found useful in the treatment of affections of the nasal cavities, the pharynx and the larynx.

Quinoline as a Preservative.

Attention has been called recently by Herr Rosenthal to the value of solutions of quinoline for the preservation of anatomical specimens (*Münch. med. Woch.*, Dec. 3, p. 868). Aqueous solutions of the hydrochlorate, tartrate and salicylate, containing equal to 0·1 to 0·2 per cent. of the base, are said to have proved very effective for the purpose. The hydrochlorate is, however, preferred, the solution being prepared by suspending a weighed quantity of quinoline in water and adding dilute hydrochloric acid, with continual stirring, until all the quinoline is dissolved. Should an excess of acid be used this may be neutralized with weak soda liquor and the solution then diluted to the required strength. The formula adopted in the Erlangen physiological institution is: quinoline, 5 grams; sodium chloride, 6 grams; glycerine, 100 grams; water, 900 grams. The ordinary tar quinoline can be used. The liquid is said to have the advantage of preserving all the tissues in their natural condition, except that it removes from them all colouring matter. Quinoline is also said to be a convenient preservative for digestive liquids, as an addition of it, in the form of salicylate, whilst preventing any putrescence does not in the least interfere with the activity of the digestive ferment.

Antipyrin Incompatibility.

Under the heading "Incompatibility of Antipyrin and Naphthol," M. Chabrol records a difficulty met with in dispensing some powders each containing β-naphthol, antipyrin, āā 0·10 gram; bismuth salicylate 0·25 gram (*Bull. Comm.*, Nov., p. 521). It was found that in whatever order the substances were mixed the final product was a liquid paste. The difficulty was overcome by mixing the antipyrin with five times its weight of sugar, and then adding the naphthol and bismuth salicylate, though of course this proceeding may be productive of inconvenience to any other dispenser who is subsequently called upon to make up the prescription. It will be noticed that the title of the paper represents the incompatibility as existing between the antipyrin and the naphthol, but as it will be remembered that a few months since (*Pharm. Journ.*, April 27, p. 862) a similar liquefaction was mentioned as taking place when antipyrin and sodium salicylate were dispensed together in the powder form, it might be thought probable that in this instance also the salicylate plays a part in the reaction. This proves, however, on experiment, not to be the case, for whilst a mixture containing only antipyrin and naphthol became pasty, one consisting of antipyrin and bismuth salicylate has remained a dry powder for several days. It may be added that on the former occasion it was stated by a correspondent (*Pharm. Journ.*, May 11, p. 920), that the mixture of antipyrin and sodium salicylate does not liquefy if kept in a closed bottle.

Nomenclature.

Referring to the suggestion recently made as to the nomenclature of some of the new compounds (*Pharm. Journ.*, Sept. 28, p. 241), which was based upon their relation to antifebrin, M. Petit makes the same objection as was raised in these columns to the use of a name in which any proprietary rights exist. He pertinently suggests that it would be no more difficult to take "acetanilid" as a starting point, and then "acetanilid," "bromated acetanilid," "methylated acetanilid," "oxymethylated acetanilid," and "oxyethylated acetanilid," would represent antifebrin, asepsin, exalgin, methacetin and phenacetin respectively. For another group of compounds he proposes to take the word "phenylhydrazin" as a basis, when pyrodin would become "acetylated phenylhydrazin," and the analogous compounds "formylated," "butylated," "amylated," and so on.

Digitalin.

As is known there exists on the continent considerable diversity of opinion as to the substance to which the name "digitalin" is properly to be applied. The German views on this point have already appeared in these columns (*Pharm. Journ.*, [3], xvii., 163); it may be convenient therefore to summarize the French opinion respecting it as recently expressed by Dr. Bardet (*Nouv. Rem.*, Nov. 24, p. 590). In the French Codex the name "digitalin" is officially applied to two preparations, one crystalline and the other amorphous, but both are required to be entirely soluble in chloroform. These preparations have been alleged by German writers to consist not of digitalin but of digitoxin, and various authorities have stated that the crystalline preparation is much more powerful than the amorphous one. Dr. Bardet, however, claims to have established experimentally that the two Codex preparations, which he speaks of generally as "chloroformic digitalin," are identical in their activity and effects and represent the only well defined derivative of digitalis, although he prefers the crystalline as being slightly more pure. On the other hand he says that German digitoxin, as it occurs in commerce, differs from the Codex preparations in not being completely soluble in chloroform and in being only one-half or one-third as active. The substance named digitalin in Germany is said to be an indefinite substance, resembling digitalein in being insoluble in chloroform and soluble in water and in its action, which in both cases is variable and always much less than that of chloroformic digitalin.

New Sugar Reagent.

At a recent meeting of the Mulhouse Industrial Society M. Matthieu-Plessy described a new reagent for cane sugar, grape sugar and pyrogallic acid, consisting of a solution of lead paranitrate ($PbHNO_4$) in an excess of melted ammonium nitrate (*Mon. Scient.*, Dec., p. 1446). It is prepared by melting 54 parts of ammonium nitrate and adding to it 34 parts of lead nitrate and 21 parts of lead hydrate. The reagent melts at about 115° C., and in contact with glucose it gives a cherry-red colour, with cane sugar the colour of *café-au-lait*; and with pyrogallic acid a chrome green colour.

Ash-free Albumen.

In a recent communication to the Berlin Chemical Society (*Berichte*, xxii., 3046) Herr Harnack describes the preparation of albumen which yielded no ash when burnt and presented some noteworthy characters. It was prepared by repeatedly dissolving and precipitating a metallic albuminate, obtained by treating a solution of a copper salt with a solution of albumen freed from globulin and otherwise as pure as possible. When all trace of phosphates had been removed the albuminate of copper was decomposed and the albumen obtained free and otherwise unaltered. In this condition it was found not to be coagulated by boiling and apparently incapable of passing into the coagulated state; it was not precipitable by alcohol, ether, carbolic acid or tannin; with pure cold water it thickened and gradually assumed the appearance of a solution, especially upon heating to boiling temperature; from this solution it was precipitated by neutral salt solutions (again soluble on strong dilution) and by acids (insoluble in excess), but not by alkalies; and the albumen did not lose these properties on evaporation of the solution to dryness at 100° C.

Oil of Birch and Oil of Wintergreen.

In August last (*Pharm. Journ.*, Aug. 31, p. 166) a paper was published by Messrs. Trimble and Schroeter on the oils of wintergreen and birch, in which the authors controverted some earlier statements and expressed the opinion that the oils are physically and chemically identical, both of them consisting mainly of methyl salicylate, and in addition containing a hydrocarbon of the formula $C_{15}H_{24}$ together with small quantities of benzoic acid and ethyl alcohol. They also stated that a sample of artificial oil of wintergreen examined by them possessed the properties neither of the natural oil nor of methyl salicylate. This paper has called forth an energetic rejoinder from Dr. Power (*Pharm. Rundsch.*, Dec., p. 283), in which he gives the results of the examination of a number of samples. The conclusions he arrives at are that natural oil of gaultheria consists of methyl salicylate and 0·3 per cent. or less of a lævogyre terpene; that oil of birch, when pure, consists simply of methyl salicylate, and is inactive towards polarized light; and that neither of them contains benzoic acid or, as far as he has been able to satisfy himself, any ethylic alcohol. A sample of oil of birch supplied as genuine by the same agents as supplied Messrs. Trimble and Schroeter with oil examined by them was found by Dr. Power to be sophisticated with kerosene. Dr. Power also failed to detect a trace of benzoic acid in a representative sample of artificial oil of wintergreen.

Aloes in Cascara Sagrada Extract.

A few months since a statement appeared in an American journal to the effect that fluid extract of cascara sagrada had been met with containing aloes (*Drug. Bull.*, July, p. 288). Accordingly Herr Reuter was induced to experiment as to the best means of detecting the presence of such an adulterant. From the results obtained he is of opinion this is to be found in the application of Klunge's cupraloin reaction (*Pharm. Zeit.*, Dec. 7, p. 745). Two drops of the extract are diluted with 10 c.c. of water so as to form a faintly yellowish coloured liquid and five drops of 10 per cent. solution of sulphate of copper added. Herr Reuter says that liquid extract of aloes treated in this way gives a yellow colour; a genuine liquid extract of cascara sagrada a blue green colour; and a mixture containing equal quantities of the liquid extracts of cascara sagrada and aloes a yellow colour. Upon the addition then of about 2 c.c. of a 20 per cent. solution of sodium chloride and a few drops of alcohol, the liquids from the extract of aloes and the mixture of the two immediately assume a purple red colour, while that from extract of cascara remains unaltered. As the reaction is somewhat obscured by the suspended resin, ten to twenty drops of the extract may be evaporated, the residue taken up with water, the liquid filtered and to the filtrate ten to twenty drops of the copper sulphate solution added, followed by some sodium chloride and a few drops of alcohol, when the reaction occurs with great sharpness. In a later communication (*Pharm. Zeit.*, Dec. 14, p. 761) Herr Reuter's communication is somewhat sharply criticized by Herr Conrady, who expresses the opinion that extract of cascara sagrada is much more likely to be adulterated with extract of *Rhamnus Frangula* than with extract of aloes.

Adulterated Saffron.

At the last pharmaceutical meeting at the College of Pharmacy in Philadelphia, Mr. Beringer directed attention to an adulterated saffron at present in the market, which he stated was mixed with a kind of grass stained with some colouring matter, most probably a coal oil colour, and weighted with sulphate of calcium, another sample containing sulphate of sodium. Similar samples have already made their appearance in this country, but the vegetable filaments are easily recognized when the saffron is placed in water, while the sample stains the paper in which it is wrapped of a red rather than saffron colour. Professor Maisch remarked that good saffron could always be obtained by those who chose to pay the price for it, and that excellent saffron produced for home use was grown in Pennsylvania, in Lancaster and Lebanon counties, and that the surplus was sold for its weight in silver. Pure saffron, according to Messrs. G. Kuntze and A. Hilger (*Journ. de Pharm. et Chim.*), should give not more than 8 per cent. of ash on incineration, and a filtered infusion made with boiling water should give no precipitate during evaporation. A drop of concentrated sulphuric acid should give a deep blue, rapidly passing to brown. Out of sixty samples of saffron examined by the authors only five were found to be pure.

Crozophora tinctoria.

Dr. J. Hornsey Casson, Physician to Her Majesty's Legation in Persia, recently called the attention of the Director of Kew Gardens to a plant which caused the death of six persons at intervals varying from thirty-six to seventy-two hours with symptoms of severe jaundice, abdominal pain, bilious vomiting, dilation of pupil, bleeding from the nose, constipation, bloody urine tinged with bile, and stupor (Kew *Bulletin*, p. 279). The plant turns out to be *Crozophora tinctoria*, an Euphorbiaceous plant, ielding the blue dye known as turnsole. This s been described by Hanbury in the *Pharmaceutical Journal* ([1], ix., 308), and Lindley in 'Flora Medica' (p. 179) mentions it as possessing emetic, drastic and corrosive properties.

Iodide of Ethyl in Bronchitis.

Dr. R. Main reports (*Brit. Med. Journ.*, Nov. 30, p. 1216) that he has found an inhalation of ten minims of the iodide of ethyl extremely beneficial in cases of bronchitis and bronchial catarrh, complicated with Bright's disease and fatty heart, especially when the dyspnœa is urgent and the bronchial secretion viscid; about five minutes after inhalation free expectoration results. He believes that this action of the iodide is worthy of attention on the part of medical practitioners.

Phosphorus in Diabetes.

Mr. Balmanno Squire records (*Brit. Med. Journ.*, Nov. 30, p. 1216) a case in which phosphorus dissolved in oil was given for eczema, and, in addition to having a most beneficial effect in that disease, it had also a most marked remedial action on diabetes from which the patient was also suffering. It was given in perles containing one-thirtieth of a grain, to the extent of one-tenth of a grain a day for three days, and then one-fifth of a grain daily for seven days. He thinks this result due to the well known action of phosphorus on the liver.

Chromic Acid in Hyperidrosis.

Experiments made on a large scale in the German army as to the best treatment for excessive perspiration of the feet indicate that chromic acid is superior to all other applications. Out of 18,000 cases only 8 per cent. were unrelieved by it, 42 per cent. being cured and 50 per cent. improved. A 5 per cent. solution of the acid is used, and is applied with a brush after bathing and then drying the feet. Two or three applications are generally sufficient, but sometimes the treatment has to be repeated in a fortnight.

Ammonia in Cocaine Poisoning.

A case of poisoning by a comparatively small quantity of cocaine is described by Dr. Golovkoff in the 'Proceedings of the Caucasian Medical Society' (*Lancet*, Nov. 30, p. 1126), in which ammonia was successfully used to restore the pulse and respiration to their natural condition. The ammonia was given internally in doses of a few drops every five or ten minutes, and liquid ammonia was also given to the patient to smell. In about two hours the patient had quite recovered.

Transformation of Sugar into Starch by Plants.

It is evident from the researches of Saposchnikoff (*Ber. deutsch. bot. Gesells.*, viii., p. 258) that sugar can be turned into starch in the leaves of plants. He placed plants of various sorts in the dark for a time, then cut off some leaves and divided them in halves along the midrib. One half was tested for starch, the other was laid for four to ten days in a 10 to 20 per cent. solution of cane sugar, and then tested for starch both by iodine and by Faulenbach's method. Starch was found in abundance, especially along the veins. In variegated leaves only the chlorophyllous cells formed starch.

Pollen of Pontederia cordata.

Mr. Byron D. Halsted has examined the pollen of this plant, which has trimorphic flowers, and finds that the relative sizes of the pollen in the three forms vary more than in any other known trimorphic plant, being relatively in the proportions of 16, 13, 9 (*Bot. Gaz.*, p. 257).

The Pharmaceutical Journal.

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SATURDAY, DECEMBER 28, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL ORGANIZATION.

The very excellent paper read before the Manchester Pharmaceutical Association by Mr. Kemp a fortnight since, deals with one of the sorest grievances affecting all engaged in the business of chemists and druggists. The disregard of the advantages to be derived from the maintenance of representative organizations appears to be a remarkable characteristic of the class, not only at Manchester, but also throughout the kingdom. While other trades and occupations of a more professional nature have their local organizations and general representative associations, through the medium of which the interests of the various bodies can be protected and promoted, there seems to be such a practical indifference prevailing among chemists and druggists, that no such organization can be maintained for long in a state of efficiency. It is difficult to assign a reason for this deficiency, for there can be no question that scarcely any class of persons have greater need of the protective assistance that is only to be hoped for from mutual co-operation and concerted action. Nor is the neglect of these measures to be ascribed to any inferiority of intelligence or education, for as Mr. Kemp very justly remarked, the average chemist is generally a man of more than ordinary intelligence, whatever exceptions must be made as regards particular individuals. The large number of chemists who occupy positions of honour in the public service alone furnishes evidence of their capacity and of the fact that it is appreciated. But still the fact remains that it is possible to say of such an important centre as Manchester that there is not an Association adequately representative of the legitimate drug trade of that populous district, and with some few exceptions the same may be said of other localities.

Nor is it only in regard to local associations that this pernicious indifference is manifested. The larger organizations that have been instituted for the representation of the entire body have not in any instance been supported by the individual members of that body as they ought to be. Even the Trade Association that was formed with the object of promoting the most obvious material interests of chemists and druggists, failed to receive such support as would have made it really powerful and efficient, and after a few years of languid existence it was allowed to become extinct. Similarly a due measure of support has been withheld from the Pharmaceutical Society, notwithstanding the various attempts that have been made to render it a truly representative body. While individual members of the trade persist in refusing to be represented by it, and in abstaining from any other participation in the direction of pharmaceutical affairs, beyond grumbling and bewailing their sad condition, even the Pharmaceutical Society will fall short of the power to deal with matters affecting their interests as it might otherwise do. Just as the members of the Society in the Manchester district have, to adopt Mr. Kemp's words, practically allowed themselves to be disfranchized, so have the chemists and druggists of the entire kingdom, who hold aloof from the Pharmaceutical Society, disfranchized themselves, and placed themselves beyond the only possibility of being beneficially represented. In the discussion of matters affecting the interests of the body, however, we constantly meet with involuntary evidence of the need there is for representation by a well-supported organization. In one of the letters that appear in this week's Journal, for instance, it is urged that the kind of Pharmacy Act that is wanted is one containing clauses prohibiting any persons, except duly qualified chemists, from dealing in drugs of any description. Such an enactment, we admit, would be eminently beneficial for chemists, and on the whole we believe it would also be for the benefit of the public. But without going into the general question as to probability of any measure being passed to establish a legislative monopoly in the sale of drugs, we may at least affirm, without fear of contradiction, that if ever such a measure, or one in any way approaching to it, were passed, it would only be through the agency of such a body as the Pharmaceutical Society, acting as the real representative of all the chemists and druggists in the kingdom who had any claim to be considered by the legislature.

Some weeks ago we called attention to the fact that the Revenue Act passed last session contains a provision that methylated spirit is not to be sold between the hours of 10 p.m. on Saturdays, and 8 a.m. on Mondays, under a penalty of one hundred pounds. We understand that in some instances this has escaped observation and therefore it seems desirable to supplement our previous mention of the new enactment by publishing the following notice that has been issued by the Board of Inland Revenue, bearing date November, 1889.

"NOTICE.

"To retailers of Methylated Spirits.

"Notice is hereby given that section 26 of the Revenue Act, 1889 (52 and 53 Vict. c. 42) prohibits the sale of methylated spirits between the hours of 10 o'clock on Saturday evening and 8 o'clock on the following Monday morning. Any person who sells methylated spirits in contravention of this provision of the law incurs for each offence a penalty of one hundred pounds.

"By order of the Board of Inland Revenue,

(Signed) "Robert Micks, *Secretary.*"

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December 12, 13, 17, 18, 19 *and* 20, 1889.

Present on the 12th, 13th, 18th, 19th, and 20th.—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner, Taylor and Thresh.

Present on the 17th.—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was present on the 13th and 17th on behalf of the Privy Council.

MAJOR EXAMINATION.

12*th.*—*Seven* candidates were examined. *Two* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Cheney, Henry Robert ....Banbury.
Green, Herbert John ....Deal.
Higgins, Charles Alfred.........Manchester.
Hook, Richard Graves............Bridgwater.
Masters, Henry ....Buxton.

13*th.*—*Eight* candidates were examined. *Six* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Roper, Frederick Alfred... .....Plymouth.
Thorp, Edwin ....Harrogate.

17*th.*—*Seven* candidates were examined. *Four* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Gourlay, Henry Hamilton......Lytham.
Greaves, Robert Bond............Sheffield.
Hollely, Thomas Lowe ....Ollerton.

MINOR EXAMINATION.

12*th.*—*Twenty-five* candidates were examined. *Sixteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Adcock, Robert McIntosh......Sheffield.
Beattie, James Brown ....Fife.
Bircham, Jesse ....Reepham.
Boucher, Charles Ernest ......Bristol.
Branson, Preston James.........Plympton.
Calcutt, Thomas John ....Sevenoaks.
Clark, Alfred Turner Sims ...London.
Coulson, Thomas.................Leicester.
Symes, Charles Frederick ......Liverpool.

18*th.*—*Twenty-three* candidates were examined. *Ten* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Branford, William ....Farnham.
Cooper, William ....Warrington.
Cowin, William Stephen ......Union Mills.
Emberton, Frederick Charles Silverdale.
Enness, Walter Frederick......London.
Eyre, William Robert............Ashbourne.
Farnworth, Walter...............Blackbourne.
Farthing, Herbert William ...Cardiff.
Fast, John Percival..............Wellingborough.
Foster, Ernest Lionel............Plymouth.
Freeman, Arthur Alexander...London.
Greenwood, George Lister......Keighley.
Jones, John ....Rhyl.

17*th.*—*Twenty-four* candidates were examined. *Twenty* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bloomfield, Edwin James......Leamington.
Grice, Walter Thomas ....Yardley.
Grieve, James ....Hawick.
Heath, Victor Charles ....Birmingham.

18*th.* — *Thirty-two* candidates were examined. *Seventeen* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Harris, George William.........Nottingham.
Jones, Thomas.....................Swansea.
Le Cudennec, Louis Edourd...Mauritius.
Lloyd, William Howard.........Leicester.
Lovibond, James Joseph ......Plymouth.
Making, Edwin James ....Sudbury.
Mallett, Henry Philip ....Norwich.
Marshall, Frederick Cornforth..Beverley.
Mason, Joseph Edwin ....Bexley Heath.
Mawer, William Fred ....Grimsby.
Merrick, W. Stephens Nickels..Exeter.
Moore, John.......................Stafford.
Morgan, Alfred ....Market Drayton.
Palmer, John George............Durham.
Walker, Herbert ....Nottingham.

19*th.* — *Twenty-nine* candidates were examined. *Nineteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Kent, John Collison ....Wakefield.
Pearson, George Edward ......Northallerton.
Perfect, Egbert George.........Newark.
Quant, Ernest ....Winchcombe.
Sleight, Fred ....Louth.
Smith, Henry James ....London.
Spink, Arthur Bowman ....Westminster.
Symons, William..................Stoke.
Thomas, Frederick William ...London.
Westmacott, George Leonard.Manchester.

20*th.*—*Twenty-six* candidates were examined. *Seventeen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Umney, John Charles ....Sydenham.
Wake, George ....Howden.
Warner, George Oram ....Clifton.
Williams, Thomas John ......Plymouth.
Winfield, George Frederick...Birmingham.
Wood, James ....Nottingham.
Woolls, Victor John ....Margate.
Wright, Edward Goddard......Doncaster.
Zusman, Harry ....Wolverhampton.

MODIFIED EXAMINATION.

17*th.*—*One* candidate was examined, and failed.

PRELIMINARY EXAMINATION.

20*th.*—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Clutterbuck, Charles ....Nottingham.
Coats, Alexander..................Pilrig.
Dobson, Thomas D. ....Broughty Ferry.
Ellam, George Henry............Weaste.
Franks, Frank Richard.........London.
Freeland, James ....Bathgate.
George, John Arthur ....Sheffield.
Gillam, Walter Graham ......Brighton.
Hall, Alfred William ....Watford.
Moore, Clifford Bond............King's Bromley.
Pitts, Herbert ....Norwich.
Richardson, H. N. Bardsley ...Leicester.
Rose, Francis ....London.
Taylor, George Orissa............Norwich.
West, Joseph Arthur............Peckham.

Retirement of Dr. Thresh.

On the motion of Mr. Gale, seconded by Mr. Taylor, it was unanimously resolved—

"That the Board desires to place on record its high appreciation of the services rendered to the Society and to pharmacy by Dr. John Clough Thresh during the period he has been a member of the Board. His colleagues venture to express their regret at his retirement from among them, and their best wishes for his future health and happiness."

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At the meeting of the Chemical Society on Thursday, November 21, Dr. W. J. Russell, F.R.S., President, in the chair, the following papers were read:—

The Law of the Freezing Points of Solutions. By S. U. Pickering.—Although the influence which a substance exerts in lowering the freezing point of a solvent, when used with caution, may give valuable evidence as to its molecular weight in the quasi-gaseous condition, it is impossible to accept Raoult's statement of the observed facts as a general law of freezing points. The so-called constant exhibits a variation of some 20 or 30 per cent. in the case of different substances (not counting those cases where the values are admittedly abnormal), and may also vary to the same, or to a greater, extent, when different proportions of the same substance and solvent are taken, even when we confine our attention to cases where the proportion is that of not more than 1 mol. to 100 mols. of the solvent. Still less can we, on the strength of the supposed constancy of the value, draw any conclusions from it respecting the nature of solutions. The author believes that he has found the law which regulates the freezing point of a solution of any strength. He attributes the lowering produced by the dissolved substance to three distinct causes, which he classifies as (1) mechanical, (2) physical, and (3) chemical. In the first place he points out that if a weak solution (taking water as a concrete instance of a solvent) consists, as he maintains it does, of a hydrate, the water which crystallizes out on cooling is derived from the hydrate itself; which is thermally possible, since the heat of solidification of the water is far in excess of the heat of formation of the hydrate. Hence the whole hydrate does not act as the "foreign molecule," but only that part of it which is not water, *e.g.*, H_2SO_4; and hence, also, the molecular weight obtained by Raoult's method is that of the H_2SO_4 and not that of the hydrate. But, although the decomposition of a complex hydrate into the next lower one and solid water is an exothermic change, such would not be the case with all the lower hydrates, and, in fact, the limit of possible decomposition is fixed very clearly at the hydrate containing $5{\cdot}5H_2O$. In the same way the limits of the two branches of each of the curves representing the crystallization of $H_2SO_4{\cdot}4H_2O$ and $H_2SO_4{\cdot}H_2O$, and that of the one branch of H_2SO_4 curve, can be established from thermochemical considerations, and all these limits agree very well with the nature of the curves obtained experimentally.

(1) *Mechanical Lowering.*—Considering the foreign molecules to be uniformly distributed throughout the solvent, and considering, also, for the sake of simplicity, that the molecules are stationary, the author argues that the solvent molecules will be entirely isolated from each other, and, therefore, will be prevented from combining to form the aggregates of which a solid is constituted, when there are 300 foreign molecules to every 100 molecules of the solvent. This value obtains only if we consider the molecules on a superficies, but the author argues on experimental as well as general grounds that crystallization is entirely a surface action. The temperature below which a liquid will not solidify is—160°, according to Person (see 'Trans.,' 1889, 32): hence 300 foreign molecules to the 100 will lower the freezing point of water 160°, and one molecule will lower it by (160 ÷ 300 =) 0·53°, a constant closely approximating to that (0·63°) found by Raoult for various solvents freezing at about the same temperature as water. In the case of water, Raoult's work shows that the active molecule is not H_2O but $3H_2O$; the mechanical constant will, therefore, be (·57 × 3 =) 1·6°.

(2) *Physical Lowering.*—If water be superfused to $t°$ below its normal freezing point, and then be made to crystallize, the heat evolved in its solidification diminishes regularly with the value for $t°$ from 1430 cal. per H_2O at 0° to *nil* at −160°: if $t°$ be −79°, or any lower temperature, the whole of the water will solidify, whereas for smaller values of t, the amount solidifying is given by $\frac{t}{79}$, and the heat evolved in this partial solidification will always be exactly sufficient to raise the resulting mixture of ice and water from $t°$ to 0°. If, however, we take a hydrate, say, $H_2SO_4 13H_2O$, the freezing point (water crystallizing out) of which is −34°, the total water available for crystallization is only $7{\cdot}5H_2O$, for no amount of cold would suffice to decompose the residual hydrate $H_2SO_4 5{\cdot}5H_2O$; the amount of water which would crystallize would, therefore, be $\frac{34}{79}$ of $7{\cdot}5H_2O$, or $3{\cdot}2124H_2O$, and the heat evolved in its crystallization is easily calculated, being 3615 cal. After the crystallization a mixture of $3{\cdot}2124H_2O$ as ice $(7{\cdot}5 - 3{\cdot}2124)H_2O$ as water and $H_2SO_4 5{\cdot}5H_2O$ would remain, the total heat capacity of which is 223·5, and this mixture would be raised 16·17° by the 3615 cal. evolved, instead of 34°, as would have been the case had there been nothing but the water present. The freezing point, therefore, will have been lowered (34° − 16·17° =) 17·83° from this "physical" cause.

(3) *Chemical Lowering.*—A definite hydrate such as $H_2SO_4 13H_2O$ can only give up its water by decomposing into the next lower hydrate, $H_2SO_4 9H_2O$ in the instance taken; the heat absorbed in this change is given by the heat of dissolution curve (863 cal.), and will lower the temperature of a mixture with a heat capacity of 223·5 cal. by 3·5°. The sum of these three lowerings gives −33·64° as the freezing point, whereas −34·0° is the value obtained. The former is more strictly a calculated verification of the observed value than a calculated value; but it is in calculating the physical lowering only that the observed value is taken to start with, and the author finds that if a wrong value be taken for the freezing point the "calculated" value does not agree with it, and that by a series of approximations we might ultimately obtain the true value, starting with any temperature in the first instance. The following instances may be quoted:—

Hydrate.	Per cent. H_2SO_4.	F. p. found.	F. p. calculated.
$H_2SO_4 130H_2O$	4·02	− 1·59	− 1·39
" 60 " .	8·59	− 3·80	− 3·44
" 24 " .	18·49	−11·83	−11·52
" 13 " .	29·53	−34·00	−33·64
" 9 " .	37·70	−72·63	−72·77

After the hydrate with $13H_2O$, the active water-molecule becomes simplified, attaining the formula H_2O before the hydrate with $9H_2O$ is reached. A similar simplification has been observed at about the same molecular composition in the case of mixtures of alcohol and water. Instead of calculating the freezing point, we may take the observed freezing point and calculate the heat evolved in the chemical action, and hence the composition of the next lower hydrate formed in the reaction. The values given by the last three of the above-mentioned freezing points are—

		P.c.		P.c.
Position of next hydrate.	Found	29·5	Calc.	31·1
" "	"	37·7	"	38·5
" "	"	49·8	"	49·5

In the other two cases the chemical lowering is so small in comparison with the errors inherent in the calculations, that the calculated position of the next hydrate is valueless. If no definite hydrates existed in solution, the chemical lowering would be absent; its absence would always increase the discrepancy between the observed and calculated values, and in the last three cases would destroy all semblance of agreement, the differences amounting to from 1·6° to 10·3°. In the case of very weak solutions (0·36 and 0·37 per cent.), the actual error between the observed and calculated values is less than 0·01°, but this is a relatively large quantity, and is probably due to errors in the experimental method adopted. A very striking confirmation of the composition of the hydrates at these points may, however, be obtained by comparing the figures representing the found and calculated values. Very definite proof is thus obtained that the author was wrong in supposing the existence of a hydrate with $510H_2O$ (1·0 per cent.), but right as to the others. The correctness of the calculated values affords proof not only of the position of the next hydrate, but also of there being a hydrate of the composition of the solution at which the f. p. is taken. Points intermediate between definite hydrates may be correctly calculated on the supposition that the liquid consists of a mixture of next higher and next lower hydrate; whereas if the calculation be based on the wrong supposition that the liquid consists of one definite hydrate, wrong values are obtained. Thus $H_2SO_416H_2O$ = 25·4 p.c.; the f.p. found was −23·0°; that calculated for a mixture of $H_2SO_424H_2O$ and $H_2SO_413H_2O$ is −22·36°; that calculated for a definite hydrate is −20·75°. Very strong evidence of the existence of certain definite hydrates may be deduced from the limit assigned on thermochemical grounds ($H_2SO_45{\cdot}5H_2O$) to the decomposition of the hydrates. Thus, taking the f. p. of the solution $H_2SO_413H_2O$, we get —34° as the found value, and —33·64 as the value calculated with the above-mentioned limit; whereas, if the limit be taken to the next hydrate above or below that with $5{\cdot}5H_2O$, namely, those with 9 and $4H_2O$, we get —41·51 and —30·18 as the calculated values respectively; and, more important still, if we take that limit which would hold good on the physical theory of there being no definite hydrates in solution, which limit would be at about $H_2SO_47H_2O$, we get —37·11° instead of —34° as the calculated value. The results obtained in calculating the lowering of the freezing point of sulphuric acid by the addition of water do not, from several causes, agree so well with the observed values as in the case of the water curve; but the differences are not great, and, though they prevent the correct calculation of the composition of the hydrates present, they are not sufficient to prevent our drawing from them further important confirmation of the general truth of the author's theory, and of concluding that the active molecules are, in this case, H_2SO_4 and H_2O respectively. The results mentioned are the following:—

		F. p. found.	F. p. calc.
$36H_2SO_4H_2O$,	99·49 p. c.	— 3·05°	— 1·89°
12 "	98·49 "	— 8·85°	— 7·38°
6 "	97 03 "	—18·60°	—16·97°
3 "	94·23 "	—41·60°	—38·61°

these numbers representing degrees below the f. p. of the pure acid (10·35° C.). In the case of the crystallization of the monohydrate, the active molecule of sulphuric acid appears to be $12H_2SO_4$ throughout; while on the other branch of the curve where the f. p. is lowered by the addition of water, the "mechanical lowering" appears to be absent. This is probably due to the active molecule of water being very complex; if it were twelve times as big as it is when *it* is the crystallizing substance (*i.e.*, the same proportion which obtains in the case of the sulphuric acid molecules), it would be $36H_2O$, and the lowering thereby produced would be practically negligible. The magnitude of the active molecules of the "foreign substance" in this case is probably due to the fact that the crystallizing substance actually contains some of each of them, and therefore exerts less influence on them than would otherwise be the case. The fact that we have to determine the magnitude of the mechanical constant in the first instance from the curve does not detract much from the value of the deductions as to the calculated value; for one point is sufficient to give us the value of the constant, and we can then apply it in an indefinite number of other points. The instances given are—

Hydrate.	P.c.	F. p. found.	F. p. calculated	Next hydrate.	
				Found.	Calculated.
				p. c.	p. c.
$H_2SO_4H_2O,\frac{1}{6}H_2SO_4$.	86·40	−2·2	−2·36	89·10	88·46
" $\frac{1}{2}$ "	89·10	−9·8	−10·14	94·23	93·65
" 2 "	94·23	(−60·7)	−63·19	–	–
" $\frac{1}{6}H_2O$...	82·36	−2·10	−2·13	78·41	78·45
" $\frac{1}{2}$ "	78·41	−15·41	−15·05	73·14	72·78

Of the 20 hydrates which the author has already announced as existing in the case of sulphuric acid, one has been definitely disproved by the present calculations; in the case of three others the evidence is insufficient to be termed proof; while proof of the most definite description is obtained in the case of the remaining. The hydrate $H_2SO_44H_2O$ is included, since the mere existence of the curve representing its crystallization is ample proof of its existence, though there are no data existing in this case at present on which to found any calculations of the freezing points.

Professor Ramsay said that it was impossible without careful study to offer any valuable criticism on so comprehensive a paper, opening up such new points of view. He drew attention to the fact that the supporters of Van't Hoff's theory of the existence of a substance dissolved in a liquid in a molecular state comparable with that of a gas by no means shut their eyes to the possibility, and in many cases the probability, of the existence of complex molecules, either of the solvent itself, or of compounds of the solvents with the dissolved substance. He also questioned the correctness of Person's data on which it was assumed that the "solid-liquid critical point" was—160°, inasmuch as it is founded on insufficient data regarding the specific heats of solids and liquids at low temperatures. With reference to the sudden change in the molecular complexity of the water-molecule, assumed by Mr. Pickering to occur between the hydrate with $13H_2O$ and that with $9H_2O$, he suggested that a gradual disruption of the complex water-molecule would be more likely, and stated that from experiments of his own it appeared more probable that the water-molecule consists of $4H_2O$. The existence of complex molecules of sulphuric acid he regarded as supported by the fact of there being double sulphates of such formulæ as $NaH_7(SO_4)_4$.

Mr. Pickering, in reply, said that it was quite true that Person's "absolute zero" of −160° was more or less hypothetical. But it was founded on considerations precisely analogous to those on which the "absolute zero" for gases, −273°, was founded; and, just as the latter, though hypothetical also, yields correct results in all cases where true gases are concerned, so the former yields correct results in the case of liquids. He pointed out that the change of the acting water-molecule from $3H_2O$ to H_2O was not sudden, but was spread over a range 8 per cent. in the strength of the solutions. There were no signs of the change beginning before the solutions attained the composition $H_2SO_4 13H_2O$. Finally, although, according to Raoult's work, the active molecule of water in this and in the majority of cases appeared to be $3H_2O$, there were other instances in which it attained the magnitude $4H_2O$.

The Constituents of Flax. By C. F. **Cross** and E. J. **Bevan**.—The authors describe the results of their examination of the cuticular constituents of the fibre, the only investigation of which hitherto published is that of F. Hodges ('Proc. R. Irish Acad.,' 1881, iii., 460). On exhaustion with boiling alcohol the fibre loses 3–4 per cent. of its weight; as the solution cools it deposits a greenish-white resin, which on hydrolysis with alcoholic soda yields a wax alcohol, identified as ceryl alcohol. In addition to the alcohol an oily, ketone-like substance was obtained. The residue appeared to be unresolved: on submitting it to drastic treatment with alkalis, two fatty acids were obtained, one of which, from its equivalent and melting point, appears to be cerotic acid. A considerable residue of unresolved products remained. The green filtrate from the resin-wax yielded on distillation a green, oily residue. From this a further quantity (10 per cent.) of ceryl alcohol was isolated, and a much larger proportion of the oily ketone (15 per cent.); the residue being a complex of ill-defined, inert compounds, yielding "ketones" on hydrolysis. These "ketones" have the characteristic odour of raw flax and flax goods, and from their property of emulsifying with water, no doubt exercise an important influence on the wet processes of fine spinning of flax. The pectic group of constituents, associated with the cellulose in the fibre proper, was found to yield mucic acid on oxidation with nitric acid ($d = 1{\cdot}15$): The isolation of a pure cellulose from flax is a difficult operation. The presence of unremoved cuticular constituents accounts for the statements of Godeffroy, that flax cellulose reduces silver nitrate when boiled with a neutral solution of the salt, pure flax cellulose resembling cotton cellulose in resisting the action of this agent. Flax cellulose oxidized with permanganate in alkaline solution yields, in addition to oxycellulose and oxalic acid, acid bodies, from which furfural is obtained by acid hydrolysis.

Acetylcarbinol (*Acetol*), $CH_3{\cdot}CO{\cdot}CH_2{\cdot}OH$. (*Preliminary Notice.*) By W. H. **Perkin**, Junr., and J. **Bishop Tingle**, Ph.D.

At the meeting held on Thursday, December 5, the papers read were:—

Compounds of Phenanthraquinone with Metallic Salts. By **Francis R. Japp**, F.R.S., and **Alfred E. Turner**.

Action of Aldehydes and Ammonia on a-Diketones. By G. H. **Wadsworth**, Associate of the Normal School of Science.

Phenylhexamethylene Derivatives. By F. **Stanley Kipping**, Ph.D., D.Sc., and W. H. **Perkin**, Junr., Ph.D.

Diphenylfurfuran. By W. H. **Perkin**, Junr., Ph.D., and **Aug. Schloesser**, Ph.D., M.Sc.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

At the meeting of this Association held on Thursday evening, the 12th inst., the following paper was read:—

Titanium and its Compounds.

BY A. J. SIMONS AND A. O. SCRIVENER.

Metallic titanium was discovered in 1789 by a clergyman named William Gregor, who first found it in the mineral ilmenite and named it menachin. Seven years later Klaproth, while investigating rutile, discovered a metal which he called titanium, and two years later he proved that it was identical with Gregor's menachin. Titanium is never found in the metallic state in nature. Combined with other elements it is found very widely distributed. Most clays and many seeds contain small traces of titanium. The chief minerals containing it are as follows. Ilmenite, a double oxide of iron and titanium, which contains about 30 per cent. of the metal and is found in Cornwall, Norway, United States of America and New Zealand. Washingtonite, which is very similar in composition to ilmenite, but contains less titanium. The oxide of titanium is found in nature in three different forms, the commonest of which is rutile, which crystallizes in the tetragonal system. It contains 98 per cent. of pure oxide, and occurs in Norway, Finland and St. Gothard. Brookite, which is found in rhombic plates, is a pretty red transparent mineral, containing about 94 per cent. of titanic oxide. It is most plentiful in the province of Dauphiny, at St. Gothard, and in the Urals. Anatase, the third native oxide of titanium, also comes from the province of Dauphiny; it contains 98 per cent. of the oxide.

Sphene or titanite is a silicate of titanium and calcium. It belongs to the monoclinic system, is of a black colour and very brittle. It is found in Norway, Tyrol, Renfrew and St. Gothard. Greenovite is a variety of sphene containing magnesium; it is of a pink colour and occurs at San Marcel. Lederite, another variety, is brown and comes from New York. Euxenite is a columbotantalate of titanic acid, yttrium and uranium. It contains 16 per cent. of titanic oxide. It is found at Arendal in Norway. Perofskite is a titanate of calcium. It is of a reddish brown colour, and is found in cubo-octahedrons at Magnet Cove, Arkansas. Mosandrite, a silicate of titanium and many other bases, is found in Norway. Warwickite is a borotitanite of iron and magnesium, it is of a dark brown to a dull black colour, and is found in small quantities in Norway and in Warwick County, United States. Polymignite contains 46 per cent. of titanium. It is a very rare mineral and comes from Norway.

The metal can be obtained by heating the double fluoride of potassium and titanium with metallic potassium or sodium, but when prepared by this method, nearly always contains some nitride and metallic potassium and sodium. A better method of preparing it is to place two porcelain boats, one containing the double fluoride of potassium and titanium, and the other metallic sodium, in a porcelain tube containing hydrogen, then heating the tube to redness. The sodium vapour reduces the titanium salt and leaves the metal in the form of a grey powder, from which the sodium fluoride can be removed with water. It is stated in Watts' that when titanic oxide is heated with one-sixth of its weight of charcoal in a charcoal crucible to a very high temperature metallic titanium is produced, but we failed to obtain any metal, producing by this method only bright scales of a lower oxide. S. T., in the *Chemical News* of March 17, 1871, states that he was unable to produce the metal by this method. Hern's method of preparing the metal is to pass a mixture of sodium vapour and titanium tetrachloride through a tube heated to redness. The metal prepared in this way will only decompose water at 500° C., while that prepared by the ignition of the double fluoride with metallic potassium decomposes it easily at 100° C. The metal is of a dark grey colour, and takes no polish under the burnisher. When thrown into the flame of a bunsen burner it ignites with a bright flash. If a small portion is heated in oxygen vivid combustion takes place, a white powder, titanic oxide (TiO_2), being left. In the cold it has no action on chlorine, but when ignited in that gas the tetrachloride is formed. with the evolution of light and heat. In its properties it is closely allied to iron and chromium. The best steel is said to be that which is prepared from iron which contains a little titanium, and it is now added to iron in the manufacture of steel. With microcosmic salt it gives a bead which is yellow while hot, and violet when cold. If it is mixed with a little iron it gives a red bead. On the addition of peroxide of hydrogen to a solution of titanic oxide in hydrochloric or sulphuric acid, a yellow coloration is produced. This reaction does not take place if there is an excess of fluoric acid present, but in that case it can be brought about by the addition of a large quantity of hydrochloric acid. Fresenius proposed as a test a solution of hyposulphurous acid, prepared by dissolving zinc in sulphurous acid, which, when added to a solution containing titanium, gives a red coloration. These reactions take place when 1 c.c. of solution contains ·001 gram of titanium. Titanium is always estimated in the form of dioxide (TiO_2).

The best method is that proposed by Lévy, who fuses a weighed quantity of the sample with bisulphate of potassium and dissolves the residue in water that contains sufficient sulphuric acid to convert all the potassium into the state of bisulphate; he then adds 5 per cent. of sulphuric acid to the solution, boils for six hours, collects, washes, and ignites precipitate. Several oxides of titanium are known, the most important being titanic oxide (TiO_2), which is usually obtained by purifying rutile. This is accomplished by fusing the powdered rutile with three times its weight of potassium carbonate; the fused mass is poured on to an iron plate, and when cold, powdered, placed on a filter and washed with water until the powder begins to come through the filter paper. The residue is then dissolved in cold strong hydrochloric acid (which takes a long time). Sulphurous and acetic acids are added, and the solution boiled for two or three hours, when the titanium is precipitated and can be filtered off. Another method, giving a purer oxide, is to treat the fused mass with fluoric acid and add sufficient water to dissolve the double fluoride, filtering while quite hot. On cooling the filtrate, crystals separate, which are taken, dissolved in hot water, ammonia added, and the precipitate ignited.

When chlorine and hydrochloric acid vapour is passed over rutile or ilmenite, ferric chloride is volatilized and pure titanic oxide (TiO_2) remains. It can also be prepared from the tetrachloride, by diluting it with water and evaporating. Hydrosulphuric acid passed over rutile converts the iron into sulphide, but does not affect the titanium, and the sulphide of iron can be removed by washing with hydrochloric acid.

Titanic oxide (TiO_2) is a white powder, which when pure is without taste. When strongly heated it forms lumps which look like rutile. After ignition it is insoluble in hydrochloric and nitric acids, but slightly soluble in boiling sulphuric acid. This solution turns turmeric paper brown. When fused with microcosmic salt crystals of a phosphate separate; these were at one time supposed to be anatase. Artificial crystals can be prepared by the ignition of the fluoride in moist air and hydrogen. Titanic oxide can be fused before the oxyhydrogen blowpipe. The sesquioxide is obtained by passing hydrogen over strongly ignited titanic oxide (TiO_2). It is obtained as a by product in the preparation of the trichloride, by passing a mixture of hydrogen and vapour of tetrachloride of titanium over the oxychloride. Friedel and Guérin state (*Chem. Soc. Journ.*, xxx., p. 46) that they obtained the sesquioxide by the reaction of hydrogen and titanium tetrachloride on titanic acid, but we were unable to obtain it by this method, and our experience is confirmed by T. Koenig and O. Pfordten in a recent communication to the *Berichte*. It is of a bronze colour and appears in hexagonal plates under the microscope. Salts corresponding to this oxide can be prepared by dissolving titanium in hydrochloric acid or sulphuric acid. This sulphate crystallizes in groups of small crystals, which by oxidation with nitric acid form titanic sulphate. Titanium trioxide (TiO_3) can be prepared by adding peroxide of hydrogen in excess to a dilute solution of the tetrachloride in alcohol, and then adding ammonia; a yellow precipitate is obtained, which should be washed and dried. Another method of preparing it is to add barium dioxide to a solution of titanic oxide in sulphuric acid, keeping the solution cool, filtering from barium sulphate and adding ammonia to the clear filtrate, when titanium trioxide is obtained. It is readily soluble in hydrochloric acid, chlorine being given off.

Titanium combines with chlorine to form three compounds; the dichloride, trichloride and tetrachloride. The dichloride is exceedingly difficult to prepare, the best method being to take freshly prepared trichloride and introduce it into a retort containing carbon dioxide, and then replace the carbon dioxide with hydrogen, heat the retort on a sand-bath to redness, and pass a continuous stream of hydrogen until all the tetrachloride has distilled over, the hydrogen being then replaced with carbon dioxide, and the retort allowed to cool. Titanium dichloride is a black powder and very hygroscopic. When thrown on to water it hisses like phosphoric anhydride, liberating hydrogen and leaving a yellow liquid. It burns in the air, the tetrachloride being given off and the dioxide left. It unites with bromine, forming a compound having the composition $TiBr_2Cl_2$. Titanium trichloride is prepared by passing the vapour of titanium tetrachloride and hydrogen through a red hot tube. It can also be prepared by heating the tetrachloride with metallic mercury or silver, when the following reaction takes place:—$2TiCl_4 + 2Ag = 2AgCl + Ti_2Cl_6$. If too high a temperature is used the reverse reaction occurs. Titanium trichloride when prepared by the first method appears as violet scales, which readily dissolve in water. It burns in air, the tetrachloride being given off, and the oxide left as a white powder. The salts of gold, silver and mercury are readily reduced by it. It also unites with bromine. The tetrachloride is prepared by passing chlorine over a mixture of rutile and charcoal; it can be separated from the ferric chloride by redistillation over sodium. When pure it is a colourless liquid having a specific gravity of 1·7609. It boils at 135° C., and its vapour has a density of 6·836. It smells very acid and gives off white fumes when heated in the air. When passed over heated metallic sodium it is decomposed. It dissolves in water, and when exposed to the air it takes up water and becomes a crystalline solid, which is soluble in a large quantity of water. Titanium tetrachloride unites with ethers forming compounds. The yellow colour of the commercial chloride is due to ferric chloride. Titanium oxychloride ($Ti_2O_2Cl_2$) can be prepared by passing hydrogen and the tetrachloride over red hot titanic oxide (TiO_2). It forms rectangular laminæ of a brown-red colour; it is not decomposed by water or nitric acid, but on exposure to air it turns white, titanic oxide (TiO_2) being formed. Only one bromide of titanium is known ($TiBr_4$), which is prepared by passing the vapour of bromine over a mixture of titanium dioxide and charcoal heated to redness. The red crystalline product can be purified over mercury. The pure bromide is very hygroscopic; it is of an amber-yellow colour, specific gravity 2·6, melting at 39° C. and boiling at

220° C. Titanium tetraiodide (TiI_4) is obtained by passing the vapour of iodine over ignited titanium. It can also be prepared by passing hydriodic acid through a solution of the tetrachloride heated to its boiling point. It forms a brown crystalline mass, soluble in water. It melts at 150° C. and distils without decomposition at 362° C. Titanium tetrafluoride can be obtained by distilling in a leaden retort a mixture of titanium dioxide, fluor spar and fuming sulphuric acid. The tetrafluoride distils over in brown oily drops which dissolve in water.

Potassium titanofluoride is prepared by fusing the oxide with three times its weight of potassium carbonate and dissolving the fused mass in fluoric acid; it is soluble in hot water, and loses its water of crystallization at 100° C., fusing at a white heat. Sodium titanofluoride can be prepared in a similar manner. Four nitrides of titanium have been prepared, Ti_3N_2, Ti_3N_4, Ti_2N_2 and Ti_5N_6. The first of these is found in the slag of blast furnaces, and was at one time supposed to be metallic titanium. The second is obtained by heating the ammonia chloride of titanium by itself or in ammonia gas. The third, Ti_2N_3, is prepared by passing ammonia gas over a mixture of the ignited dioxide and sesquioxide. It is a bronze-coloured powder which on ignition in air leaves titanic oxide (TiO_2). Ti_5N_6 is prepared, according to Roscoe, when Ti_3N_4 is ignited in hydrogen, ammonia being given off, and a golden-yellow substance formed which is not decomposed at a very high temperature if air is excluded. Titanium sulphide is formed when carbon disulphide is passed over titanic oxide (TiO_2) ignited to redness; it has the form of copper-coloured scales which burn in air.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association held on Thursday evening, December 12, Mr. Ellwood, President, in the chair, the following paper was read:—

History of Botany.—(Herbaria).

BY G. C. DRUCE, M.A., F.L.S., ETC.

Before touching upon the more especial subject of my paper, which I must explain is rather a compilation of other works than an original thesis, I thought it would be well to assume that to some, at any rate, among you a brief account of the history of botany would not be altogether unwelcome. In all ages and in all countries of the globe vegetables have been a principal article of human food, primeval man being essentially a frugivorous feeder, and thus early must he have had an elementary knowledge of plants, since roots, fruits and herbs being his food, he would soon find out those which were more or less easy of digestion. He would discover, as Pulteney says, the flatulent kinds and such as corrected flatulency, which acted as astringents, and which possessed alterative or laxative properties, which were most nutritious, and probably by fatal accident such as were poisonous. A knowledge of the various species would gradually increase, together with some idea of distribution and some rude differentiation of plant form. A woody trunk would soon be distinguished from an herbaceous one. A tree and a shrub, an annual and a perennial herb would not long be confounded. The form, the consistence, the colour of fruit would be mastered. Hence the rudiments of botany and medical science. Oral tradition would carry down the knowledge, and possibly the names of the discoverers of new foods, or the medicinal properties, until by length of time their names might become venerated as gods, for doubtless intimately mixed up with religion would be the profession of the healing or killing art, and quite early in the history of our race would be the union of priest and physician.

Moses appeared to have been acquainted with three characteristic divisions of plants. Grass, of which the seed was for some time doubtless overlooked or disregarded, herbs, which bear their seed in a dry pericarp, and trees, with all other vegetables which have their seed inclosed in a pulpy or some other edible substance. It will be noticed by readers of the first chapter of Genesis that in the grant of vegetables to man for the purpose of food only the two latter are mentioned; the first being reserved for the beasts of the earth and the fowls of the air, and everything that creepeth on the earth. Solomon is celebrated for his knowledge of plants, but all that we know of it is that he spake of them from the cedar of Lebanon to the hyssop on the wall. In Britain we know that the Druids had some knowledge of plants, but the little that we can learn from Pliny or Cæsar shows that the uses of the plants were attended with the utmost superstitious rites; for to the mistletoe, the vervain, the selago and samolus they attributed efficacies almost divine, and ordained their collection and administration with the most complicated ceremonies. For instance, the mistletoe must be cut only with a golden knife, must be gathered when the moon was six days old, the priest must be clothed in white, the plant received on a white napkin, and lastly two white bulls were to be sacrificed, and, thus consecrated, mistletoe was an antidote to poison and prevented sterility.

The vervain (of whose identity we are by no means certain, and which is probably not the plant now called by that name) was to be gathered at the rising of the Dog Star, when neither sun nor moon shone, with the left hand only, after describing a circle round the plant, etc., and, thus prepared, it vanquished fevers and other distempers, was an antidote to the bite of serpents, and a charm to conciliate friendship.

The selago was not to be cut with iron nor touched with the naked hand, but with the sagum, the Druid clothed in white, and with naked feet. Thus collected and consecrated, it became a remedy for diseased eyes and a charm against misfortune. The identity of this plant, again, is almost impossible. Pliny only says it is like the savin. Most authors agree in considering it a species of club-moss. Cesalpini considered it to be a sedum and Guilandinus an erica. The knowledge of the medicinal properties of plants was evidently considered as a highly valuable attainment many ages before the plants themselves were made the objects of a distinct science. Botany was only the handmaid of medicine. The balm of Gilead bore a high price in the estimation of the Jew, because of its healing power. In Homer, Patroclus staunches the bleeding wound of Eurypylus with the juice of a bitter root, the virtues of which he had learned from Achilles, and Achilles from Chiron. The power of the moly used as an internal antidote against the incantations of witchcraft is likewise celebrated by the same poet, and the knowledge of it is said to have been owing to the intervention of a god. Considerable *kudos* was evidently obtained by a knowledge of plant properties in the heroic age, as is proved by the encomiums given to the wife of one of the heroes whom Nestor boasts of having slain in his youth, "Who knew the virtues of each earth-born herb."

Even at a much later period we shall search in vain for any information respecting the botany of the ancients, except in their medical writers. Hippocrates, who figures on our diploma the oldest of those who have left any remains, flourished at the beginning of the Peloponnesian war, but he only mentions the plants which were employed in the cure of diseases. The names alone are given with the supposed properties. Aristotle, who lived about 50 years later, and whose comprehensive genius left scarcely anything unexplored, could not overlook such a tempting subject, but the two books on this subject now existing which bear his name are probably spurious, as they are of such inferior merit. Theophrastus, the disciple of Aristotle, is the first professed writer on plants whose works have incontestably descended to these times. He was acquainted with about 500 species, and has left descriptions of them, with slight philosophical sketches, relating to some of their most prominent distinctions. His descriptions are very vague and imperfect, and in most cases it is difficult, in many impossible, to determine what plant he intended. He has made some rude attempts to divide them into grand families, either by their size and texture, as trees, shrubs, and herbaceous plants, or by the uses to which they were commonly applied.

From the age of Theophrastus to that of Dioscorides and Pliny there is an interval of 400 years. Dioscorides was a physician and wrote entirely as such. He has enumerated between 600 and 700 plants. A priceless copy of the figures of plants in Dioscorides is contained in the Oxford Botanical Garden Library. The figures are rude in the extreme, and his descriptions of them are so brief and indeterminate as to render them of slight value in a botanical point of view. Nor in this respect is Pliny entitled to much greater praise.

On the decline of Greece and Rome, and during that time when the Saxons were establishing themselves in Britain, medical knowledge passed into the hands of the Saracens, Bagdad under the Eastern Caliphs became the seat of learning, and the doctrines of Aristotle, Galen and Dioscorides were studied in the Universities of Cordova and of Granada, at that time enormous cities and centres of Moorish civilization and commerce. To the Arabians and Persians we owe the senna, cassia fistula, manna, tamarinds, rhubarb. Avicenna had coloured drawings for the instruction of his pupils in botany. A MS. of the Arabian School is contained in the Escorial in Spain, which was written by Ebn Berthar, a protégé of Saladin. He died in 1284. Herbelot tells us he was called Aschard, or the Botanist. One of our earliest writers after the Conquest was the historian Henry, Archdeacon of Huntingdon, in the time of Stephen. He left a MS., no. 6353 in the Bodley collection, 'De Herbis de Aromatibus et de Gemmis.' MSS. of a nearly similar date are contained in the British Museum and several others in the Bodlein Library. 'Alphita,' a medico-botanical glossary M.S. in the Bodleian, dated about 1465, has recently been printed under the editorship of J. L. Mowat, and is an extremely interesting publication.

With the invention of printing came the publication of the 'Patres Botanici,' that of Pliny, being printed at Savona in 1468, Dioscorides at Cologne in 1478, Theophrastus at Venice about 1480. The restoration of these sages of antiquity immediately raised up a numerous set of commentators. Every plant was sought for, and every plant was discovered in the works of antiquity. No drug used in medicine was deemed true unless found in Dioscorides. The lovers of botany, buoyed up by vain expectations, devoted themselves to the study of these works and wasted much time in endeavouring to find on the west side of the Adriatic all the plants which had been found by the Greeks on the eastern side of that sea. So commentator succeeded commentator, conjecture superseded conjecture, till at length a few intelligent minds, weary of fruitless attempts, perceived the folly of studying a science in the imperfect remains of two dead languages, when they might have free access to the book of nature. Conrad Gesner in particular, the greatest naturalist whom the world had seen since the days of Aristotle, cultivated both zoology and botany with a zeal rarely equalled, and with a discernment and good sense which, till then, had never been known. He has the glory of dividing plants into classes, genera and species and the necessity of taking the distinguishing character of each division from the fruit and seed. He died in 1565.

Clusius or, more properly, De L'Ecluse, born at Arras in the French Netherlands, 1521, who was his contemporary and many years his survivor, engaged in the study of plants with equal ardour but not with equal talents for just arrangement. He distributed them chiefly according to their size, their general habit and their other sensible qualities. He visited Spain, Portugal and England, and while in this country recorded one or two plants from Berkshire. The cherry laurel and the horse chestnut we owe to him, he having had the seeds from Constantinople in 1576. His chief works are 'Rariorum Aliquot Stirpium per Hispanias Observatarum Historia,' 1576, with 220 woodcuts, and 'Rariorum Aliquot Stirpium per Pannoniam Austriam, etc.,' 1583, with 350 woodcuts. The foregoing were republished in 1601 under the title of 'Rariorum Plantarum Historia.'

At this time flourished the father of British Botany, William Turner, who was born at Morpeth about the end of the fifteenth century. He was educated at Cambridge and says, while he was yet a student of Pembroke Hall, "whereas I could learne never one Greke, neither Latin nor English name even amongst the physicians of any herbe or tree, such was the ignorance of that time, and as yet there was no English Herbal but one full of unlearned cacographies and falsely naming of herbes." His first botanical work was a small tract of twenty pages, which contains the earliest printed records of any English plants. It was printed in 1538 and called 'Libellus de Re Herbaria Novus.' He embraced Protestantism and published and preached in support of it; for this he was obliged to leave Cambridge, was imprisoned and afterwards exiled to Germany, where botany became his consolation. He says in his 'Names of Herbes,' which he published in 1548, "that clinopodium groweth plentifully about Bon, by the Rheine, and I heare also it groweth about Oxford." On the accession of Edward VI. he returned to England, was made Prebend of York and Canon of Windsor, and eventually Dean of Wells and Member of Parliament. In 1551 he published the 'New Herball,' part I. On the accession of Mary he was again banished, so parts II. and III. were published in Cologne. Elizabeth restored his preferments, and to her he dedicated the 'New Herball,' the three parts in one, published in 1568. While much credit is due to Turner for his diligence in examining and judgment in discriminating different species, yet in classification he is far inferior to Clusius, for he has simply adopted an alphabetical arrangement. The 'New Herball' is in the black letter, and has many woodcuts (502 in number), said to be the same as those in Fuchs' 'Stirpium.'

Lyte (1578) describes 1050 species, of which 870 are figured, the blocks being probably the same as those employed by Clusius, in themselves copies of Fuchs'. The arrangement was very superior to that of Turner.

In 1570, Lobelius published his 'Adversaria,' in which there is the first sketch, rude as it is, of a natural method of arrangement, which, however, extends no farther than throwing the plants into large tribes, families, or orders, according to the external appearance or habit of the ample plant or flower; the whole forms 44 tribes. At the head he prefixes a synoptical view of all the species to be described under it. He then gives the Greek or Latin name, and, wherever he can, the name of the genus and species in German, French, Dutch and English. Then the plant's description, the time of flowering, the country in which it is indigenous, and in England he gives the precise spot where some of the rarer ones are to be found. In 1576 he published his 'Observationes' with 1486 figures. His name is perpetuated in our Lobelia.

This was followed in 1599 by Gerarde's 'Herbale.' Here the grasses, grain, rushes, reeds, flags, bulbous-rooted plants, are placed together, an arrangement suggested, however, not by a regard to the monocotyledenous character of the seeds, but to the simple and general form of the leaves. In the second part are included all herbs used for food, for medicine, or for their beauty and elegance. The third is a motley assemblage of trees, shrubs, fruit trees, resins, gums, roses, heaths, mosses, fungi and algæ. Cesalpini carried out Gesner's idea, and formed a natural arrangement of the whole vegetable kingdom into a regular system. He also was the first writer who has distinctly mentioned the true difference of sexes in plants. You will remember he is commemorated in the sub-order of the Leguminosæ, the Cæsalpiniæ.

Johann and Kaspar Bauhin, two brothers, are the next to notice; the elder added but little to our knowledge, but the junior, in his 'Pinax,' published 1623, made a new era in botany, as it showed at one view the information which had been given by a multitude of scattered authors. Pona and Zanoni, in Italy, Johnson and Parkinson, in England, Hernandez, Piso and Marcgrave, in South America, found many new plants, who in his 'Hortus Malabaricus,' brought to light about 800 plants from the East Indies. But it was reserved for the golden age, when in different lands, but nearly contemporaneously Morison, the immortal Ray, Rivinus, and Tournefort, directed their attention to plant classification. Morison, in 1669, in the 'Hortus Blesensis,' and later, in 1680, in the 'Historia Oxoniensis,' gave the rudiments of an arrangement founded on the fruit, and also asserted that the characters of the genera should be taken from the same quarter. This system was soon superseded by that of Ray, the outlines of which were first given in 1682 in the 'Methodus Plantarum,' the principle aim of this great naturalist being to preserve the natural families of plants, as they are connected by a similarity of fructification and general habit. Influenced by the latter consideration, he retained the ancient division of the vegetable kingdom into trees, shrubs and herbaceous plants, making no alteration, except in classing with the latter what are generally called suffruticose, or under shrubs. This system he afterwards improved and brought nearer to a natural arrangement, but he still left the characters of his genera in a great degree indeterminate and governed by no fixed principle. In the year 1686 he published his 'Historia Plantarum.' Altogether he described 6906 species. In 1688 appeared his 'Fasciculus Stirpium,' and in 1690 his 'Synopsis,' which was really the first practical flora of Great Britain.

Rivinus, in 1690, published a classification derived from the structure of the corolla. He first saw the impropriety of separating trees from herbaceous plants. As Morison yielded to Ray, so Rivinus gave way to Tournefort, the glory of France. His elements of botany, in which the primary divisions are taken from the corolla and the secondary ones from the fruit, were published in 1694. The distinction of sexual parts in plants, as I have said, had been discovered, and pretty generally admitted; but it was Carl Lind, or as we are accustomed to say, Linnæus, the Swede, who first made it the basis of an artificial system. The first sketch of his 'Systema Naturæ' was published in 1735, and the 'Fundamenta Botanica' in 1736. In 1737 they were followed by 'Critica Botanica,' 'Genera Plantarum,' 'Hortus Cliffortianus,' 'Flora Lapponica' and 'Methodus Sexualis.' In 1751 he published his 'Philosophia Botanica.'

1753 marked a new era in botanical literature, the introduction of the binomial nomenclature by Linnæus in the 'Species Plantarum.' In the 'Genera Plantarum' he gave greater distinctness and precision to generic characters than they had before received. In this 'Species Plantarum' he conferred the same obligation on the species, with the addition of the trivial names, consisting of a single word instead of the tedious specific names, as they were called, with which botanical literature had previously been burdened and embarrassed. This innovation was violently condemned at first by disciples of the old schools, including Dillenius, our own Oxford professor, but during a visit paid by Linnæus to Oxford the opposition in this particular case became much modified. The binomial system soon became generally adopted. His artificial system of arrangement, based upon the sexes of plants, held its position for some time and had much in it to commend itself, especially to students, but being opposed to nature various botanists began to work at forming a more natural arrangement, amongst whom may be named Bernard Jussieu, Adanson, Gleditsch, Crantz, Lamarck, Gaertner, Mœnch, Thunberg, Gmelin, and Willdenow, and more especially to Antoine Laurent de Jussieu, whose system is based first upon the number of cotyledons in the seed, hence the classes Dicotyledon and Monocotyledon; the insertion of the stamens, whether immediately on the receptacle—on the calyx—on the pistil itself, or mediately by the means of the corolla similarly situated, and so on, from the essential to the non-essential—from the more to the less important parts.

Antoine Laurent de Jussieu's system was first published in 1774. Under fifteen classes Jussieu arranged 100 natural orders.

Augustin Pyramus de Candolle first promulgated a system in 1813 which, modified, forms the basis of the system at present adopted, and with which you are necessarily familiar.

(To be concluded.)

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

A meeting was held on Friday, December 20, at the University College, Bristol, Mr. J. W. White, President in the chair. After other business, it was moved by Mr. Keen, seconded by Mr. Pitchford, and carried unanimously, "That this meeting disapproves the action of the Council of the Pharmaceutical Society of Great Britain in prosecuting the assistant of a registered pharmacist for the sale of Battle's vermin-killer, and considers that action to be contrary both to the letter and spirit of the Pharmacy Act, 1868."

It was moved by Mr. Stroud, seconded by Mr. John, and carried unanimously, "That this meeting would deeply regret the matter being left in its present imperfectly defined position, and suggests that an effort be made by the pharmacists of the locality to raise a fund in support of the expenses of the appeal."

The following sums are promised on the understanding that the appeal is pursued:—Mr. White, £1 1*s.*; Mr. Towerzey, £1 1*s.*; Mr. Schacht, £2 2*s.*; Mr. Stroud, 10*s.* 6*d.*; Mr. Keen, 10*s.* 6*d.*; Mr. Pitchford, 10*s.* 6*d.*; Mr. John, 10*s.* 6*d.*; Mr. Pitman, £1 1*s.*; Mr. Isaac, 10*s.* 6*d.*; Mr. Troake, 10*s.* 6*d.*; Mr. Turner, 10*s.* 6*d.*; Mr. Townsend, £1 1*s.*

Further contributions will be announced as they are promised.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The following paper was read at the "Students' Night," of the above Association, held on the 11th inst.:—

PILLS AND THEIR EXCIPIENTS.

BY A. S. SMITH.

The subject I have chosen is, I venture to say, a very important one to students. It is a subject about which much has been written, and ever likely to be, so long as it plays such an important part in our qualification. The difficulties to be met with in "pill making" are only too numerous, and seem to be ever on the increase, for such is the confidence of the medical fraternity in the pharmacist of to-day, that they seem to think anything can be made into a pilular form, and when they have written "Fiat pil." at the end of their prescription they have done all and done it well, and expect the chemist to do his part equally well.

I will now venture to say what a well made pill should be. It should be spherical, of sufficient firmness as will ensure it keeping that shape, but not so hard that its solubility, or rather disintegration might be questioned, and, lastly, its ingredients should be thoroughly incorporated with each other, and in such a manner that their efficacy is not in any way injured.

The choosing of the excipient is, of course, the most important part of the dispenser's art. His chief guidance must be a strict observation of results obtained, for while not attempting to in any way undervalue the information to be obtained from a careful study of the long list of excipients to be found in most text books, yet it must be remembered that nothing teaches like experience. What dispenser, indeed, has not his own particular hobby? and does not pin his faith on some special excipients. I may say I have not hunted up all the out of the way substances and difficult recipes I could lay hold of, but have contented myself by endeavouring to deal with some of those which may be met with from time to time in most establishments.

I will firstly touch on some excipients I have tried, and the results obtained. Of course the simplest excipient is undoubtedly the best. For masses which contain a large proportion of vegetable powder (as in the case of pil. morph. gr. ¼, which is to be made up with some inert vegetable powder). I have found nothing better than simple syrup with a few grains of pulv. tragacanthæ. Of course the tragacanth is to be added after the mass is made.

Glycerine, on account of its property of keeping many pills soft is much used; it is very treacherous, however, and must not be used in masses which contain iron, as it makes such masses very brittle and crumbly.

Glycerine and tragacanth, in the form of Proctor's paste (which contains a greater proportion of water than the official), is very useful and makes better masses of metallic salts than syrup and tragacanth. In most other cases, however, I have got better results and in less time with syrup, etc.

For the benefit of those amongst you who have not yet tried it, and would care to do so, the following is the recipe:—

Pulv. tragacanth	ʒi.
Glycerine	℥iii.
Water	ʒi.

Extract of malt is an excipient which I cannot but think has only to be better known in order to be more generally used; it has given excellent results in most masses containing iron. I have here a mass composed of ferri redact gr. 24 and quin. sulph. gr. 12. It was massed with extract of malt a fortnight ago and is still in a good condition, a result with difficulty obtained with any other simple excipient. I have also a mass of quin. sulph. alone, which was made at the same time. It is in a splendid condition and was massed with the same excipient, which is preferable to confection of roses, on account of the bulkiness of the latter, and is superior to tartaric acid for therapeutic reasons. While I am speaking of extract of malt I may say I have noticed that the following B.P. pill masses, viz.: Pil. ferri carb., pil. coloc. co., pil. aloes et ferri, pil. aloes et myrrhæ and pil. aloes et asafœtidæ, all get extremely hard after being kept some time. I have substituted extract of malt for the official excipient in the three following: pil. ferri carb., pil. coloc. co. and pil. aloes et ferri. They have now been made more than a week and I invite your attention to their present condition. I have no doubt that equally good result could be obtained in all the cases named.

Soap powder, as you all know, has its special purposes. In the case of creasote pills I have found the powdered animal soap far superior. I have here a mass made by digesting at a gentle heat, in a wide mouthed bottle, by means of a water bath, equal parts of animal soap and creasote until thoroughly mixed, and after allowing to cool massed by the addition of 1½ grain of powdered liquorice to every minim of creasote. Yellow wax is much used for this mass, but is too indigestible. Bread crumb has deservedly gone out of favour for this mass.

I have found the compound decoction of aloes an excellent excipient for pills containing a large quantity of aloes; a very small quantity suffices, and it gives a splendid polish to pills, thus dispensing with powder. Incompatibility should, of course, be guarded against. Canada balsam makes good pills with deliquescent salts, such as potassium acetate, potassium citrate and calcium chloride; it is also useful for benzoic acid. Pills thus made should be coated with varnish, and if meant to be kept must be kept in a stoppered bottle.

Calcii phosph. and magnes. calc. are very useful on account of their drying properties. They may be used in conjunction with cera flav. in small quantities in pills containing much oil. In using them plenty of time must be given and magnes. calc. is very liable to make pills insoluble.

I must now leave this part of my subject, and will proceed to treat of a few substances which may occasion some little trouble when met with, and which have not been touched upon while speaking of excipients.

Butyl chloral hydrate is best managed with a thick mucilage. It may not be out of place here to say that one of the greatest drawbacks of this excipient is its acidity.

Burgundy pitch can be made into a good mass with pulv. tragacanthæ co.; it is here that the hot plate comes into requisition, by the aid of which it is easily manipulated.

Carbolic acid is not, at any rate, the most pleasant substance to make into pills; many things have been recommended, such as soap, wheat, flour, marsh mallow powder, etc. I have here a mass which leaves nothing to be desired, prepared according to the following formula:—

℞ Carbolic acid crystals . . .	gr. iss.
Pulv. glycyrrh. decort. . . .	gr. iv.
Mucilage of acacia	q.s. Fiat. pil. i.

Croton oil, owing to its small dose, can be treated with success in the same way.

Tannic and gallic acids can be massed with thick mucilage: the addition of a little glycerine to keep them soft will be found very serviceable.

Camphor makes a satisfactory mass with a small quantity of soap, say 1 grain to every 6, and massed with either simple syrup and tragacanth, or Proctor's paste, if intended to be kept any time. I think the latter is preferable, *i.e.*, if the size will permit its use.

Chloride of calcium being so deliquescent is exceedingly troublesome. I have here some pills containing 3 grains of that substance; they were made by the addition of ½ a grain of resin to each and massed with Canada balsam. They have been varnished and have kept their shape perfectly.

Potassium permanganate is another troublesome substance to deal with. I have some pills here containing 3 grains made with the addition of ½ a grain of pulv. resinæ and powdered fuller's earth 1 grain, and massed with vaseline; they are much firmer than if made with ung. resinæ alone. Kaolin ointment makes a good mass, but is not always handy at the dispensing counter.

The bulkiness of most scale preparations can be greatly reduced by the addition of a few drops of water, and may be massed with pulv. tragacanthæ co. and simple syrup.

Soluble crystalline salts, such as potassii iodid. and potassii bromid. must be treated with aqua destill. in order to lose their crystalline form; they can then be massed with pulv. glycyrrh. and simple syrup with tragacanth, as in the following:—

℞ Potassii iodid.	ʒss.
Aquæ dest.	min. iv.
Pulv. glycyrrh.	gr. x.
Syrup. et tragacanthæ	q. s.

Essential oils are a class upon which no fixed rule can be laid down; it is here more particularly where good judgment is of the greatest value in the choosing of an excipient. Soap is useful, but the question of incompatibility must not be overlooked.

Cera flava for coloured, and cera alba for colourless oils, are very useful, but should be used sparingly; in fact we should do well to remember to avoid their use where possible. Liq. potassæ, with all its drawbacks, is a very good friend in those cases where there is a superabundance of oil to be combined with an extract or resinous ingredients. A drop or two will sometimes work wonders.

I have here some pills made from the following receipe, which I had to negotiate during last week:—

℞ Zinci valerian.	36 gr.
Creasoti	18 gr.
Pil. asafœtid. co.	36 gr.
Pulv. rhei.	18 gr.
Pulv. camph.	18 gr.

Ft. mas. divid. in pil. 36.

As will be seen each pill contains half a minim of creasote and one grain of zinci valerian, besides the camphor, none of which are particularly nice things to manage. I took care of the creasote by mixing it with an equal quantity of pulv. sapo animalis in a warm mortar; I then rubbed down the camphor in another mortar and mixed it with the pulv. rhei and zinci valerian., after adding it to the soap and creasote, and by using an equivalent quantity of pulv. for pil. asafœtidæ co. I got a splendid mass by the final addition of half a grain of calcii phosphas.

I will conclude my remarks with a few words on those cases where a potent remedy is to be administered. An intimate mixing and perfect combination is here of the greatest importance; this end is best acquired by presenting the drug in the form of a solution. In these particular cases glycerine is especially useful, for instance by its means hyd. bichlor. and strychnia may be first dissolved and massed with some inert vegetable powder. I think it is now generally admitted that such pills should be made up to the size of 1 grain.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The fifth meeting of the session was held on Thursday, the 12th inst., in the Society's Rooms, Colquitt Street, when a paper was read by the President, Mr. H. Wyatt, Ph. Ch., entitled—

Dry Reactions of Simple Salts.

BY H. WYATT.

The author stated in commencement that the selection of this subject for a paper had been decided by the scant attention pharmaceutical students generally bestow upon this most important branch of chemical analysis. He was sorry to have occasion to make such a sweeping assertion, but his experience led him to the conclusion that the generality of students looked upon analysis in the dry way as a dry subject, and scamped it accordingly, or at the most performed it in anything but a systematic manner. This was a state of affairs to be deplored, and one which would not long exist if students would only take the trouble to follow some definite course systematically; such an one as might be found in any text-book of repute.

After remarking upon the excellent results obtained by an intelligent use of the blow-pipe in the hands of an honest and conscientious worker, the author gave an outline of the scheme generally followed, which consisted, he remarked, of three stages:—

1. Heating a little of the substance in a hard glass tube, and observing any fumes, sublimate, or peculiar coloration.
2. Heating before the blow-pipe on carbon in both the oxidizing and reducing flame, in the latter case with the addition of sodic carbonate or potassic cyanide; taking notice of the manner in which the salt behaves, whether it deflagrates or sublimes, leaving no residue, or leaves a white or coloured residue or a metallic bead. In the latter case observe if the bead be bright or covered with oxide.
3. Observing the colour a Bunsen flame acquires when a little of the salt, taken up on a platinum wire moistened with hydrochloric acid, is placed in it.

Taking these stages *seriatim*, in the second stage, after heating a salt on carbon in the oxidizing flame, if a white residue was left, the mode of procedure was to add a drop of cobaltic nitrate solution and heat again under the blowpipe, when a green mass indicated a zinc salt, a blue aluminium, and a pink magnesium.

Silicates, the author said, sometimes gave a blue colour like aluminium salts if over-heated, but might be distinguished by the mass appearing fused.

When a coloured mass resulted, a little of the salt was taken up on a borax bead, and heated first in the oxidizing and then in the reducing flame, when according to the colour produced the metal in the salt could be ascertained.

There was considerable difficulty in getting these bead reactions, as so much depended upon the worker's ability to produce a sustained blowpipe flame of the required variety, practice in this particular being most essential before anything like certain results could be hoped for. The difficulties of this portion were much increased by the want of uniformity among writers on the blowpipe as to what is to be understood by an oxidizing and a reducing flame, students, after reading two or three authorities, each giving a different definition, being as it were between the proverbial two stools.

The third stage, examination of the flame-colouring properties of salts, was rather a favourite with students, and in the case of simple salts offered few difficulties, the detection of potassium being the only one commonly occurring. For observing this the cobalt glass usually sold is next to useless if more than slight traces of sodium salts are present; three pieces of glass placed one over the other were not at all too deep a blue in such a case. The best method to absorb the sodium flame was undoubtedly to view it through a hollow-glass prism filled with indigo solution, but as this piece of apparatus is somewhat expensive the author said he had seen the suggestion somewhere that a flat bottle of permanganate solution, or better, aniline could be used as a substitute. This he had adopted with good results, using an ordinary flask with flattened sides, containing aniline blue dissolved in glycerine and water of such a strength that an ordinary luminous gas flame could just be distinguished through it. By means of this potassium could be easily recognized by its flame, even when mixed with both sodium and lithium.

Another point to be remembered was that although cupric salts generally give a green flame cupric chloride gives a beautiful bright blue.

Turning next to the acidulous side of salts he mentioned the fact that many marked reactions could be observed during the pyrological examination, both with salts of organic acids and of inorganic acids, as instances noting the decomposition of acetates, oxalates and tartrates, and the deoxidizing effect of carbon on sulphates by which a sulphide is formed which evolves H_2S on addition of a dilute acid. A similar case to this latter was the test for phosphates, consisting in heating with an alkali and metallic sodium or magnesium, when PH_3 is given off on addition of water.

Besides inorganic salts, many alkaloids and organic bodies could be detected by the dry method, quinine and cinchona alkaloids exhibiting a most characteristic purplish sublimate of an oily nature if heated in an oily tube. Among scaled preparations, too, beberinæ sulph., by its peculiar burnt meat odour when heated, could not be mistaken for any other salt; and coming to more recent introductions into medicine, sulphonal, when heated with cyanide of potassium or pyrogallol, gave off fumes of mercaptan or some allied body of decidedly alliaceous odour. These reactions were mentioned, the author said in conclusion, to emphasize the general applicability of systematically conducted examination by the dry method.

Mr. Johnson thanked the President for his paper, which he was sure would convey many valuable hints to those present. He had always depended largely upon results obtained from a systematic use of preliminary tests and with considerable advantage. With regard to the difficulty encountered in obtaining the amethyst colour characteristic of a manganese salt in the borax bead, he had been recommended a bead fused from a mixture of carbonate of soda and nitre, which gave a most characteristic green with the minutest trace of a manganese salt. He looked upon this as a most delicate test for manganese. He had also found an excellent indication of a nitrate was obtained by reducing the salt under examination by fusion, and afterwards testing for a nitrite with iodide of potassium and starch paste in the usual way. He had also found that much help was obtained by using as an additional preliminary test a concentrated solution of a caustic alkali, since on heating some of the salt with a small quantity of the solution, not only was ammonium directly revealed, but frequently metals often present as very insoluble salts were betrayed through reductions to their lower oxides and hydrates. In conclusion, he was sure that a little attention paid to a few dry reactions often saved a considerable amount of trouble and annoyance.

Mr. Shaw also impressed upon students the importance of preliminary analysis, and advocated the use of the blow-pipe to obtain the characteristic colour reactions of some of the more stable salts of metals, as they were not readily attacked by HCl, *e.g.*, $BaSO_4$, $SrSO_4$, etc., etc. He also mentioned a test for ammonium which was very useful. Where only a trace was present put a little of the substance moistened with lime into a watch glass and fix on the inside of another a little red litmus paper; place the two glasses together and warm over a Bunsen flame. If ammonia be present the paper will, of course, be turned blue.

Mr. Mitchell also spoke of the importance of preliminary analysis, and said it had served him well in the examination room.

The next meeting will be held on Thursday, January 9, when a paper will be read by Mr. Wokes, Pharmaceutical Chemist.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At the eleventh meeting of the first session held on Thursday evening, December 12, Mr. Lindsay read a paper on "Infusions."

The author dealt almost exclusively with concentrated infusion making, as he said that simple infusions were almost unknown in many pharmacies. He gave in detail his experiences in the preservation of these preparations and showed several samples of concentrated infusions which he had made. The best, although at the same time the most expensive, preservative was rectified spirit. This in the proportion of about three ounces in the pint, added before the infusion got cold, was quite sufficient to preserve infusions for a considerable time, even in very warm weather. This applied particularly to infusions of buchu, calumba, gentian, and senega. Boracic acid or glycerine was suitable for many infusions, especially quassia. Infusion of calumba, he said, was one of the most difficult to make, but he had found that percolation was the method best suited for this. In concluding a very instructive paper Mr. Lindsay advocated the boiling of the water for a short time before making the infusion, as in this way it kept better.

In the discussion which followed some very interesting experiences were given, and an animated discussion took place between Messrs. Henderson and Lamont on the use of liquor potassæ in the preparation of infusion buchu and decoct. scoparia.

Mr. Henderson strongly advocated its use. He had been led to do so, through reading a paper on the subject of a deposit in decoct. scopariæ by Mr. F. H. Fisher, which was read in Edinburgh a year or two ago. His results had been most satisfactory, and he had carried them on to infusion buchu with like results. No concentrated infusions were strictly B.P., and the amount of liquor potassæ added was so small as to have practically no effect.

On the motion of the Chairman a hearty vote of thanks was accorded to Mr. Lindsay for his paper.

The next paper was on—

PILL COATING.

BY ISAAC HISLOP.

In introducing his subject Mr. Hislop said they all would admit that pills were one of the most popular and convenient of all forms of medicine, and that it was necessary once the pills were made to lessen the bitterness of the taste and make them easily swallowed.

Various methods had been tried to render them tasteless, and it was his intention to bring before them four different kinds of coating, viz., gelatine, pearl, sugar, and silvering.

Beginning with silver coating he said that for small quantities a covered pot might be used if the chemist had not a globular pill silverer. The pills must be entirely free from powder, then moistened with mucilage about two drops to each dozen of ordinary pills. Place the pills in the silver leaf and rotate until they are entirely covered. Mr. Hislop said that objections had been raised to silvering pil. hydrarg. Personally he had found no difficulty. He added a little gum tragacanth to the mass in order to harden it up. After they were thoroughly dry, silver in the same manner as any other pill.

He then treated in turn the various methods of coating. For pearl coating he used a solution of resin in sulphuric ether as a varnish (1 in 4). Then he used ordinary mucilage of acacia to take on the French chalk. For gelatine coating he used the following solution:—

Take of—

Gelatine	1 ounce
Glycerine	½ ounce
Water	8 ounces

Dissolve the gelatine by means of a water bath and when ready remove the apparatus a little distance from the heat. The pills are stuck on the ends of needles dipped in this solution and rotated several times in the fingers and finally stuck in putty to dry. For sugar coating he recommended Dr. Symes's method as all that could be desired. In concluding an interesting paper Mr. Hislop said that many chemists objected to coated pills because they took longer to act, but upon that point he must disagree with them, as there was always a certain amount of heat between the coating and the pill which kept it soft.

An interesting exchange of opinion followed this paper and a hearty vote of thanks was accorded to Mr. Hislop for the excellent way he had treated the subject.

The Chairman then called on Mr. S. C. Henderson to read the last paper, which was entitled—

IMPROVED FORMULA FOR—(a) LOTIO HYDRARGYRI NIG.; (b) LOTIO PLUMBI C. OPIO.

BY T. C. HENDERSON, ROYAL INFIRMARY.

Lotio Hydrargyri Nig.

The only apology I have to offer for placing this formula before you to-night is that I was led to do so after reading a letter which appeared in the correspondence column of the *Chemist and Druggist* of Nov. 30, 1889. In this letter the writer (Mr. T. A. Heale, of Holloway, London, N.) described a change which he had observed in his stock of lotio hydrarg. nig. This change has probably not been noticed by many of the members present, due doubtless to the fact that most pharmacists prepare their "black wash" just as it is required, and once dispensed they have no further opportunity of observing its appearance and noting any change which may take place. However, as might be imagined, this preparation is largely used in hospital practice, and hence I have always a stock on hand. Previous to adopting my present method some year ago I frequently observed the change mentioned by Mr. Heale.

The main reason attributed for this change is the oxidation of the mercurous oxide into the mercuric oxide. Accepting this as correct, the point for us is to prevent, if possible, this oxidation, and this can effectually be done by the introduction of a small quantity of glycerine, proceeding thus:—

Take of—
Calomel . . . . 60 grains
Glycerine . . . . ʒi.
Lime water . . . . q. s.

Rub up the calomel with the glycerine in a mortar, transfer the mixture to a bottle, add 4 ounces of lime water and shake well, then add sufficient lime water to produce 1 pint. Made thus the Hg_2O is in a much finer state of sub-division, shakes up more readily and keeps any length of time without change, while the product is more elegant in appearance than the B.P. preparation.

For those who use large quantities, the calomel and glycerine may be kept readily mixed (ʒj. of calomel in ℥j. of glycerine) and the requisite quantity taken and lime water added as required.

Lotio Plumbi c. Opio.

Although not an official, yet this is a largely used lotion, and various formulæ for its preparation are followed. In our Hospital Pharmacopœia it read thus—

Take—
Solution of subacetate of lead. . . 1 fl. oz.
Tincture of opium . . . . 1 fl. oz.
Water to . . . . 1 pint.
Mix.

Made according to the above formula the product has a muddy appearance, is of a dirty brownish grey colour, soon separates and thickly coats the sides of the bottle in which it is dispensed. After several attempts to improve the appearance of this I selected the following:—

Solution of subacetate of lead . . . ℥j.
Glycerine . . . . ℥j.
Tincture of opium . . . . ℥j.
Water to . . . . 1 pint.

Dilute the tincture of opium with 15 or 16 ounces of water. Mix the lead and glycerine together, add these, and finally make up to 20 ounces with water. The result of this modification is that you obtain a quite transparent lotion which does not separate, and is certainly much more presentable than the former, and thus should find favour in the eyes of all who advocate elegance in dispensing.

A short discussion followed the reading of this paper, and Mr. Henderson was thanked for his notes. As it was late the reading of the apprentices' prize essays was left over until another night.

The twelfth meeting of the session was held on Thursday evening, December 19, the Vice-President in the chair. There was a large attendance.

After the minutes had been read and some other business transacted, the Chairman called on Mr. W. McKay to read his paper on "Medicine in Shakespeare."

On the conclusion of a very elaborate and carefully written paper a hearty vote of thanks was accorded to Mr. McKay on the motion of the Secretary, and supported by several members.

The first Annual Assembly in connection with the Association took place in Speed's Hall on Wednesday evening, December 18. There was a fair turn out of chemists' assistants and their lady friends, and a most enjoyable evening was spent. Mr. Isaac Hislop acted as M.C. in an able manner.

Reviews.

LECTURES ON MASSAGE AND ELECTRICITY IN THE TREATMENT OF DISEASES (Masso-Electro-Therapeutics). By THOMAS STRETCH DOWSE, M.D., F.R.C.P., Ed.*

Fifteen lectures on the therapeutic value of massage and electricity are brought together in this book. It is customary, we believe, in publishing lectures, for the author to indicate in some way or other the status and character of his audience, a point of some value in estimating truly the *raison d'etre* of the lectures, but unfortunately information in this direction is not forthcoming. The book is dedicated to Dr. Weir Mitchell, a name familiar to many in connection with the successful treatment of obscure neuroses.

Dr. Dowse in the preface hopes that "his worst enemies will see no reason to insinuate that they have been produced from any other than purely professional motives." His plea for the appearance of the work consists in the fact that "he has endeavoured to deal with the problems involved in a spirit of scientific inquiry and research," but we venture to say that any work appearing on these premises needs no apology such as is tendered in the preface.

Massage is defined as "consisting of a series of movements classified and arranged so as to produce certain definite well-known physiological effects; and its combination with the induced current passed through the body of the masseur adds greatly to its value."

One matter is alluded to in the introduction which entirely claims our active sympathy. The dearth of teaching in physiological physics in the medical curriculum is much lamented. As a case in point the preliminary scientific examination of the University of London is brought forward. Here Dr. Dowse remarks that in order to obtain correct information of the natural laws governing the use of the stethoscope, ophthalmoscope and microscope, it is necessary to wade through interminable problems on the C. G. S. system of units or vortex theories of matter, etc. All readers of the work who have passed this trying, and to a large extent time-wasting, ordeal will cordially endorse Dr. Dowse's remarks.

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* Bristol: John Wright and Co. London: Hamilton, Adams and Co., Paternoster Row. 8vo., pp. 379.

In the first lecture mechanical principles generally are treated of, leading on to a consideration of those involved in massage particularly, with the physiological effects produced, these latter consisting fundamentally in the conversion of potential into kinetic energy. The second lecture appears to us more valuable than any of the others, since the methods of massage are clearly described and much assistance is gained in the understanding of the text by the insertion of copious diagrams. "Effleurage," "petrissage" and "tapotement," are well defined and their distinctive value and application are indicated.

Since massage finds its chief, but by no means sole, application in the therapeutics of diseases of the nervous system, a considerable portion of the text is devoted to this branch of medicine. Neuralgias, peripheral neuritis, infantile paralysis are all benefited by massage combined with electricity, and "may even be cured if cases are seen soon enough." We are glad to note that Dr. Dowse has been eminently successful in the treatment of varieties of myxœdema, and his success contrasts remarkably with the entirely negative results which followed all other kinds of treatment in 109 cases, tabulated in the last edition of the Clinical Society's 'Transactions.' It may be that the author's clinical experience and acumen in the recognition of the "varieties of myxœdema" have contributed not a little to his success.

Lecture VII. is devoted to a careful *résumé* of the Weir-Mitchell treatment for hysteria, and it teems with practical hints and observations, which only those who have had such cases under their care will be able fully to appreciate. Great stress is laid upon absolute rest, entire seclusion from sympathetic friends and relatives, and careful dieting.

Lecture IX. treats of neurasthenia, railway spine and hystero-epilepsy, and we are indebted to the author for a new term, "railway-brain," which is defined by him as the "supervention of psychical disturbance and commotion following a shake up in a railway accident." In the treatment of orthopædic affections the mode of treatment under review naturally takes a prominent position, and we are indebted to the author for his abstract from the admirable post-graduate lecture given by Mr. Barwell, dealing with the clinical examination of lateral curvature of the spine.

According to the author massage has not been sufficiently used in the treatment of functional disturbances and diseases of the abdominal viscera, and some cases of constipation and intestinal obstruction are benefited by it; but it is naturally of no avail if the obstruction arise from new growth. Of doubtful value we think is the use of the electric-compress in constipation. Patients so affected are too apt to pass a large part of their waking hours in a constant condition of introspecting their own viscera, and not infrequently this state of mind is the portal to confirmed and incurable hypochondriasis. It would be certainly more to the interests of a patient so afflicted to advise him or her not to submit to massage, which after all is but passive exercise, but rather to shake off the lethargy of egotism by well regulated active exercise, such as walking, riding, cycling.

The author's remarks on massage of the uterus are by no means sufficiently decisive when he discusses the subject with the remark "it is not thought to be necessary otherwise than in exceptional cases." When it is remembered that uterine massage practically consists in repeated and prolonged bimanual examinations of the uterus and vagina, and that one of its earliest and most pronounced exponents advised only those to practise it "who have clean hands and a pure heart," surely such a practice needs the most stringent safeguards, if, as we most vigorously doubt, it ought to be practised at all.

Lectures XIV. and XV. treat of the difficult subject of the application of electricity to medicine, and are models of concise writing. We wish that the same could be said of the book as a whole, and that the author had not been tempted to stray from the path indicated by him in the preface of "setting forth his results in a plain, simple, ungarnished statement of facts." It appeared to us that while Dr. Stretch Dowse has in some measure succeeded in dealing with the problems involved in a spirit of scientific research, yet he has certainly erred in the matter of excessive quotation. There are whole pages standing in inverted commas, and an abundance of anecdotage and verbiage, of which the following sentence is one of the least glaring examples:—"Life is the sum of antagonistic action and interaction of internal properties and external agents; the evolute potential of vitality. Death is the dissolution, the catalysis, disintegration and degeneration of evolute processes." Wherein lies the doubtless hidden meaning of this over-blown sentence? Anecdotes of the Emperor Hadrian and the doings of the Town Council at Bath are allowed to occupy half a page and two pages respectively, to the detriment of the reader. We trust that when a new edition appears much "weeding out" will have taken place and the whole subject have been placed in a more concise form.

WATTS'S MANUAL OF CHEMISTRY. Theoretical and Practical (based on Fownes's Manual). Vol. I. Physical and Inorganic Chemistry. By WILLIAM A. TILDEN, D. Sc., F.R.S., Professor of Chemistry in the Mason College.*

The well-known "Fownes," which has stood the test of so many years, and won such a high reputation, is apparently not decreasing in popularity, as is shown by the publication of a new edition, the second under its new name, the fourteenth in all. The enormous developments of chemistry, especially of organic chemistry, since the publication of the original work in 1847 have of course necessitated great expansions and additions in successive issues, and in the last edition the organic portion was separated into a distinct volume. In this new edition of the volume dealing with inorganic chemistry and chemical physics, the tendency that all books have to increase more or less in size in every successive edition, has been repressed, the present work being somewhat smaller than the last; the diminution has been obtained chiefly at the expense of the physical portion. It no longer contains a separate section devoted to physics, some of the more purely physical articles, such as descriptions of the air pump, thermometer, electrical machines, Ruhmkorff's coil, etc., being omitted, while others more intimately connected with chemistry, such as the spectroscope, crystallography, specific densities and heats, etc., are interspersed in appropriate portions of the chemical section. A beginning has also been made in the direction of introducing instructions for the performance of practical experiments in connection with many of the compounds described. These experiments are of an elementary character, but are comparatively few and scattered, and are therefore insufficient to render the book available for use as a complete guide in the practical study of the subject, although where few facilities for a regular course of experimenting exist, they will be useful as illustrating the subjects of study and making them more interesting.

With these exceptions, the previous character of the book has been preserved, its excellent illustrations and general style being the same as before, while the slower growth of inorganic as compared with organic chemistry has rendered fewer additions and alterations necessary than might have been expected. The book now begins with a short introduction setting forth the general laws of chemical action, and then at once proceeds to the consideration of the non-metallic elements, among the descriptions of which are interpolated, as occasion arises, the paragraphs previously treated in the section of chemical physics. Thus the consideration of hydrogen leads up to that of the general properties of gases, Boyle's law, diffusion, occlusion, and the kinetic theory; oxygen gives rise to the discussion of flame, burners, safety-lamps, etc.; water to specific gravities, vapour densities, and dialysis; and most of the other physical information directly bearing on chemistry is still retained in the same way. We are pleased to see that the old dual formulæ of the type H_2O,SO_3, often so useful in explaining the formation and decomposition of salts, have not been entirely discarded in favour of the more generally used modern formulæ, but are still frequently employed in conjunction with the others. By the judicious use sometimes of one formula, sometimes of another, a student is led to regard a compound from various points of view and see it in lights that would not otherwise strike him. By laying too much stress on the formula H_2SO_4, for instance, one is apt to fall into the error of regarding the other hydrates of SO_3, such as $H_2S_2O_7$ and H_4SO_5, as simply molecular combinations of H_2SO_4 with SO_3 and H_2O respectively, while when we write $2SO_3,H_2O$, SO_3H_2O and $SO_3 2H_2O$, their analogy to the three varieties of phosphoric acid $P_2O_5H_2O$, $P_2O_5 2H_2O$ and $P_2O_5 3H_2O$, strikes us, and we consider them as distinct acids, differing fundamentally in properties, but easily convertible one into another.

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* London: J. and A. Churchill. Small 8vo. Pp. i.-xx., 1-544. 8*s.* 6*d.*

In many other respects, by regarding the facts of chemistry from various aspects and dealing with every side of the question, this will remain one of the very best books for giving a good all-round knowledge of the science.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Prizes for Students.

Sir,—I note with considerable pleasure the introduction in the Council of a scheme for giving prizes and certificates to apprentices or students of the Society, and I am desirous of giving my testimony in its favour through your columns.

Most members of Council seem to recognize the fact that the Society loses touch with the youths who enter the trade from the time of their passing the Preliminary to the time when they are compelled to become candidates for the Minor, and that during this period the great majority do not undertake any systematic study. And why? Simply because, as Mr. Leigh stated, they do not feel that there is any urgency in the matter; they get through their everyday duties, and feel that for the present that is enough, and all that should be required of them.

We know how natural it is, especially in the thoughtless days of youth, to allow our conduct to be actuated by the motto "never do to-day what you can put off till to-morrow;" and so we find apprentices devoting all their leisure to pursuits apart from their business. There is really no inducement for them to study. Of course this applies principally to the youths who pass their apprentice days in small towns which have not the boon of a local association, and in which it would be impossible for one to subsist; and I take it that it is in such places the majority of apprenticeships are served. Now, sir, to alter this state of things for the better is of the highest importance, and worthy of the best energies of the Pharmaceutical Council, and any legitimate scheme which would arouse this apathy and create a desire for study should receive earnest consideration. Both masters and apprentices would be benefited; the former in that the youths would be better equipped for their daily duties, and would speedily gain a more intelligent interest in, and knowledge of their business; and the latter would feel that having adopted a systematic course of study during apprenticeship their preparation for the Minor would be all the easier; the examination would be less of a bugbear, requiring the expenditure of much less time and money.

It is needless, however, to dilate further upon this phase of the subject; but I should like to note one other point, which was referred to by Mr. Leigh, and emphasized by Mr. Harrison, and that is that some benefit would undoubtedly accrue to the Society itself. Loyalty to the Society would be fostered by it, and this is an important consideration.

It is frequently said that the Society does nothing for the trade except receive its subscriptions; that it evinces no genuine interest in its welfare. Let it be understood that I do not make this charge, nor am I endorsing it; but I hear it reiterated again and again, and the fact cannot be gainsaid that there is such a feeling abroad and to a very large extent. Now, sir, here is an opportunity for the Society to show its desire to help the trade in one of its difficulties, which would be duly recognized and appreciated. And no doubt many more youths would be induced to pass their Preliminary as early as possible, so that they might attach themselves to the Society, and be qualified for the competition; thus they would be drawn towards the Society, and their interest in it stimulated.

But in reading the speeches delivered in the Council on the motion, one is driven to the conclusion, that members' minds are, at present, saturated with the one idea of the curriculum; almost all who spoke seemed to be afflicted with "compulsion on the brain;" and there seemed to be lurking in the minds of some, that this scheme would interfere with their educational project. I fail to see why it should; and while heartily approving of the curriculum, which I trust the Council will be successful in establishing, I cannot see why Mr. Leigh's scheme should not be adopted also. The two things are not antagonistic, but would, I think, serve quite different purposes. I presume the curriculum cannot be made contemporaneous with apprenticeship, and Mr. Leigh's idea, it seems to me, is to take hold of the youths during the time they are actually serving their apprenticeship, and not from the period when they have completed their term (still being apprentices of the Society), to the time of their Minor examination, and this is the time when studious habits, or otherwise, are formed, which tell upon after life.

I hope the Committee will give the matter thoughtful consideration, and see its way to recommend some such scheme for adoption. It would be well if the trade would express its opinion as far as possible. WALTER ASTON.

Sir,—I like the notion of the motion of Mr. Leigh. The scheme foreshadowed is, I consider, quite practicable, and contains the germs of a most beneficent reform. It is greatly to be hoped that it will not be allowed to expire in committee.

The proposition probably does admit "the existence of the evils which a curriculum is intended to do away with," but the curriculum embodied in the alterations in the bye laws proposed some years ago would not do away with all the evils this new scheme is intended to remedy.

We have at present only a very thin outline of the proposed examinations, but I imagine that there would not be much opposition to their being made compulsory, in the same way as the pupil teachers' examinations under the education code.

The idea of dividing the Minor examination was a step in the right direction, and the compulsory courses of lectures would no doubt have insured an increased amount of preparation; but the opposition these proposals met clearly places that scheme, at all events in its original form, outside the range of practical politics.

Apprenticeship examinations, with or without prizes, would probably pave the way for a curriculum, when in the shadowy future the chemical-curiosity-oil-shop-looking-windows of the present race of pharmacists shall have given place to the professional wire blind and the emblematic carboy. SOUTHERN SCOTT.

THE PROPOSED PHARMACY BILL.

Sir,—I read with great interest the motion of Mr. Hampson at the last Council meeting, and consider it a step in the right direction, although on the subject of equality of title I agree with Mr. Martindale. I do not wish to throw mud at our Council, far from it; and long may it reign over us. Nevertheless, why should men who hold no qualification whatever, beyond that of having been born in time to get into business before examinations were compulsory, have a better right to legislate for us than those born in more recent years, and who by their own skill and brain power pass the qualifying examination. If Associates in Business be granted seats on the Council, they should not be allowed a voice in matters concerning pharmaceutical chemists, but leave those in the hands of men like the present Council, who might, so to speak, constitute an "Upper House," and still remain as "gods" amongst us. I would also suggest the exclusion of chemists, in addition to pharmaceutical chemists, from the jury lists. Surely in things professional as well as in general business matters, our interests are mutual with pharmaceutical chemists. JOHN W. T. MORRISON.

UNIVERSITY DEGREE FOR PHARMACISTS.

Sir,—It is to be hoped that Professor Fraser's proposition *re* a University degree for pharmacists may be carried effectually to its greatest extent. There is one point, however, which may be worth mentioning respecting already qualified pharmacists and chemists, namely, that such persons should be admitted to examination without further compulsory curriculum, by this means encouraging the older as well as the younger members of the profession to obtain the double qualification.

It may not be altogether inopportune at the present for me to suggest an idea which has weighed considerably in my mind for some time past: it relates to the establishing of voluntary examinations by the Pharmaceutical Society in "sanitary science." That the science of sanitation has for years past occupied a prominent position, both educationally and domestically, there is no gainsaying; but that no examination exists suitable to the requirements of the chemist is equally certain. True, the Universities hold examinations in sanitary knowledge, but these are exclusively for medical practitioners; the Sanitary Institute also holds examinations, but these are for Surveyors and Inspectors of Nuisances, and treat principally of buildings; whilst the examinations (although including all points) held in hygiene by the Science and Art Department, South Kensington, are intended for students and teachers of that subject only. Let us hope that Mr. Carteighe, as President of the Society, may see his way clear to organize a scheme which may meet these requirements, and that it may not be considered unwise to ask Sir Douglas Galton, the President of the Sanitary Institute, to confer with the Pharmaceutical Council upon so important a subject. FREDERICK DAVIS.

THE SALE OF POISONS BY UNQUALIFIED PERSONS.

Sir,—The latest mode of dealing in poisons by unqualified men, is to present the article asked for to their customers, informing them they cannot sell it but will give them some and the customer may give them something (the value, I suppose) in return. Are they not rendering themselves as liable as if they actually sold the poison? And will not the 15th section of the Pharmacy Act (new version) apply to them by so dealing, as it does to the apprentice or unqualified assistant? I consider the Society is at fault in the manner in which it carries out that section. At the present time an unqualified man has to be twice caught selling poisons before he is prosecuted. The first time he is informed that the Society has heard he is dealing in poisons, and at the same time cautioned not to do it again. If the Society has not power to prosecute on the first offence, then the bye-laws ought to be altered in order that it can do so. At the next election for the Council, this question ought to be put to each candidate—"Are you in favour of the prosecution of unqualified men for selling poisons on first offence?" and if the answer be in the negative, do not vote for him.

I dare say some of our higher brethren will say, "Take no notice of these unqualified men, the public will soon find them out and will not patronize them." But if the upper class chemists had their livings to scratch for in a low class district, amongst people who do not know the difference between an unqualified and a qualified man, and who do not care a straw what he is, so long as they can get what they want, then they would be as ready to cry out as we are.

What is wanted is a new Pharmacy Act, containing clauses prohibiting anyone dealing in drugs of any description, except duly qualified chemists. Then, and then only will the business be as it should. There will be a good living for us all, which would repay us for our time and money, now thrown away upon examinations. Make the business worth going in for and then enforce your curriculum. A POOR CHEMIST.

LIME WATER.

Sir,—Mr. Ellwood asks me to refer again to his paper for the method of preparing supersaturated solution of calcium oxide, and I have done so, but as the method there recommended is that best calculated to obtain a strong solution of the soluble impurities present (especially potash and soda), I have not repeated this experiment, because I have pointed out this source of error before (*Pharm. Journ.*, vol. xiv., p. 579; see also p. 600, 619 and 677). However, if Mr. Ellwood will be good enough to send me a sample of his so-called supersaturated lime water, I shall be pleased to examine it.

Mr. Ellwood hurls two quotations at me. The first one, from a German work abstracted into the *Journal of the Society of Chemical Industry*, I have read long ago; but the term supersaturated is evidently very loosely used, and judging by the abstract—for I have not seen the original—no means were taken to avoid the known source of error. The other reference I cannot call a quotation, for it is a gross misquotation, and it is to be found at p. 550 (not 500) of the 'Proceedings of the Chemical Society for 1888,' where it is stated that the solubility of calcium hydroxide (not CaO, as Mr. Ellwood says), is 1 in 640, which is equal to 1 in 843 of the oxide, which tallies well with Dalton's Solubilities, which, according to my experiments, are extremely accurate. To paraphrase Mr. Ellwood's remark I may say that it would be a decided advantage to your readers if Mr. Ellwood, instead of confidently asserting or rather re-asserting fallacies regarding the erratic behaviour of lime, would not believe all that he sees in print and proceed to give it forth as fact.

I generally have the lime water bottled off a few days after it is made and tested, but have never found that it made the slightest difference, however long it stood upon the lime.

I must apologize for occupying so much of your space, but so many fallacies have been printed about the extraordinary behaviour of lime that I think it is very desirable that they should, when possible, be contradicted.

A. C. ABRAHAM.

NOTES ON A BOTANICAL RAMBLE IN CORNWALL, SCILLY ISLES, ETC.

Sir,—Mr. White is right. The allium found near Kynance is undoubtedly *A. Schœnoprasum*, var. *Sibiricum*, and not *A. sphœrocephalum*, as stated.

With one or two exceptions I found all the plants mentioned by Mr. Balkwill and others besides, which might prove wearying to mention. The statice I found at Gunwalloe, *i.e.*, between the points mentioned by Mr. Balkwill, was *S. binervosa*, the sea lavender. *S. Armeria* was abundant everywhere I have not seen *S. Limonium* in the Lizard district. The *Thalictrum* that grows between the rocks with the *Allium sibiricum* is *T. minus*. It is also common in Kennack Cove.

I might mention, too, that the dwarf juniper is to be found on Bradanack Downs, where I came across two large and very prostrate masses of it. Cunnack, of Helston, was a well known botanical name, and I hope his fine herbarium is in good keeping. WM. BAXTER, JUNR.

Errata.—On p. 483, col. ii., bottom line, *for* "D. and S. Sturge, of Birmingham," *read* "J. and E. Sturge, of Birmingham." On p. 492, col. ii., *for* "total sodium carbonate" *read* "total carbonate." On p. 493, col. i., lines 8 and 9, *omit* the words "and a process for purity."

J. McDerment.—*The Analyst* is published by Baillière, Tindall and Cox, King William Street, Strand.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Perry, Maiden, Wilkerson, Aston, Leigh, Forret, Long, Chamomile.

The Pharmaceutical Journal.

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1889.

Before entering upon a review of the past year it may be useful to call attention to a number of questions relating to pharmaceutical affairs that are now waiting to be dealt with and that are of especial interest because considerable difference of opinion prevails in regard to them. First among these there is the question whether the new Pharmacy Acts Amendment Bill shall seek to provide not only for educational reform, but also alterations in the constitution of the Pharmaceutical Society, and additional safeguards of the privileges of qualified pharmacists. Then there is the legal question as to the interpretation of the words "it shall be unlawful for any person to sell," the question as to the sale of medicated wine, and that relating to the medicine stamp duty. All of them are considered to have important bearing on the interests of those engaged in the practice of pharmacy, and during the coming year they may be expected to occupy at least as prominent a position in pharmaceutical affairs as they have done in that which has just closed. Adopting the opinion expressed by Mr. Perry, the President of the Midland Counties Chemists' Association, that it is mainly through the instrumentality of the Pharmaceutical Society that pharmacists can hope to get their grievances remedied, it will be appropriate to commence the record of last year's events by a reference to the executive body of that Society and to the work that it has been engaged upon.

During the first five months of the year the only change in the Council was that caused by the resignation in April of Mr. Symes, whose place was filled at the May meeting by the election of Mr. Harrison, of Sunderland. At the annual election there were only four new candidates out of thirty-eight nominees, and Messrs. Abraham, Leigh and Martindale were elected in the place of Messrs. Butt and Nichol, who were unsuccessful candidates for re-election, and of Mr. Savage, who had resigned, after serving as a member of Council for twenty-eight years. Although perhaps more than ordinary interest was taken in the election on that occasion, it is worthy of note that more than one-half of the voting papers issued were not returned at all, and that out of those sent in no less than one hundred and five, or more than 6 per cent., were either received too late or had to be disallowed by the scrutineers on account of some informality. This is a fact strangely inconsistent with the statement sometimes made that the policy of the Council does not meet with the approval of a majority of the members of the Society. It would be absurd to suppose that those who disapprove of the work of the Council vote for the re-election of its members, and unless it were impossible to obtain anyone to represent their views it would be equally absurd to abstain from voting altogether. It has been suggested that the small number of voters does not necessarily prove indifference or neglect, but that with the majority of members of the Society there is such perfect satisfaction with their representatives on the Council that they are content to leave the voting to more restless spirits. However that may be, such an occurrence as that just mentioned, if it be due only to the indifference of voters, should certainly be sufficient to silence the complaints and expressions of dissatisfaction that are sometimes launched against the Council, and when the same thing is repeated year by year the fact becomes a standing record of censure on the complainers if they be the persons who abstain from voting. With an executive body of such democratic constitution as the Council of the Pharmaceutical Society, ample opportunity is furnished for the representation of the opinions of those who care to exercise the privileges and fulfil the duties of membership if candidates can be obtained for that purpose. There is no occasion for hole and corner cabals and intrigues on the part of members of the Society, or even on the part of those who do not belong to the Society, provided at least the objects they have in view are really for the good of pharmacy or in other respects capable of bearing publicity. As the President pointed out at the last annual meeting, the present grievances of chemists may be ascribed in great part to irrational antagonism to the Society, and to the opposition offered to the Society's Bill in 1866. The circumstances which led him to refer to that fact fully justified his indignant protest against the disloyalty of members who, instead of availing themselves of the constitutional opportunities provided for open discussion of any subject they may desire to have inquired into or otherwise dealt with, go to another society, or allow themselves to be decoyed from their allegiance, to set up false issues, and with the aid of money from "an alien and irresponsible" association assist in creating dissension among their own class. As regards the impudent attempt, made without any justifiable pretext, to interfere with the internal affairs of the Pharmaceutical Society, it has been fittingly denounced by Mr. Hampson as not only stupid in itself, but "a shameful abuse of power and of money." It is much to be regretted that members of the Society should have lent themselves to such a miserable device, for though the chief object in view was effectually frustrated, the Society lost the services of a very useful member of Council and narrowly escaped a serious calamity. However, Mr. Carteighe was re-elected to the Council, as Mr. Percy Wells sagaciously predicted he would be, and at the June meeting he was for the eighth time in succession elected President of the Society. Mr. Bottle was re-elected to the office of Vice-President, and Mr. Robbins to that of Treasurer, which he had already filled for nine years.

Passing now to the business transacted by the Council during the past year, attention must first be directed to the renewal of the endeavour to obtain an amendment of the Pharmacy Act, so as to admit of the arrangements necessary for establishing a definite system of pharmaceutical education. This was taken in hand at an early period, for at the January meeting the President proposed that the Law and Parliamentary Committee should consider the form in which a Bill should be introduced for that purpose, and the following month a report was presented to the Council together with the draft of a Bill. The Bill then recommended by the Committee was limited to the subject of education, and with the exception of a few verbal alterations it was a reproduction of that previously introduced into Parliament by the Council. So far as concerned the educational provisions of the draft Bill it met with unanimous approval. The discussion that took place on the President's motion for the adoption of the report turned chiefly upon the question whether the new Bill should not deal with other matters as well as that of education. Five members of the Council supported the opinion that this was desirable, Messrs. Evans, Martin, Southall, Symes and Watt. Their chief arguments were that it would probably be difficult to get the Bill passed in any case, and that if it were passed the value of the result would be diminished if various matters affecting trade interests were not dealt with as well as education. However, these views were merely placed on record, and as no amendment to that effect was moved, the report of the Committee was adopted *nem. con.*, as well as the motion to instruct the Law and Parliamentary Committee to take the necessary steps for introducing the Bill into Parliament. On the 1st of March the Bill was introduced into the House of Commons by Sir Henry Roscoe, bearing also the names of Dr. Farquharson, Sir Tindal Robertson, Mr. Craig, Sir Trevor Lawrence and Sir Guyer Hunter.

No opportunity offered for advancing the Bill beyond that stage, and eventually it shared the fate of numerous other measures, leaving the requirements of the Society still unprovided for. At the meeting of Council in December, Mr. Hampson, being convinced that it was the duty of the Council to continue its efforts in regard to systematic education, which he considered was the keystone of any legislation, moved in pursuance of notice that further steps should be taken to introduce a Bill into Parliament. He argued that any claim which pharmacists may have upon the consideration of Parliament must be based upon their educational position, and that it is essential in the public interest that they should be well educated. But while recognizing that measures for improvement in that direction are indispensable, his motion also suggested that the advisability of including in the scope of a Bill provisions for other matters should be taken into consideration. He did not propose that such an extension should go so far as the Bill of 1883, since he thought there was not now the slightest chance of passing a measure to prevent co-operative society trading, and the additional features of a new Pharmacy Bill which he suggested for consideration were of a nature affecting the internal organization of the Society. Those specified were the giving of associates in business more of the privileges of members, the adoption of one title for all persons registered under the Pharmacy Act, and some method for entitling all who pass the qualifying examination to become members of the Society. These proposals point to objects which will commend themselves to all who have a sound appreciation of what is desirable for the interests of pharmacy. They furnish evidence of the conviction that those interests can be adequately promoted only through the medium of a strong representative body, and by making the Pharmaceutical Society the representative of all engaged in the business. But at the same time these proposals involve the consideration of a number of minor points that are likely to give rise to serious difficulties, and as regards membership of the Society the objections that can be offered were pointed out by Mr. Martindale. However Mr. Hampson's motion was referred to a committee for consideration, and at the suggestion of Mr. Harrison, who seconded it, an addition was made that the committee should take into consideration the advisability of introducing into the Bill any other provisions for making the Pharmacy Act of 1868 a more complete enactment of the principle laid down in its preamble. Mr. Harrison's support of the motion was based upon the deficiencies of the Act which have become manifest during twenty years' working, as well as the belief that all who practise pharmacy should do so under the same conditions, and that the time has come for endeavouring to remedy those deficiencies, which have arisen from the compromise of conflicting interests when the Act was passed. But both he and Mr. **Watt** agreed with Mr. **Hampson** in thinking that the probability of getting a measure passed with those objects would depend upon its being generally supported by chemists and druggists as a combined body. The absence of any such unity among them was, however, regarded by several of the speakers as a strong reason for not weighting the requisite educational provisions with other matters, and some expressed a decided intention to oppose the introduction of anything that would jeopardize the prospects of a Bill to establish a compulsory systematic curriculum. That is, at least, felt to be the great want for British pharmacy, and though the difference of general opinion as to the advisability of introducing other matters is fairly represented in the Council, most of those who advocated the introduction of other matters admitted that it must not be done so as to embarrass the progress of the Curriculum Bill. However, these questions are now the subject matter of consideration by a Committee which will in due course report to the Council, and their further development belongs to the future.

During the year educational matters have been several times under consideration. At the January meeting Mr. **Symes** brought forward a motion in reference to the grant of annual sums as endowments of provincial schools of pharmacy, which gave rise to a long discussion, the result of which showed that, apart from the question where the money was to be obtained for such a purpose, there was a very general opinion that it would be almost useless to attempt anything in the way of provincial education until a demand were created for it as a matter of necessity. The facts referred to by Mr. **Symes** himself, as well as by Messrs. **Atkins**, **Martin** and **Southall**, proved that the impossibility of obtaining students had been a still greater difficulty than the financial question. Even so enthusiastic an advocate of provincial education as Mr. **Schacht** confessed he had come to the conclusion that his former efforts in that direction were a mistake, and he felt it would be merely wasting good material to revive the attempt. To adopt the procedure suggested by Mr. **Symes**, and apply the Society's money in providing opportunity for eleemosynary education, was held by Mr. **Hampson** to be a course that the Council had no right to take, as it would be spending the money of the members to help individuals to enter the business and compete with them. In view of the numerous failures of such attempts to promote education in the provinces, it was the general feeling that whatever education may be desirable or requisite for the pharmacist should be paid for by students, and that they should all be compelled to pass through a definite course, so that they might stand, in that respect, upon an equal footing. As the result of the discussion Mr. **Symes**'s motion was withdrawn. The necessity of obtaining powers for insuring the suitable education of pharmaceutical students was also referred to in the discussion that took place at the February meeting as to the form in which a Pharmacy Act Amendment Bill should be introduced into Parliament, and it was generally acknowledged to be at least an essential desideratum. Mr. **Watt**, speaking on behalf of Scotch chemists, said he had found them unanimously of that opinion. Mr. **Hampson**, though anxious to see other amendments of the Pharmacy Act, admitted that there were strong reasons for not attempting them, but that the need for the educational amendment was imperative, not only on its own account, but also because it would, if achieved, create a possibility of further progress. Mr. **Atkins**, while fully appreciating the distressed condition and difficulties of many in the business, and desiring to do anything possible for their relief, looked upon the establishment of a definite system of pharmaceutical education as the most substantial instalment towards raising even the trade position of the body, and as the thing absolutely essential for bringing about a solution of the difficulty that had so deeply impressed him as the result of some years' experience in attending the examinations. Lastly the Vice-President, speaking with the authority of fifty years' experience in the trade, declared advisedly that the Educational Bill was calculated to promote trade interests much better than any Bill which the Council could hope to carry. At the Council meeting in June a letter was read from a firm of solicitors, asking whether private schools would be recognized in the event of the Pharmacy Act Amendment Bill becoming law, and at the suggestion of the President a reply was sent stating that it was the intention of the Council to recognize any school where the course of instruction was conducted in accordance with the rules and conditions laid down and approved under the provisions of the Bill.

At the Council meeting in December Mr. **Leigh** brought forward a motion in reference to the promotion of pharmaceutical education, and suggested that the Council should with that object offer to grant prizes and certificates to registered apprentices of the Society. In a long speech that showed a thoroughly sound appreciation of the disadvantageous and discouraging position of chemists' apprentices, he instanced the fact that, with the exception of a very small number, the great mass of apprentices neglect study altogether because they do not perceive the necessity of it. He referred to the failures to pass the Minor examination as proof of that fact and urged in reference to the acknowledged unsatisfactory state of pharmaceutical education in the provinces that it was necessary to rouse apprentices from their apathetic condition by making them do what they would not do voluntarily. He therefore proposed that this should be effected by the Council offering inducements and incentives that would appeal to the love of rivalry and the desire for approbation and praise. The failure of numerous previous efforts like that suggested he regarded as having been due in part to the want of stability in the provincial schools and societies to which those efforts had been limited, and still more largely to the want of co-operation of apprentices themselves, which is absolutely essential for the success of any educational scheme. To remedy the present great disadvantage, that there is no inducement to study from the time of passing the Preliminary examination and entering apprenticeship to the time for passing the qualifying examination, Mr. LEIGH desired to see an influence to keep a lad steadily at work during the whole of his apprenticeship. In the discussion that followed both Mr. ATKINS and Mr. SCHACHT expressed their appreciation of the importance to be attached to the circumstance last mentioned, but the former thought that the educational scheme the Council was endeavouring to get established would be the most effectual remedy for the evil, besides furnishing a real motive power that does not now exist. He entertained no hope of getting apprentices to study until pressure was brought to bear on them. In regard to Mr. LEIGH's scheme, he thought it would not be sufficiently effectual, and that it would also cost a great deal more than the Society's resources would be equal to. Mr. ALLEN took exception to the statement that there were not at the present time inducements for apprentices to study, since there are the scholarships given by the Society, which to some extent effected the desired object; and Mr. SOUTHALL added that though the Society had been trying by those inducements for more than forty years to persuade apprentices to study, it had been extremely unsuccessful, since very few took the trouble to study for these scholarships, though they are of considerable value. He did not therefore think much could be done with small prizes of books, or by anything less than distinct compulsion. When that was established it would be necessary to have schools, because a demand for education that does not now exist would thus be created. Several other members of Council concurred in the opinion that nothing short of a compulsory curriculum would be thoroughly effective in bringing about what is desirable with apprentices; Mr. MARTINDALE also expressed the opinion that it was the only influence under which masters would be constrained to recognize what is their duty to apprentices, and by which apprentices generally could be induced to apply themselves to the studies necessary for them. The motion to refer the question to a committee for consideration was, however, agreed to, and the conclusion to be arrived at will form part of the work of the future. It may be added that in the discussion of the subsequent motion as to the nature of the Pharmacy Bill to be brought in next year, it was taken as an accepted principle by all the members of Council that whether other matters were introduced or not the educational scheme was the *sine quâ non* of pharmaceutical legislation, without which nothing could be done or hoped for.

The representation of the Society by local secretaries in the provinces has, on several occasions, engaged the attention of the Council. It was felt that these officers are placed at some disadvantage as local representatives of the Society by having to collect subscriptions. The value of the services local secretaries are capable of rendering can scarcely be overestimated, but in many instances the work involved in the performance of their duties is too onerous to be undertaken by one individual in an extensive district. Probably in such cases some of the younger members or associates would be willing to assist the local secretary, and glad to have that opportunity of contributing to maintain that intimate connection between the provinces and the executive of the Society which is essential for the general good. When the appointment of divisional secretaries was being considered at the meetings in February and March, reference was incidentally made to the desirability of some altered arrangements. Subsequently when the time came for the appointment of local secretaries it was pointed out that the chief difficulty lay in the question how local secretaries were to be appointed. The President then showed that notwithstanding the democratic constitution of the Society and the provision made for election of local secretaries by the members and associates in the several districts, the plan introduced by the Council some years ago had been a complete failure, for there was not sufficient interest taken in the work to enable the Council to feel any confidence in dealing with the names sent up. Mr. HAMPSON remarked that the experience in this respect afforded little encouragement to entertain the project of territorial representation suggested some time ago. The subject was then referred to a committee.

In the course of discussion as to the best means of endeavouring to increase the number of subscribers to the Benevolent Fund in London, it was suggested by Mr. SCHACHT that considering the enormous magnitude of London it might be well for the Society to follow the step taken by the Legislature in dividing the metropolis into districts and appoint officers for each of the new divisions. This idea was accepted with general approval, and Mr. Butt mentioned that he had already put it forward to the Library and Museum Committee. At the following Council meeting, in February, a report was presented recommending, as the result of further discussion of the subject, that it was desirable to appoint a member or associate of the Society as divisional secretary in each of the Parliamentary divisions of London, and it was resolved that steps should be taken for that purpose. At the March meeting the Committee to which this business had been referred submitted a list of names of those who had, at the request of the Secretary and Mr. Allen, consented to act in this capacity, and recommended their appointment. This was unanimously agreed to, and the opinion was expressed that while the fact of these fifty-eight persons being publicly identified with the work of the Society would have a beneficial influence in exciting greater interest in that work, the services of the divisional secretaries would be very useful whenever it was necessary to obtain assistance in supporting or opposing any legislative measure. Shortly afterwards the divisional secretaries met at a conference with the Committee on the affairs of the Society, which afforded gratifying evidence of the possibility that much good work might be done by the new organization, and at a subsequent meeting, in November, some suggestions were made which may prove useful in the future.

The arrangements for the building of the Society's new premises have been frequently under consideration. Early in the year the Committee to which this matter was referred recommended that the two houses adjoining No. 17 should be rebuilt, No. 16 for the purpose of providing the additional accommodation required by the Society, and No. 15 as a residence to be let. The total cost was estimated at £6700. In order to afford the members of Council an opportunity of considering the plans proposed, the report was allowed to stand over until the next meeting in March, when, after a long discussion as to the finances of the Society, it was resolved to adopt the recommendations of the Building Committee that the work should be proceeded with at once. At the July meeting the Committee reported upon the tenders received, and recommended the acceptance of Messrs. Kirk and Randall's tender for £7425, the increase on the original rough estimate being due to some unavoidable alterations in the plans and the inclusion of several items of the nature of fittings. After a long discussion it was unanimously decided that the recommendations should be adopted and the contract for the building authorized. The work of reconstruction was commenced early in the autumn and is now far advanced towards completion.

Complaints respecting infringements of the Pharmacy Acts have engaged the Council at each of its meetings, the total number of cases brought under consideration and dealt with during the year having been 193. In the majority of these the warning sent by the Registrar has been sufficient to put a stop to the infringement, but 33 cases have had to be placed in the solicitor's hands. The prosecution of an unqualified assistant for the sale of poison, which was undertaken at the request of one of the coroners for London, resulted in a conviction, against which notice has been given of an appeal, but it is still doubtful whether the advantage of a more authoritative decision of the legal question will be secured, as there has not yet been much actual support of the attempt beyond the expression of opinion. The conduct of the Research Laboratory has been from time to time under consideration, and a report of the work carried out was presented to the Council at the March meeting, in which the regulations relating to the admission of workers were laid down. In addition to the special subjects above mentioned, and the consideration of the reports presented every month by the five standing Committees, various other matters have engaged the attention of the Council, among which may be mentioned the Excise regulations relating to the retailing of methylated spirit and the sale of medicated wine, railway rates, the Medical Act Amendment Bill, the Medicine Stamp Act, and the arrangements to be made for assisting the General Medical Council in the preparation of an addendum to the Pharmacopœia.

Considering the disparaging remarks that are sometimes made in reference to the work of the Council, it might be expected that if there were any real foundation for them the opportunity afforded by the annual meeting would be taken advantage of for bringing under discussion proposals of a practicable nature likely to be useful, and to make up for the alleged neglect of the Council to try and benefit the chemist in his trade. But the discussion of the Council report and of the President's remarks upon it at the annual meeting did not partake of that character. Almost the only suggestions of practical importance were those offered by Mr. Guyer in reference to the conditions of pupilage and by Mr. Warren and Mr. Sandell as to occasional meetings of local secretaries. Mr. Bland's proposal to attack the Board of Inland Revenue on the subject of the medicine stamp duty was shown to be based on a misconception, while his objections to the proposed educational regulations were self-contradictory in themselves, and were well refuted by Mr. Martin in favour of the proposition that every step taken in education is a direct advantage to the pharmacist in his trade. The opinion expressed by Mr. Percy Wells that the more you educate the chemist the more you make him respected by his fellow men, is merely another statement of the same fact, though he professed he could not see this. It was in the exercise of the privilege of "baiting" the Council that the chief interest was excited; but no great success was thus gained, for the reasons of the "atrophy" to which Mr. WELLS considers new members of the Council become subject were satisfactorily explained by the President, and the hopes of legislative protection entertained by some members of the trade were shown to be manifestly futile and unreasonable. The special motions brought under consideration were also more adapted for the purpose of "baiting" than for anything more useful. The one of which Mr. WELLS had given notice was handled by him in a manner almost personally offensive to the President. It sought to obtain the opinion of the meeting that it is expedient to have the names of the proprietors of a chemist's business displayed in a conspicuous and legible manner. Though a certain amount of sympathy with the object in view was expressed, it soon became evident that the means proposed would be ineffectual, and the motion was negatived by a large majority. Mr. NICHOLL's motion that the stamping of specialities prepared for sale only by the vendor is an unjustifiable impost curtailing the liberties of the pharmacist was not more fortunate in commanding support, and after the President had pointed out that the abolition of the Medicine Stamp duty might be expected to aggravate rather than remedy the disadvantages now complained of in regard to the sale of medicinal articles the motion was withdrawn.

The statistics of the year show a slight diminution in the total number of entries for the different examinations as compared with 1888; but this will probably hardly be considered a subject for regret, if it should prove to indicate a check in the unduly increasing desire that has been manifest in recent years to take up the calling of a chemist and druggist. The total number of entries has been 2507, against 2604 in 1888, or a decrease of 97. This falling off has been shared by both the Preliminary and Minor examinations, which are now the only compulsory ordeals for pharmaceutical aspirants. But it is satisfactory to add that the entries for the voluntary Major examination show an increase, the total having been 138, with 82, or 60 per cent. of passes, against a total of 117, with only 66 passes in the previous year. This is a higher number of both entries and passes for the Major examination than has occurred in any year since the passing of the Pharmacy Act, 1868, the nearest approach to it having been in 1879, when the entries were 134 and the passes 77. The entries for the Minor examination numbered altogether 1013, being less than in either year since 1885; of these the passes numbered 439, or 43·3 per cent., against 510, or 46·7 per cent. in 1887. Only 5 persons entered for the Modified examination, of whom three passed. For the Preliminary examination there were 1351 entries, with 659 passes, or equal to 48·8 per cent., against 733, representing 52·6 per cent. of passes in the previous year. This number of 659 has, of course, to be supplemented by that of the certificates accepted in lieu of the Society's examination, but of these there were only 62, showing a very considerable falling off as compared with the previous year. Altogether, therefore, there were 721 persons who passed in 1889 the preliminary stage in acquiring qualification as chemists and druggists, or 109 less than in the previous year.

The first report of Dr. STEVENSON, as Visitor to the examinations on behalf of the Privy Council, had to be made after only a very limited acquaintance with them, but it contains evidence that the successor to Dr. GREENHOW will prove to be an independent though sympathetic critic. In it he bears testimony to the "discrimination and fairness" with which the Minor examination is conducted, and expresses the opinion that under existing conditions it is not likely that a competent candidate will be rejected or any quite incompetent one passed. Nevertheless he indicates some directions in which, in his opinion, alteration would be improvement, and these suggestions have no doubt already received the careful consideration of the boards of examiners. In respect to the Preliminary examination he bears testimony that it is by no means severe, and indeed he remarks that it does not prevent candidates presenting themselves at the Minor examination whose knowledge of the application of simple arithmetical calculations in pharmacy is defective. Notwithstanding, however, this suggestion of tenderness in respect of arithmetic it would appear that it is still in this subject that the largest proportion of rejections occur. That such is the case however does not indicate a mistake in Dr. STEVENSON's criticism, but a serious defect in the education of the class from which the candidates for the Preliminary are chiefly drawn. This is emphatically shown by the fact that a simple sum that proved a stumbling-block to 118 out of 315 candidates at the January examination, was subsequently worked correctly by 21 out of 25 children in the fifth standard class at a provincial board school.

From a financial point of view the Benevolent Fund shows a slight improvement, the total contributions amounting to £1833 14*s*. 9*d*. But it is important to note that the sum of £1477 15*s*. 9*d*., representing the annual subscriptions, shows a slight falling off as compared with the previous year. The fact is that such increase as there was in the gross total is referable mainly to a legacy of £100 from the late Mr. John Williams and one of £19 19*s*. from the late Mr. Richard Forrest. The donations received amounted to about the same as in 1888, the donations and legacies together amounting to £355 19*s*. On the other hand, the expenditure in annuities has been £1696 5*s*. and in casual grants £384, amounting together to £2080 5*s*., or £246 10*s*. 3*d*. in excess of the subscriptions, donations and legacies received during the same period. Last month, in accordance with the resolution of Council, four annuitants were elected out of eight approved candidates, and at the time of writing there are no less than fifty persons receiving annual pensions of £30 or £35 from the Fund.

The Evening Meetings of the Society, both in London and Edinburgh, have been continued with quite an average amount of success, and at the former some further contributions from the Research Laboratory have been read. In London, as usual, the October meeting was devoted to the reception of the reports from the teachers in the Society's School and from the examiners for the Council Prizes, after which the prizes were distributed by the President, the Pereira medallist of the year being Mr. Harry Dixon Fuge. It had been hoped that the President of the Medical Council, Mr. John Marshall, would have been present to speak some words of advice and encouragement to the students, but being debarred through indisposition he sent a written address that was read by Professor Attfield. The proceedings of the evening concluded with the presentation of the Hanbury Medal, which had been awarded to Professor Planchon, who came over from Paris to receive it in person. In Edinburgh the inaugural meeting was held in November, when Professor Fraser delivered a very interesting address, in the course of which he suggested that pharmaceutical education and examination might be associated more closely with university functions than they now are. The papers read at the London meetings during the year have been as follows:—"The Proper Time for Collecting Aconite Root," by Mr. P. W. Squire; "The Congealing Point of Oil of Anise," by Mr. J. C. Umney; "Note on Cascara Sagrada," by Mr. J. Moss; "An Apparatus for the Estimation of Nitrites," by Professor Dunstan and Mr. T. S. Dymond; "Notes on Egyptian Opium and Some Other Drugs of the Cairo Bazaars," by Mr. W. Martindale; "The Iodine Absorption Equivalent of Essential Oils," by Mr. R. H. Davies; "The So-Called Mussænda Coffee of Réunion," by Professor Dunstan; "Sterculia Gum, its Similarities and Dissimilarities to Tragacanth," by Mr. J. H. Maiden; "On the Chemical Constituents of *Scopola carniolica*," by Professor Dunstan and Mr. A. E. Chaston; "The Pharmacy of *Scopola carniolica*," by Mr. F. Ransom; "Observations on the Therapeutic Action of *Scopola carniolica*," by Sir Dyce Duckworth; "The Natural History of *Scopola carniolica*," by Mr. E. M. Holmes; "Histological Characters of the Rhizome of *Scopola carniolica* compared with those of *Atropa Belladonna*," by Mr. T. Greenish; "On the Root-Bark of Euonymus (Wahoo) and on Euonymin," by Messrs. W. A. H. Naylor and E. M. Chaplin; and "Notes on Calamine," by Mr. W. M. Holmes. At the Evening Meetings in Edinburgh the papers read were: "Suggestion for an Improved Chloroform Liniment," by Mr. P. Boa; "Extract of Nux Vomica," by Mr. W. Duncan; "The American Tinctura Quillajæ," by Mr. J. R. Hill; "Compound Liquorice Powder," by Mr. J. H. Fisher; "Notes on Suspending Bismuth Subnitrate in Mixtures," by Mr. S. Lawrence; "Missisquoi Water," by Mr. T. Maben; "Salts or Saltpetre?" by Mr. T. Maben; "The Dilution of Cow's Milk in Infant Feeding," by Mr. T. Maben; "Note on Green Euonymin," by Mr. J. W. Thomson; "Note on Methyl-Orange," by Mr. D. B. Dott; "Action of Tartaric Acid on Mercuric Chloride," by Mr. D. B. Dott; "Liquor Calcis Saccharatus," by Mr. C. Arthur; "Glycerites of Ferrous Salts," by Mr. C. Arthur; "A Simple Arrangement for Rapid Filtration," by Mr. C. Arthur; and a "Note on the Colouring Matter in Green Euonymin," by Mr. W. Gilmour.

The Museum of the Society has continued to exhibit a healthy growth during the past year, both in the number of donations received and in the attendance of students and visitors. The principal contributors, however, have been much the same as during previous years. Products from the Dutch East Indies have been received from Professor Van Eeden; Messrs. Symes and Hallawell and Mr. J. Hartford have contributed specimens from South and North America respectively; Mr. J. G. Prebble and Mr. D. Hooper have furnished novelties from India; Mr. H. B. Brady has given nickel and other ores from New Caledonia, obtained during his travels; and Messrs. E. C. Bennett and Co. have presented uranium ore from the new Cornish mine. African native remedies have been contributed by Dr. Papefio and Dr. J. F. Easmon, the latter having also enriched the Herbarium with a series of plants used in medicine on the Gold Coast. Besides these the Herbarium has received valuable additions from Mr. J. G. Prebble, of Bombay, and the English Herbarium from Mr. J. C. White and Mr. G. C. Druce; while to the collection of histological material Mr. J. Hart has again contributed largely, and Mr. J. G. Prebble has presented a valuable series of slides of the lignum aloes of Eastern commerce. The total attendance in the Museum has been 5712 in the day and 1096 in the evening, being an increase of 588 in the day and 240 in the evening over that of the preceding year. A number of duplicate specimens have been distributed, and others lent during the year to illustrate lectures given by local associations.

The Library has also been maintained in a state of efficiency, and has been augmented by 270 volumes and pamphlets, some of which were purchased and some presented. In the course of the year a new edition of the Catalogue was published. The attendance in the Library in the daytime has been 6075, or about 300 less than in the previous twelve months, and in the evening 2017, or about 300 more, so that the gross total remains practically the same. The circulation of books is represented by 3275 entries, which shows a slight falling off that is more marked in the country than in the town borrowers.

The annual report of the executive of the North British Branch of the Society was presented to the Council at the meeting in May. The record of work done was considered very satisfactory, the success realized having been largely due to the excellent services of the assistant secretary, Mr. HILL. At the same time it was pointed out that notwithstanding the growing attachment to the Society, and the evidence that the acquisition of the new premises in Edinburgh was a wise step, there was yet much to be done in Scotland in gaining an accession of strength from the ranks of Scotch chemists. At the meeting held in June for the election of the Executive the Chairman, Mr. GILMOUR, spoke of the advantages resulting from the official visits of members to Aberdeen and London. He expressed regret that there was not more interest in the affairs of the Society, and that such a large number remained unconnected with it. In reference to the complaints that the Council was not doing what it should, he said it should be remembered the Society could only be what the members themselves made it, and that while the members ought to take greater interest in the management of its business there should be a large addition to its numbers from those outside, so that those who differed from the Council might support any opposite policy they desired. Mr. WATT took the opportunity of declaring, in reference to the prosecution of certain reforms on which he had set his mind, that he was in direct opposition to the President, but had not received much support. At the same time he admitted that there was no foundation for the statements sometimes made that the Council neglected complaints of infringements and omitted to take up prosecutions.

In Ireland the Pharmaceutical Society has experienced somewhat troublous times. The Pharmacy Bill that had been promoted by the Council of the Irish Society provoked considerable opposition from the chemists and druggists, which, although insufficient to affect much the opinion of the Select Committee, was equal to blocking its progress in the House of Commons. With a view to abate this opposition concessions were negotiated by the President and Vice-President that failed to receive the endorsement of the majority of their colleagues, with the result that Mr. BRUNKER and Mr. DRAPER resigned their posts and withdrew from the Council. At the meeting in July Mr. CHARLES EVANS was elected to the vacant post of President and Mr. PAYNE as Vice-President. The proceedings at the annual meeting seemed to show that the non-conceding course taken by the majority of the Council had the approval of the pharmaceutical chemists of the country, since it was announced that the membership had increased from 81 to 123. At the meeting of the Council in November Mr. CHARLES EVANS was re-elected as President and Mr. HODGSON as Treasurer, and Mr. WELLS was elected as Vice-President.

The year has contributed its usual share of meetings and festive gatherings more or less interesting to pharmacists. First in order came the Chemists' Ball and the Junior Ball, followed by the well-supported annual dinner of the Chemists' Assistants' Association. In May, in connection with the annual meeting, there was the annual dinner of the members of the Pharmaceutical Society and their friends. In July the Society of Chemical Industry assembled in London; in August the British Medical Association met in Leeds; and in the following month the British Pharmaceutical Conference and the British Association met in Newcastle-upon-Tyne. In the early days of August, in connection with the great universal exposition, there was a Congress of Therapeutists and Pharmacognosists held in Paris. In Germany the Apotheker-Verein met at Mayence in August and the Naturforscher Society at Heidelberg in September. In the United States the American Pharmaceutical Association met in San Francisco in June.

Although the death roll of the year is not unusually heavy, it includes two names that represent a grievous loss to British pharmacy. In JOHN WILLIAMS there passed away a sound chemist, a sagacious man of business, and a wise and genial counsellor, who for the last eighteen years of his life placed these qualities at the service of his fellow pharmacists, in the position successively of Member of Council, Treasurer and President of the Pharmaceutical Society, President of the British Pharmaceutical Conference, and as the author of several important scientific papers. FREDERICK BARRON also served the Society as Auditor, and was a munificent contributor to the necessities of his poorer brethren. JAMES SLIPPER for a short time sat on the Council, and HAROLD WOOLLEY bore a name that was familiar there. The Society has, in addition, lost former

Local Secretaries in John Phillips, of Newport, George Galloway, of Inverness, and Francis Earle, of Hull. In this country also general science has lost James Prescott Joule, the great physicist, Warren de la Rue, John Dale, James Brazier and John Percy. In France, the Nestor among chemists, Michel Eugène Chevreul, has died at the age of 102; as well as Claude Adolph Nativelle, the discoverer of crystallized digitalin, and Gustav Augustin Quesneville, who for half a century conducted an important scientific journal. Oscar Schlickum was a voluminous contributor to pharmaceutical literature in Germany, and Rheinold Rother played a similar part in the United States.

In taking a glance at the progress made during the year in the sciences related to pharmacy it will be seen that the vegetable kingdom continues to yield in unstinted plenty fresh substances as candidates for the attention of the therapeutist, whilst these, as well as those already in use, present innumerable problems that require investigation by the chemist and pharmacist. One of the earliest papers on this class of drugs to appear in the year was a communication from Messrs. Dymock and Hooper on *Podophyllum Emodi*, the Asiatic representative of the genus. This plant, although probably familiar to the Hindus as a medicine long before the existence of the American species was known, and bearing a native name suggestive of its properties as a hepatic stimulant, remained without chemical examination until recently, although mentioned in the Pharmacopœia of India as a possible source of podophyllin. The suggestion proves to be so far justified that the authors obtained from the powdered rhizome and rootlets of *P. Emodi* as much as 10 and 12 per cent. of a purgative resin, presenting the physical and chemical properties of podophyllin, the average yield from *P. peltatum* being only from 3¼ to 5 per cent. Another plant, *Picrasma quassioides*, mentioned in the Indian Pharmacopœia, under the name *Brucea* (*Nima*) *quassioides*, as yielding a likely substitute for quassia, has been investigated by Messrs. Dymock and Warden. The wood, which presents histological characters similar to those of quassia wood, yielded a crystallizable principle that was thought to be identical with quassiin, as well as a fluorescent bitter resinoid, an amorphous bitter resin, possibly the substance that has been called uncrystallizable quassiin, and distinct indications of an alkaloidal principle. The wood is not so bitter to the taste as ordinary quassia wood and probably contains less quassiin. Musambra, a variety of East Indian aloes, has been the subject of an investigation by Mr. D. Hooper, from which it would appear that in different parts of India, under this name, an inferior kind of aloes is met with, probably prepared in the country from *Aloe vulgaris*. *Casearia esculenta* root, said to be coming into use in India as a hepatic medicine, was the subject of a communication to the Conference from Dr. Mootooswamy. Another Indian product examined by Mr. Hooper is a gum resin derived from *Balsamodendron Berryi*, used for medicinal purposes by the natives in the Coimbatore district, south of the Nilgiri Hills, and reputed to resemble the official myrrh. The gum resin proved, however, to be free from bitterness or odour, and useless as incense or as a substitute for the official drug, though it yields a good adhesive mucilage. From New South Wales Mr. Maiden has supplied some interesting information respecting the so-called "Botany Bay" or eucalyptus kinos. The author refers to thirty varieties of kino, the products of different plants, which he divides into the "ruby group," forming clear ruby solutions in spirit and in cold water; the "gummy group," soluble in water, but only slightly soluble in spirit; and the "turbid group," forming turbid solutions in spirit and in water. The varieties which Mr. Maiden considers to satisfy the B.P. requirements are all the members of the "ruby group" and some of the "turbid group." From the results of a large series of experiments he concludes that gelatinization does not occur in tinctures made from kinos not more than one or two years old, and then only in those made from "ruby" kinos. He recommends that when a member of the ruby group ceases to form a clear ruby solution in cold water it should be rejected for pharmaceutical purposes. Mr. Maiden has also contributed a record of experiments and observations on a number of Australian and Indian "sterculia" gums, the results of which do not, however, much favour the probability of these gums finding industrial application. The gums present some points of superficial resemblance to tragacanth, but do not appreciably thicken in water, in which they form a granular non-adhesive jelly, and are distinguishable from it in not giving a canary yellow colour upon adding caustic soda and boiling. One observation of interest was that they contain from 60 to 75 per cent. of pararabin, which is convertible into arabin by boiling in dilute acid. In reference to tragacanth attention has been called by Professor Maisch to the statement, contained in both the British and the United States Pharmacopœias, to the effect that water in which tragacanth has been macerated is "not precipitated" on the addition of alcohol. This Professor Maisch stated he had disproved by experiment, and his experience was afterwards confirmed in a paper contributed by Mr. Ogle. As to gum arabic, the falling off of the supply from the Soudan has given rise to the suggestion whether the phenomenon of gumming might not be set up in acacia trees growing in other localities by inoculation with the ferment said to cause the exudation, while the high price due to the scarcity has been no doubt a factor in the adulteration of powdered gum arabic with rice starch observed by Mr. J. H. WILSON.

At the Evening Meeting in February, Mr. P. W. SQUIRE raised the question as to the proper time of collecting aconite root. The British Pharmacopœia says, "in the winter or early spring, before the leaves have appeared." But as the result of a systematic examination of roots of cultivated plants at different stages of growth, Mr. SQUIRE is of opinion that aconite root should be collected in autumn, when it is in perfection and when he had found it to produce a maximum amount of numbing sensation on the tongue. As, however, it is at this time difficult to distinguish the roots of *Aconitum Napellus* from those of *A. paniculatum*, Mr. SQUIRE recommended that observation of the plants should be made at the time of flowering in the spring, and pointed out that this could probably be best effected by systematic cultivation of the plant. Subsequently, Mr. F. RANSOM raised a doubt as to the plan of cultivation, on the ground of cost, and suggested that the Japanese aconite (*Aconitum Fischeri*) might be advantageously substituted for the present official drug; but this has been objected to by Mr. HOLMES on account of the reputed difference in the physiological action of the two roots. The deterioration resulting to rhubarb root through the ravages of an insect grub formed the subject of some experiments made by Mr. SAWER, with a view to ascertaining the best means of destroying the pest. This was found to be done most effectively by heating the root for ten minutes to a temperature of 80° or 90° C., and then subjecting it for twenty minutes to the action of sulphurous acid gas. A report that an increased cost of cascara sagrada, owing to the demand for it being temporarily in excess of the supply, had led to a large quantity of spurious bark being placed on the market, furnished Mr. Moss with an opportunity to bring the subject forward at an evening meeting early in the year. On that occasion he called attention specially to an Oregon bark, said to be physiologically inactive, as well as to some genuine cascara sagrada collected out of season, and some alleged spurious bark. Personal experiment had however shown the Oregon bark to be far from inert, and the conclusion was arrived at that it was really the product of *Rhamnus Purshiana*, grown perhaps under somewhat different conditions than those which affect the better-known Californian bark. The alleged spurious bark also turned out to be probably a genuine cascara sagrada, owing its special appearance to having been collected out of season. Subsequently, when the temporary scarcity had passed away, Dr. SQUIBB said there was reason to believe that bark from *Rhamnus californica* had been collected and sent into the market as cascara sagrada, and he also referred to New York gossip that preparations of *Rhamnus Frangula* had been offered in that city as tasteless cascara sagrada preparations. In a paper read before the School of Pharmacy Students' Association, Mr. H. D. FUGE stated that he had found cascara sagrada which had been used for making liquid extract according to the official process to yield upon treatment with spirit a further quantity of extractive possessing the laxative properties of the drug, and he proposed that percolation with a mixture of equal quantities of rectified spirit and water should supersede the present official process. In addition he expressed the opinion that tasteless preparations of cascara sagrada, although they possess some degree of medicinal activity, in no case represent the full physiological value of the ordinary fluid extract. A menstruum of dilute alcohol has also been recommended by Mr. ZEIG, but for the different reason that it removes the active resinous principle and dissolves very little of the two other inert resins. The root-bark of *Euonymus atropurpureus* has been subjected to an exhaustive examination by Messrs. NAYLOR and CHAPLIN, who separated from it citric, tartaric and malic acids, an acrid principle, a bitter extractive, two resins, fixed oil and fatty acids and wax. They also obtained a neutral substance corresponding to WENZELL's euonymin, but they failed to find asparagin, said to be present by that author; a substance probably mistaken for it was provisionally named atropurpurin, but eventually turned out to be dulcite or an isomer. A practical turn was given to this investigation by experiments as to the menstruum that best withdraws from the bark the principles upon which the reputation of the drug as a hepatic stimulant is founded. It was found that the bark yielded nothing to hot or cold water that produced a recognizable effect, but that 65 per cent. alcohol gave an extract unmistakably laxative and acting on the liver, while rectified spirit yielded an extract differing only in being more decidedly laxative. This has induced them to suggest a formula for a liquid extract made by percolating the powdered bark with a mixture consisting of four volumes of rectified spirit and one of water. The results mentioned also throw light on the value of some of the so-called euonymins that are now to be met with. Of five samples examined by the authors one was completely soluble in cold water and consisted of an aqueous extract of the drug diluted with liquorice powder; a second yielded 56 per cent. to cold water and a third 55 per cent. Two of the specimens contained considerable quantities of barium carbonate, and alumina and lime salts played a similar *rôle* as diluents. The presence of these mineral admixtures, as well as of sugar of milk, lycopodium and other substances, had, however, been signalized before by Messrs. JONES, BENNETT and THOMSON, the quantities of added matter reported being so large and so variable as to leave it a matter of wonder that euonymin is still used in medicine. The origin of the colouring matter in samples of green euonymin formed the subject of discussion at evening meetings in Edinburgh, and the question was practically settled by a spectroscopic investigation by Mr. W. GILMOUR, who found it to be due to chlorophyll that has undergone alteration by contact with copper, though doubtless other pigments are sometimes present.

The interesting series of papers upon *Scopola carniolica*, originating in an inquiry conducted in the Research Laboratory, has been published so recently as to need only brief mention here. The occurrence in the drug market of a substitute for belladonna, under the name "belladonna scopolia," said to be the rhizome of a plant growing wild in the Carpathians, the juice of which was supposed to possess mydriatic properties, suggested further investigation. The plant was identified by Mr. HOLMES as *Scopola carniolica*, Jacq., and Mr. GREENISH found a section from the rhizome to be identical in its general histological features with one from the so-called Japanese belladonna (*S. japonica*), and also to indicate a close alliance in this respect with the root of *Atropa Belladonna*. Chemical investigation of the rhizome by Professor DUNSTAN and Mr. CHASTON showed that it contained hyoscyamine and possibly traces of hyoscine, together with a fluorescent principle and a cholesterin fat. The pharmacy of the drug was worked out by Mr. F. RANSOM, who suggested formulæ for standardized preparations corresponding with the official preparations of belladonna, and with these Sir DYCE DUCKWORTH, in some preliminary experiments, obtained therapeutic effects comparable to those following the administration of belladonna, except that scopola did not give rise to dryness of the throat. The fact that hyoscyamine only was found with certainty in the rhizome Professor DUNSTAN thinks might be attributable to improved methods of manipulation, since it is known that hyoscyamine is easily convertible into atropine, and it has been suggested that atropine might really always be a product rather than an educt. But an observation by Professor SCHMIDT is in opposition to this theory, since he found that free atropine occurred together with hyoscyamine in belladonna roots of one year's growth, whilst fresh older roots contained only hyoscyamine. Professor SCHMIDT has also reported the finding of hyoscyamine and hyoscine in *Scopola atropoides*, and traces of a mydriatic base in *Solanum tuberosum*, *S. nigrum* and *Lycium barbarum*. Mention may also be made here of the interesting work by Messrs. LADENBURG and HUNDT, who, although they failed in splitting up inactive atropine into two optically opposed portions, succeeded in building up an optically active compound apparently standing midway between atropine and hyoscyamine. Mandragora root (*M. vernalis*) has yielded to Herr AHRENS a mydriatic alkaloid which was at first thought to be isomeric with hyoscyamine, though afterwards found to contain more hydrogen. In the practical application of the mydriatic alkaloids, M. PETIT has recommended solutions of the boric acid salts, as being free from the acidity that is an inconvenience in solutions of some of the other compounds.

Some difference of opinion has been manifested as to the constituents of the *Eschscholtzia californica*, it having been reported to contain an alkaloid agreeing in all its characters with morphine, a considerable quantity of another undescribed base and a glucoside, and alleged to yield soporific and anodyne preparations presenting some advantages over those of opium. Herr REUTER, however, failed to find morphine in the plant, but he confirms the statement as to the presence of two alkaloids and a glucoside, and it has been suggested by Professor SCHMIDT that one of these alkaloids is identical with methylchelidonine found by him in *Chelidonium majus*. This latter papaveraceous plant is said to have yielded no less than twelve different alkaloids, one of them being thought to be identical with protropine, a base discovered by HESSE in opium. The constitution of morphine has been the subject of separate studies by Professor SKRAUP and Professor KNORR, the former having found methylethylamine among the decomposition products, an observation that favours the theory that the alkaloid is a phenanthrene derivative. The changes occurring in solutions of morphine salts have been investigated afresh by M. LAMAL, who refers them to the influence of light and organized ferments, leading to the formation of amorphous morphetine and crystalline oxymorphine. "Meconarceine" has been described as a mechanical mixture of meconic acid and narceine, and the same allegation has been made concerning some commercial brands of narceine meconate; but according to Herr MERCK a homogeneous compound, containing one equivalent each of narceine and meconic acid, can be obtained. Herr MERCK has also stated that chemically pure narceine has hitherto been practically unknown, what has passed under that name always containing a small quantity of acid, which clings to the base with great persistence. The pure alkaloid is said, in contradiction to accepted statements, to exert a weak alkaline reaction.

The attempts to form the cinchona alkaloids synthetically have been continued by Professor SKRAUP, and although not yet successful they have thrown considerable light upon the constitution of those bases. It would appear from an examination of the oxidation products of cinchonine, cinchonidine, quinine and quinidine that they all possess a common constituent which is a piperidine derivative, and that in cinchonine and cinchonidine this is associated with cinchonic acid, whilst in quinine and quinidine it is associated with quininic acid, the difference in optical activity of the respective pairs of compounds depending apparently upon the physical arrangement of the molecule. A large addition to the number of compounds of the cinchona alkaloids has been made by Dr. HESSE, who has found that the alkaloids combine readily with phenol to form compounds of which quinine-resorcin-hydrochlorate may be quoted as an example. The results of the examination of twenty-three samples of quinine sulphate, as reported by Messrs. PAUL and COWNLEY, showed that, excluding some exceptional instances, the samples were, on the average, fairly pure when judged according to the official standard; one sample, however, contained 12·34 per cent. of cinchonidine and another 11·6 per cent. Other quinine compounds that have been the subject of papers are quinine lactate, which has been recommended as convenient for hypodermic injections, and quinine arsenate, preference being given to a salt having the composition represented by the formula $C_{20}H_{24}N_2O_2 \cdot AsH_3O_4 \cdot H_2O$. It having been suggested that organic bromates might have a therapeutic value similar to that accorded by some observers to inorganic bromates, Mr. JOHNSON has described a process for the preparation of quinine, quinidine, cinchonine and cinchonidine bromates, by double decomposition between the respective sulphates and potassium bromate. As a means for the estimation of cinchona alkaloids Mr. FAWSETT has proposed a process consisting essentially in titration with bromine water, it being claimed that the differences in the bromine absorption equivalents furnish sufficient indications for recognizing and distinguishing between the different cinchona alkaloids.

Coca leaves and their constituents have again contributed a full quota to scientific literature. In January an interesting paper appeared in the Kew *Bulletin*, which included the results of the chemical examination of various samples of leaves by Mr. A. G. HOWARD. These confirmed what had before been suspected, that the method of drying the leaves largely affects the subsequent yield of crystallizable alkaloid from them; for instance, leaves from the same species, grown in the same district at the same elevation, yielded 0·60 per cent. when dried in the shade and only 0·47 per cent. when dried in the sun. It also appeared that although certain varieties of *Erythroxylon Coca* grow best at particular elevations, the percentage yield of crystallizable alkaloid from the leaves is practically unaffected by the elevation at which the plants yielding them have been grown. No other species of *Erythroxylon* examined has yielded an amount of alkaloid comparable to that obtainable from the leaves of *E. Coca*. Dr. HESSE soon after published a paper in which he claimed that the isatropylcocaine described by Professor LIEBERMANN in the previous year was identical with the base he had already named cocamine, and that LIEBERMANN's isatropic acid was the same as his own cocaic acid. In reply LIEBERMANN disputed both these propositions, and took the opportunity of changing the names of his products to "truxilline" and "truxillic acid" respectively, as indicating their derivation from Truxillo coca leaves. In respect to a statement by HESSE, identifying "hygrine" as trimethylquinoline, LIEBERMANN stated that he had examined a large quantity of raw material, obtained almost in the same manner as described originally by LOSSEN, but found it to consist of a mixture of oxygenated bases. A more important observation from a practical point of view, namely, that a second crystallizable alkaloid identified as cinnamylcocaine is to be found in coca leaves and might occur as a contamination of cocaine, was published almost simultaneously by Messrs. PAUL and COWNLEY and Dr. GIESEL. According to the former one sample of coca leaves examined contained 1·75 per cent. of crystallizable alkaloid, very little of which was cocaine. Cinnamylcocaine, however, being decomposed by permanganate, with production of benzoic aldehyd, its admixture with cocaine can be detected by that reagent.

Sarsaparilla is a drug with an incomplete botanical history, notwithstanding more than three centuries have passed since its introduction into European medicine. In the B.P. and other works of authority, the official "Jamaica sarsaparilla" from Central America is described as the root of *Smilax officinalis*, and the paler variety from plants actually cultivated in Jamaica has been referred to the same species. Recent investigation has however convinced Sir JOSEPH HOOKER that the plants yielding these two varieties of sarsaparilla are not identical, and he has therefore described the source of the official drug anew under the name *Smilax ornata*. Ipecacuanha appears to be a never-failing mine for chemical and pharmaceutical workers. In a valuable paper on the assay of ipecacuanha, Messrs. CRIPPS and WHITBY recommend acetic ether as a solvent, and record the high average of 1·97 per cent. of alkaloid obtained from twelve samples of root treated with this agent. They found that heating involved considerable loss of emetine, and incidentally they also mention that about 5 per cent. of the total alkaloid is contained in the woody portion of ipecacuanha. Messrs. BRAITHWAITE and UMNEY, however, in casting about for a means of assaying the alkaloid in a liquid extract of ipecacuanha, with a view to its standardization, found that acetic ether when used for this purpose "gave results much in excess of the amount of emetine originally found in the root." They prefer a process consisting essentially in precipitating a solution of the extract with basic lead acetate, treating the precipitate with ammonia and shaking out the alkaloid with chloroform. These authors also report that the root can be completely exhausted by percolation with rectified spirit, the marc being allowed to macerate for twenty-four hours with a little slaked lime in the course of the operation. In this way they propose to make a liquid extract that shall be standardized to contain 1·25 per cent. of emetine; and from this extract they would prepare a wine by dissolving one part in twenty parts of sherry. From experiment they ascertained that the present official process for the wine extracts all the alkaloid, but that a considerable amount is lost in the drying and powdering of the acetic extract. As bearing on this subject it may be added that Herr ARNDT alleges that assays of ipecacuanha for emetine may be vitiated by the disturbing influence of a hitherto unrecognized volatile alkaloid, and he fixes the maximum of real emetine in the root at 1·12 per cent. of the cortical substance.

Senna pods furnish an instance of an old remedy that had fallen into disuse undergoing resuscitation, but for how long, who can tell? Apparently the statement by Dr. MACFARLANE that in their administration they present some advantages over senna leaves has brought them into demand and it has evoked several papers on their pharmaceutical treatment. Mr. SALMON found by experiment that the pods are richer in the characteristic cathartin compound than the leaves, but are practically free from resin, and on these grounds he suggested a liquid extract made by maceration with cold water. Subsequently, Dr. SYMES recommended one made by percolating first with dilute alcohol and then with glycerine and water containing ammonia, pressure being applied to the marc after each operation. As to senna leaves, the official tincture has been severely criticized by Mr. PROCTOR as an inert preparation, the purgative principle not being removed from the leaves by proof spirit.

Strophanthus seeds and strophanthin have formed the topic of several papers, but those notwithstanding there still exists a sense of confusion in connection with the subject. This probably arises from the fact that under the name strophanthus different varieties of seeds are now met with in commerce, the active principles of which may differ from each other. For instance, M. ARNAUD has reported that he obtained from the seeds of *Strophanthus Kombé* a strophanthin having the composition represented by the formula $C_{31}H_{48}O_{12}$, and from seeds of *Strophanthus glabrus* apparently a lower homologue, having the composition $C_{30}H_{46}O_{12}$, with a much more powerful physiological action. M. CATILLON has reported the separation from *S. Kombé* seeds of a nitrogenous principle, to which he attributes the diuretic action. On the other hand, Dr. FRASER, to whose researches the introduction of this powerful drug was originally due, working upon seeds of *S. hispidus*, of which species, according to Professor OLIVER, *S. Kombé* is merely a variety, obtained a strophanthin to which he attributes the formula $C_{16}H_{26}O_8$. This compound he found to be a glucoside, breaking up easily into a much more readily crystallizable substance, strophanthidin, and sugar. Another addition has been made to the class of compounds resembling strophanthin in tanghinin, separated from the seeds of *Tanghina venenifera*, an apocynaceous plant formerly used as an ordeal poison in Madagascar.

Commercial strychnine, subjected to a process of fractional distillation, has yielded to Dr. KOEFOED results that suggest the presence in it of a second alkaloid, homologous with strychnine, for which he suggests the name "homostrychnine." Similar results were obtained with brucine. Professor BECKURTS has called attention to the varying proportions in which strychnine and brucine occur in nux vomica, as having an important bearing upon the standardization of preparations of that drug, and suggests that for this purpose only strychnine, and not the total alkaloids, should be taken into account. Mr. W. DUNCAN, also, has reported on samples of standardized extract of nux vomica that gradually increased in alkaloidal strength through loss of moisture. Further he states that the single treatment with chloroform ordered in the official process for this extract is not sufficient to remove all the alkaloid from the alkaline liquor. Caffeine salts, it is known, are usually very unstable, but Dr. LEIPEN has pointed out that the oxalate is stable, and is not broken up by repeated re-crystallization from water. Nicotine salts are usually difficult to crystallize, but the acid tartrate has been reported an exception. Ulexine, the alkaloid obtained from gorse seeds, has been more fully described as to its physical and chemical properties by Messrs. GERRARD and SYMONS, who attribute to it the formula $C_{11}H_{14}N_2O$. Among the other more or less important work upon the active principles of plants may be mentioned the separation of three alkaloids from the areca nut, the principal one, arecoline, being apparently the constituent to which the vermifuge reputation of the nut is due; the separation of three alkaloids from "artar root" (*Xanthoxylon senegalense*); the more correct description of fumarine and corydaline from *Fumaria officinalis* and *Corydalis cava* respectively; as well as of antiarin, oepain and toxicarin, the physiologically active constituents of the juice of the upas. The occurrence of skatol in the vegetable kingdom has been observed for the first time by Professor DUNSTAN, who found it in the wood of *Celtis reticulosa*.

Under the name "mussænda coffee" some berries from Réunion were exhibited in Paris, as a coffee substitute; they were represented to be derived from a new species of *Mussænda*, a genus belonging, like *Coffea*, to the Rubiaceæ, and to contain 0·3 to 0·5 per cent. of caffeine. Botanical experts, however, referred the berries to a Loganiaceous plant, and a chemical examination by Professor Dunstan showed that they contained no caffeine. Falsely packed chiretta has again appeared in the market and been detected, the adulterants being derived from *Ophelia angustifolia* and *O. alata*. Saffron adulterators have called in a new material for effecting their object in certain soluble salts, and Mr. Proctor has described a colorimetric method of detecting sophistication. Inferior cubebs continue to be reported, though these appear to consist chiefly of genuine fruit insufficiently mature; but "cloves" have been met with made from paste, and these are nearly matched by asafœtida containing 86 per cent. of mineral matter. From New York comes a report of the importation of the "Hungarian daisy," presumably as an adulterant of insect powder.

Essential oils have continued to occupy the attention of chemical workers, and the reports of Messrs. Schimmel have especially been full of interesting information on the subject. A good illustration of the value of applied science in this direction has been the exposure of the adulteration of oil of cassia with kerosene, practised in China. At an evening meeting Mr. J. C. Umney called attention to the congealing point of oil of anise, which he considered to be wrongly stated in the B.P. According to his experiments the true solidifying points of pimpinella and star-anise oil are practically at the same temperature, but the abnormal congealing point of star-anise oil is much lower, and in his opinion it is this that is given in the official work as the true congealing point. At another evening meeting Mr. R. H. Davies reported the results of a number of experiments as to the "iodine absorption numbers" of various oils, which seemed to point to the possibility of using these data as a means of recognizing and testing essential oils. Similar work has also been done independently by Mr. Snow in America. Messrs. Benedikt and Grüssner have also proposed to utilize the "methyl number" for the same purpose. Mr. Cripps has reported some observations pointing to the imperfect blending of fractions of cajuput oil, and has also recorded adulteration of rosemary oil with petroleum. As to the fixed oils, Mr. Conroy has observed the adulteration of castor oil with cocoa-nut oil, and described a test for its detection. The adulteration of olive oil and its detection has also been dealt with in several papers.

Not a month of the year has passed without a contribution to the materia medica from the chemical laboratory, and every week has brought its supply of literature, especially of the quasi-scientific form which chemical manufacturers affect in putting forward the claims of such preparations. Antipyrin has now taken so important a place that its reactions have acquired interest, and some of these illustrate the difficulties met with by dispensers when complex compounds are ordered whilst yet their chemical behaviour is unknown. It appears to be established that the green compound formed when antipyrin and a preparation containing nitrous acid are dispensed together is physiologically harmless, and Mr. Stark has proposed to utilize this reaction as a test for the presence of antipyrin. M. Manseau has pointed out that antipyrin is capable of decolorizing a certain quantity of solution of iodine, and proposed to use this reaction as a test for the quality of the compound. Further, it has been stated that antipyrin possesses the property of increasing the solubility of some salts of quinine, and it has also been reported to be incompatible with extract of cinchona, from which it precipitates the alkaloids; with chloral hydrate, with which it forms a new compound having a coriander-like taste, and with sodium salicylate and β-naphthol, with which it forms liquid pastes. In respect to sulphonal, Mr. Boa has noted that it acts more promptly when administered as a fine powder than as a coarse one. A most interesting contribution to the history of this class of compounds has been made by Messrs. Baumann and Kast, who found that the physiological activity increases in proportion to the number of ethyl groups introduced, diethylsulphone-methylethyl-methane, or trional, being more active than diethylsulphone-dimethyl-methane, or sulphonal, and diethylsulphone-diethyl-methane, or tetronal, being more active than either. "Pyrodin," in a more homogeneous condition, has been reintroduced as "hydracetin," but evidently still remains a compound requiring great caution in its administration. Of the new compounds, one of the most interesting is "exalgine," which when first introduced as an anodyne was described as "orthomethylacetanilid;" but this was an evident misnomer, and it is now understood that the compound meant is methyl-acetanilid. "Chloralamide," a compound formed by the direct combination of chloral and formamide in molecular proportions, and "somnal," which has been described as a combination of chloral, ethylic alcohol and urethan, have also been introduced as hypnotics. Methacetin, a compound differing from phenacetin in containing a methyl group in place of an ethyl group, has been reported on favourably as an antipyretic and an antineuralgic. Thymol-mercury acetate, and β-naphthol-mercury, have been introduced as convenient agents for producing the characteristic effects of mercury. Sir Joseph Lister, also, has spoken of double cyanide of mercury and zinc as an advantageous material for impregnating antiseptic dressings; but it is very doubtful whether the material he has had experience with under that name has been a definite compound, and the subject is, at his request, now being investigated in the Research Laboratory of the Pharmaceutical

Society. Among the new antiseptics that have been brought forward are myrtol, mixtures of salol and naphthol with camphor, the cresylic ethers of salicylic acid, sodium salicylsulphonate, sodium dithiosalicylate, thioresorcin, phenylhydrazin, "thiokampf," which is a product of the treatment of camphor with sulphur dioxide, and "annidalin," or diodphenoliodide ($C_6H_3I_2 \cdot OI$). Disinfection was the subject of a special discussion at the meeting of the British Medical Association, and the opening paper by Dr. Parsons has been reproduced in this journal. In the course of some investigations on this subject, conducted on behalf of the Local Government Board, Dr. Klein had occasion to test the properties of calcium iodate, which he reported to be a much less powerful disinfectant than perchloride of mercury, but quite innocuous when swallowed with food or drink, and it seems quite possible that this is the substance about which some temporary excitement has been fostered in connection with the influenza epidemic. In addition, rubidium-ammonium bromide has been recommended as advantageous in producing bromide effects, and santoninoxim, a compound produced by the action of hydroxylamine upon santonin, has been recommended as less readily absorbable, and therefore less toxic, than santonin.

Chemical and physical investigations have been pushed with unabating activity in every direction during the past year, but the limits of this review allow of reference only to researches having more or less immediate bearing on pharmacy. Among these may be mentioned the new process for manufacturing iodoform direct from kelp liquor, the observation that the apparently greater stability of certain samples of iodoform is really due to the masking influence of certain impurities present, the improvements in the manufacture of chloroform, the production of sodium carbonate and chlorine by an electrolytic process, the occasional solubility of glass vessels, the occurrence of arsenic in glycerine, the alleged presence of sulphur and of vinyl alcohol in ether, the interesting reports on the occurrence of lead in drinking water, and Mr. Proctor's experiments on the solubility of tannin. In addition, Messrs. Dunstan and Dymond have described an improved apparatus for the testing of nitrites, and Mr. Proctor has criticized the official method of testing sulphurous acid and sodium sulphite. Mr. Millard has stated that the molybdate test for hypophosphites requires, to produce the blue colour, the addition of a small quantity of sulphurous acid to the nitric acid solution of molybdate of ammonium. Mr. Dott has pointed out that the addition of tartaric acid to a solution of mercuric chloride with a view to retard its coagulating action may result in the precipitation of some of the mercuric salt as mercurous chloride. Then there is the very interesting observation by Mr. Hawkins that contact with organic acids will cause the evolution of chlorine vapour from potassium chlorate, explaining apparently the difficulty that has been met with in keeping Lamplough's saline. In a capital paper read before the Conference Mr. Siebold did his best to explode the "superstition" current among medical men as to the extraordinary solvent powers of lithia waters on uric acid. Further, there have been several cases in which chemical skill has been usefully applied to the examination of various pharmaceutical compounds. Mr. W. Allen found mercuric iodide present in samples of mercurous iodide; Mr. Miller reported on a sample of "arsenate of iron" that appeared to consist of a mixture of arsenious acid and ferric acid; Mr. Hoseason has recorded a serious deficiency of alkaloid observed in some commercial samples of tincture of opium; Mr. Ellwood has proved that solutions of hydrogen peroxide are frequently below their reputed strength; Mr. Williams has furnished some valuable information as to the strength of lemon juice in citric acid; Mr. Cripps has observed a gradual deposition of acid hydrobromate of quinine from syrup of hydrobromate of iron and quinine prepared according to the Conference formula, which deposition Mr. Green says may be avoided by using water only to dissolve the quinine salt; and Mr. Stark has confirmed the presence of oxalic acid in the residue from the distillation of spirit of nitrous ether.

Many other communications on practical pharmacy have also appeared. Goose grease, lanolin, paraffin and lard, either alone or combined, have each had their advocates as ointment bases. Lanolin has been also recommended as an excipient for permanganate pills. An addition of castor oil has been pointed out as a means of rendering vaseline miscible with water; casein has been recommended as an emulsifier, and hypophosphorous acid as a solvent of alkaloids. New formulæ have been suggested as well as modifications of old ones. Formulæ for glycerites of iodide and bromide of iron have been submitted by Mr. Arthur. Mr. Boa has suggested the substitution of soft paraffin for olive oil in the formula for chloroform liniment, and Mr. P. Wells has proposed an economy of alcohol in preparing spirit of chloroform. Concentrated infusions have been discussed and a formula for infusion of gentian suggested by Mr. Johnston. Mr. Clague has called attention to the occasional solidification of Easton's syrup when exposed to cold, and pointed out that it can be avoided by the use of less sugar. In the formula for compound liquorice powder Mr. Fisher has advocated the replacement of part of the sugar by cream of tartar. Mr. Gerrard has stated that in the preparation of extract of stramonium the preliminary treatment of the seeds with ether is unnecessary, and Mr. Wright has reported that a mixture of chloroform and alcohol is superior to alcohol alone for the exhaustion of belladonna and aconite roots. In addition to these, and many more, there have been several excellent communications upon points of manipulation, mostly read before local associations. Among these may be mentioned those on suppositories and enemata, by Mr. Bird, on filtration, by Mr. Moffatt, and on gelatine pill coating, by Dr. Symes. Lastly, and not least interesting from a practical point of view, is the fact that new pharmacopœias have been issued in Austria and the Netherlands, whilst it is understood that a new edition of the German Pharmacopœia is on the point of publication. In this country it has been decided by the Medical Council to publish an Addendum to the British Pharmacopœia, in the preparation of which the co-operation of the Pharmaceutical Society has been invited. It was also expected that before the close of the year an Addendum to the Unofficial Formulary would see the light, and it is understood that one really will be published in the course of a few days.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The usual monthly meeting of the Council was summoned for Wednesday, the 1st instant, at the Society's Rooms, No. 11, Harcourt Street, Dublin, at three o'clock, but a quorum of seven members not attending, no business was transacted. The gentlemen who attended were the President (Mr. Charles Evans), the Vice-President (Mr. Wells), Dr. Burnes and Messrs. Doran, Montgomery (Belfast) and Merrin.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

HISTORY OF BOTANY.—(HERBARIA).

BY G. C. DRUCE, M.A., F.L.S., ETC.

(*Concluded from page* 513.)

History of Herbaria.—When herbaria were first formed it is difficult to state with any degree of accuracy. Doubtless dried plants for therapeutical purposes have been preserved from time immemorial. The Egyptians, at any rate, we know placed garlands about the mummies, etc., and many species of plants have been identified that have been obtained from Egyptian tombs. The origin of the very word *herbarium*, as applied to a dried collection, is by no means certain. It is true we frequently meet with the name in the older writers, but to them it meant a book about plants, and generally an illustrated book. Tournefort alluded to the 'Herbarium' of Fuchs, when he referred to his 'Historia Stirpium,' so too the 'Herbarium' of Mattioli did not refer to his collection, but to his 'Commentary on Dioscorides.' But it is evident that dried plants were sent by one botanist to another, for Mattioli alludes in 1543 to plants that had been sent to him, but whether these were dried in bundles or fastened to paper is left uncertain. It is probable that one of the earliest herbaria formed was made by Luca Ghini, Professor of Botany at Bologna, about 1540. From a letter of Maranta to Mattioli it is evident that Ghini sent several plants that were glued on paper and labelled to Mattioli, very shortly after the publication of Mattioli's 'Commentary' in 1548. Ghini died in 1556. Two pupils of his, Cesalpini and Aldrovandi, made herbaria, and our own countryman, Falconer, who certainly had a Hortus Siccus between 1540 and 1547, was probably also taught either at Bologna or Pisa by Ghini. In Wm. Turner's 'Herbal,' when referring to Glaux he says, "he never saw it in England except in Master Falconer's book, and he brought it from Italy." Amatus Lusitanus, who was at Ferrara from 1540 to 1547, speaks of this book of Falconer's as a singular curiosity, such as he had never seen before. No traces of this book, so far as we know, exist.

Aldrovandi, the pupil of Ghini, who died in 1605, left to the University of Bologna a large quantity of curiosities, among which was an 'Index Plantarum omnium quas in sexdecim Voluminibus diversis temporibus *ex siccatus agglutinavit.*' Cesalpini distinctly alludes to two dried collections of plants which must have been formed by him before 1574. The oldest existing collection of which I am aware is that of Jean Girault, of Lyons, 1558. Rauwolf brought home from the East over 500 dried plants collected in the year 1573 to 1576. Rauwolf says of two plants found near Tripoli that he had glued them with various other foreign plants. They were preserved in the library at Leyden. Aldrovandi's collection existed in the early part of the seventeenth century. Whether it is still preserved I am at present unable to say. It was made, as was that of Cesalpini, between 1553 an 1563. Adrian Spiegel was probably the first author who described the method of drying plants, which he did in his 'Isagoges in Rem Herbarium,' 1606. He gives the name *hortos hyemales* to the volumes of dried plants.

It has recently been my good fortune to meet with, at Oxford, among some bundles of specimens, a very old collection of dried plants. They had probably been at Oxford for some years, for the bundle was labelled on the outside by the old curator, Mr. Baxter, "A collection of very old plants, chiefly British, with ms. descriptions and synonyms. Looked over and cleaned, September, 1862." Under this Professor Daubeny had written, "In the handwriting of Dillenius, with long description of each plant attached."

When the parcel was handed to me by the curator, I saw at once that it was not Dillenius's handwriting, with which I was very familiar. On taking it home I quickly saw that the plants were not British. After a little study I came upon a label which gave me a clue to their home, and subsequent research proved them to have been collected by a Capuchin, Gregory, of Reggio, in the province of Bologna (not the more celebrated Reggio in Calabria), in 1606. Many of these specimens are admirably preserved. They were fastened on the paper by means of little strips of paper, not glued, but with some resinous cement, of which olibanum was the principal ingredient. To each plant was attached a paper label, just as the majority of botanists affix them now, *i.e.*, by cutting a line through the top, and through this loop pushing the plant.

The labels in themselves are most interesting, as Gregory gives the synonyms used for the plants by the early writers, Mattioli, Lobelius, Cesalpini, Fuchs, Camerarius, Tragus, etc. Also the habitats of the plant in a few cases precisely localized, its therapeutic uses, and the date of flowering. Occasionally he gives reasons for differing from preceding authors, or again gives a name to what he considers to be a new species. Altogether, I suppose this collection to be unique. It was bound in the leaves of an Italian service book, and labelled at the back, 'Herbarum Divers[arum] Nat[uralium] Gregorii a Reggio.' This name probably has precedence over any other as the title of a collection of plants.

A writer in the *Gardeners' Chronicle* says that he knew of the existence of the Hortus Siccus of Gregory of Reggio, but he refers him to the Calabrian not the Bononian Reggio. It is to the latter he really belongs. He was noted for his botanical knowledge, "herbarum diligentissimus et indefessus investigator, qui plurimus novas reperit Plantas variisque misit doctissimis in re herbaria viris, a quibus honorificentissime memoratur." See Anton. Bumaldus in 'Bib. Bonon.,' p. 97.

In Oxford we have many old collections of plants, including those formed by Du Bois, Bobart, Morison, Dillenius and Sherard. The British Museum has the valuable Sloanean collection with the plants of Petiver, Ray, Buddle, Plot, Dale, etc. The Linnæan Society possesses the Herbarium of Linnæus.

Nomenclature.—Up to the time of Linnæus, as I have said, a nomenclature was used of extreme clumsiness. I want now to show on what our own system is based and the correct way of using it.

A well-known plant was by these pre-Linnæan writers often designated by a single word, for instance, Bauhin and Gerarde both called our box tree *Buxus*, Gerarde also used the names of *Guaiacum*, *Aquifolium*, *Sambucus* and *Viscum* for the plants now named *Guaiacum officinale*, *Ilex Aquifolium*, *Sambucus nigra*, and *Viscum album*. Parkinson called the Black Alder, *Frangula*, the Spurge Laurel, *Laureola*. Lobelius gave the name *Lentiscus* to the Mastic. Bauhin called the Privet, *Ligustrum*, and Dodoens wrote *Sabina* for the Savin.

Again, sometimes they used a purely binomial term, for instance, Caspar Bauhin named the ash *Fraxinus excelsior*, and Parkinson called it *Fraxinus vulgaris*, and Bauhin used *Rhamnus catharticus*, as we do. *Nux moschata* was used by Bauhin for our *Myristica fragrans*, and *Amygdalus sativus* for the almond. In many cases Linnæus was not as careful as he should have been in preserving these old binomial names, and we must also bear in mind that Linnæus did not invent the binomial nomenclature; he first used it consistently.

Again sometimes the name was exceedingly verbose. For instance, the name of *Erica baccifera procumbus nigra*, C.B., for *Empetrum nigrum*, *Alnus nigra baccifera* for our *Rhamnus Frangula*, or *Rhamnus salicis folio angusto fructu flavescente*, by Kaspar Bauhin, for the sea buckthorn, and *Olea sylvestris folio duro, subtus incano* for the Olive, or Ray's *Cerasus sylvestris septentrionalis anglica fructu rubro, parvo serotina* for the bird cherry, *Prunus Padus*, or *Caryophyllus aromaticus fructu rotundo caryophyllon Plinii*, by Kaspar Bauhin, for the allspice.

These examples will show that there was no fixed rule in existence before Linnæus' system of nomenclature. The plan now adopted is first that two names, the generic and specific, are alone to be used; followed by the first syllable of the author, who first used those names under the proper genus. For instance, *Mentha Pulegium*, Linnæus. We write the *Pulegium* with a capital, for this reason, that Pulegium was a name either specifically given to this species, or was used in a generic sense by pre-Linnæan writers. Formerly capital letters were used for geographical names. Now these names, such as anglicum, etc., are not so distinguished. Proper names have still their capital letter; for instance, we write *Garcinia Hanburii*, Hook. fil., with the capital H.

When the second name is an adjective it must agree with the generic name, as *Populus nigra*, *Hyoscyamus niger*, *Solanum nigrum*. Varieties must follow the same rule. You will readily understand that many alterations have been made in the various genera since Linnæus wrote (for his generic definitions were often extremely faulty) as well as many new ones created. When it has been found necessary to change the genus of a plant from the one by which Linnæus or any other author first described it, we have to place the author's name after it who first referred it to its proper genus. This is the great law of priority. In Britain we accept the magnificent work of Bentham and Hooker as our guide and authority for the natural orders of plants and their genera. Now for an illustration of the rule. Linnæus describes a genus of grasses to which he gave the name of Aira. One of these is the well known tussock grass, *Aira caespitosa*. L. But Palisot de Beauvois more correctly described the genus, and to the genus thus restricted he gave the name *Deschampsia*; so we write *Deschampsia caespitosa*, Beauvois; not Linnæus. Some continental and many American authorities, it is true, in similar instance, commonly write *Deschampsia caespitosa* (L.), Beauv., but this really introduces a trinomial nomenclature: notwithstanding the plan has something to recommend it.

The citation for the varieties of plants follow the same rules. If a plant originally described as a variety say, by Linnæus, for instance the var. *latifolia* of *Euonymus europæa* of the Species Plantarum, is found by subsequent workers to be worth specific distinction, then the species will be connected with the name of the botanist who placed it in its proper position. For instance we do not write *Euonymus latifolia*, Linn., but Scopoli, for it was the later botanist who raised the plant to a species. These remarks will, I trust, enable you to see that there are rules for the use of nomenclature which we must follow. The neglect of them causes our botanical works to groan under the long list of synonyms. Many writers thought that a name of a plant ought to be descriptive, so they altered any name they considered inappropriate or misapplied, thus, Smith altered Scopoli's name of *Galium Cruciata* to *G. cruciatum*, because of its bad Latin, forgetting that Scopoli gave the name Cruciata to it because Tournefort had long ago thus termed it in a generic sense. Linnæus had placed it in a genus Vaillantia. Scopoli first placed it in its proper genus, and his name, of course, must stand. Even our Pharmacopœia, correct as it generally is in matters of botanical nomenclature, errs occasionally. For instance, under *Mentha piperita* Smith is given as the author, whereas it was Hudson who first gave the name to the proper plant. It is true that Linnæus used the names *M. piperita*, but it was an error, as the plant so named by him was only a form of his own *aquatica*; the name thus fell to the ground and was available for use by Hudson. There is an earlier authority than Wiggers for *Taraxacum officinalis*, and again under *Mentha arvensis*, Linnæus, not De Candolle, is the authority, its variety piperascens should be quoted as of Malinvand and its variety *glabrata* as of Holmes.

Now to come to the true title of my paper, after what I suppose some clergyman would call a few prefatory remarks. A herbarium is necessary to every systematic botanist. However well a plant may be painted or drawn, we depend upon what the artist saw, or thought he saw. We can make no further inquiry or examination. When we have a dried specimen we can judge and investigate for ourselves. We can restore the dried plant by immersing in boiling water, with just a trace of potash added, to a condition which (except in the point of colour) is almost as perfect as in a living plant. Not long ago I thus examined for critical purposes a flower collected in the sixteenth century with as much facility as I could one of the nineteenth. Type plants are of the utmost value. I have said no painting or drawing can be equal to a dried plant; then how much less useful is a description, however carefully made. Possibly I shall startle you, and probably I may be called to order for making the statement, but I believe that it would be almost impossible to name with any degree of critical accuracy from description alone the majority of species which are in the Species Plantarum. That type specimens must be consulted in critical species may be laid down as an axiom.

Now how shall a collection be made?

Ordinary specimens collected in good condition with flowers expanded, and some fruit, if possible, formed, should be carefully laid out in as natural a manner as possible upon sheets of West Newman's drying paper. Then covered with another sheet, on which several thicknesses of paper are placed. Then a thin board, followed by paper specimen, and so like a series of sandwiches. The whole is then subjected to considerable pressure, either by being placed in a press, by heavy weights, or, when travelling, by leather straps. On the following day it is better to change the wet for dry paper. After three or four changes the plants will be dry.

This sounds easy enough but each species wants variation in treatment. For instance a different amount of pressure is required for a plant like the holly than is necessary for the chickweed. Some plants, like the heaths, require immersion in boiling water, which prevents the leaves falling off as they do if dried in the ordinary way. Sedums again are better for such immersion, as they go on growing in the press unless killed previously. Many of the Liliaceous and Orchidaceous plants also require killing first. In these cases if the roots or tubers are dipped it is sufficient. I remember hearing of a plant brought to Kew from the Cape which was still living on its arrival, and so was dipped in boiling water and put in the press. On examination after some time the plant was found to be still alive. So it was dipped in alcohol and again put in the press, but the thing still lived on, so in desperation it was tied up to a beam, where it went on growing, and in a more favourable situation is, I believe, still alive.

One great complaint about dry plants is that the colour has gone or has become altered, but a great deal may be effected by careful drying. My friend Dr. Schönland told me of a plan they had in the Berlin Herbarium of dipping the specimen in three parts of sulphurous acid and one of methylated spirit. The flowers are immersed until bleached, or in the case of white ones from a few seconds to seven minutes, according to the texture of the flower, they are taken out and the superfluous moisture allowed to be absorbed by a piece of bibulous paper, and then dried in the ordinary way. Gradually the colour comes back and is then permanent.

The rationale of the process appears to be this. The destruction or alteration of plant colour in drying is probably owing to a ferment. We know that hay allowed to ferment or heat becomes spoiled. So with herbarium specimens, over heating or allowing them to remain in damp papers is absolutely destructive to colour. Some colours appear to be especially fugitive or sensitive. Blues become brown, whites become brown or black, pinks change to brown and yellow sometimes changes to green. Now, I take it, the sulphurous acid not only deoxidizes the colour, but combined with methylated spirit destroys the ferment. On exposure to air, or in process of time, the plant again becomes oxidized and the colour reappears. That the spirit may be useful in hardening the cell wall is also probable. There is some difficulty with flaccid flowers, for when dipped in the solution they become so pulpy as to render it very difficult to lay them out properly. Such specimens may be first put in parchment paper, and pressed in it.

It answers admirably for our Campanulacæ, Orchidaceæ, and also for the parasitic Cuscuta or semi-parasitic Lathrea, Bartsiana and Orobanche. My experience is that pink colours are generally darkened by it. I am told it answers well for the Cow-wheats and Asperula. My experience with the former is not as yet satisfactory.

Care must be taken to use fresh sulphurous acid free from sulphuric. I have found that slight traces of the latter are sufficient to change delicate blues to pink, and thus to give false impressions.

The flowers of the Hawkweeds and other composites should be wrapped in tissue paper when properly expanded, and allowed to remain undisturbed when changing the drying paper. The colour of the styles will thus be well shown. With Willows, Violets, Pondweeds, the plants should be collected not only during the flowering season, but also afterwards, in order to represent it thoroughly.

The Characeæ must be floated out in water and removed on a sheet of white paper in as natural a position as possible.

Brambles and Roses should have the plant in flower, in fruit, and also a portion of the barren branch collected.

When properly dried they may be mounted on sheets of white cartridge paper, 15 x 11, either by gumming the plant down with gum, dextrine, or glue, or preferably by small strips of gummed paper placed over the plant and attached to the paper, as was practised by the Capuchin monk. This allows the plant to be shifted to another sheet if necessary, and renders it always available for examination.

They must be then arranged (I am alluding to a British collection) preferably by the sequence of the London Catalogue. Each plant should have a label attached to the sheet (which should only bear specimens from one locality) with its name, synonyms, habitat, county, date, and collector's name, with any interesting note on the plant itself, or its locality. Do not be satisfied with one sheet of a plant; get it from various localities and in as many different stages as possible. One of our best critical botanists tells me he has upwards of a hundred sheets of one species of pondweed, and rather grumbles that it is not sufficiently represented in his herbarium. If a plant does not tally with a description in your book, do not throw it away as untypical; it may be a novelty. For your manuals, I may point out that in your library you have for reference Dr. Boswell Syme's 'English Botany,' with coloured plates of most of the British species. For yourselves you should possess either Bentham's 'Flora,' Hooker's 'Student's Flora,' or Babington's 'Manual.' Each has some special merit. The first is the easiest, because the author has given a dichotomous arrangement of the most salient points in the species of each genus, which allows one to identify the plant more quickly than by the others. Many of the species, too, which are given in the other floras are grouped in this, so there are fewer critical plants to puzzle one.

Probably it will be found to be the most useful, but the student should in all cases where possible consult Hooker and Babington as checks upon his results; each of the two latter will be found to add something to the information already obtained.

Now for your opportunities of collecting. I am frequently told in an adjoining place that "I have not done any botany, for nothing of any consequence grows round Leicester or London or Liverpool," as the case may be, or that "I have no time for gathering specimens as our hours are so long." Yes, I grant you our hours are long, our opportunities are few. But upon you devolves to a considerable extent the study of systematic botany of the next quarter of a century. Our medical friends, who used to be good British botanists, have almost excised botany from their scientific training. And I am afraid their fierce and frantic zeal to add a new hypnotic, or some new organic compound with wonderful temperature reducing power, to our groaning shelves will prevent them giving much attention to this the more humble and less showy handmaid of therapeutics. So it is to the pharmacist we must look (for his examination, at any rate, proves that he once possessed some idea of the rudiments of botanical science) for its advancement. The subject is wide enough. I have only touched the fringe of one of its sections. Even in Britain there is enormous work yet to be done with the Algae. Your teacher of materia medica shows what a British pharmacist may do as a phycocologist and bryologist.

Mitten, our Sussex chemist, is *facile princeps* in bryology, and West of Bradford as an algologist has attained a foremost position; while Beasley of Banbury knows not only his county plants but his county fossils. These are veterans. You are wanted to continue the work. Lichens ought to prove attractive to some pharmacist, since their differentiation appears to depend almost as much on chemical as on botanical distinctions. Fungi, not only the hymenomycetes, but in the large group of myxomycetes, are open to any amount of investigation.

These I allude to in the systematic sense; of their investigation from a physiological, morphological and histological side I need only state that a field of study is presented that in its extent is almost appalling.

One of our most eminent professors, the late occupant of the Oxford chair, stated that in one morphological point, that is in the perennation of plants, scarcely anything is given in any of our systematic works, and but comparatively little was known.

Descending to lower branches of the science, take for instance the geographical distribution of plants. Does it not seem almost impossible in the nineteenth century that new county records for Scotland should have been pouring in year by year for the last few years at the rate of 500 per annum. Much yet remains to be similarly done for England.

Now to return to the opening remark upon the paucity of plants round our large towns, or upon the impossibility of doing any scientific work in our too few available hours. An extremely interesting paper once appeared in our *Journal of Botany* by a barrister, who is now Lord de Tabley, on the plants of the London parks, which was rather astonishing, not from the paucity but the number of species noted. I have elsewhere stated that in one Sunday's walk, without going out of the Oxford municipality, I counted 350 species and garden plants were not reckoned. We are, however, exceptionally rich in mural and other plants. But we may take it as a fact that as many species may be seen by any resident in our towns in his ordinary holiday walks. The opportunities for naming them are perhaps not so generally available. Still the possession of one half guinea book will do much to aid one.

The exactness of scientific training and method are the very qualities most needed for the pharmacist. In these days of severe and perhaps somewhat unfair competition you will find that a scientific education is of immense aid. You will also have a hobby—a by no means to be despised thing—and a hobby that will provide a resource for your tedious hours of duty during which the specialist may continue his study, or use for the elaboration of the results of his labours. Later on in life, when the springtide of life has gone, then an art or a science may help to make the hours shorter and the shadows brighter. My dear old friend, the late Rev. J. Miles Berkeley, who has recently passed away, named during his long life in his Horæ Subsecivæ at least 6000 species of fungi. To the last of his long life his mind revelled in recollections of his early scrambles up the St. Vincent's rocks for the Veronica or of walks through the Bedford purlieus with their acres of Blue Columbines and Lilies of the Valley. When over eighty years of age, he wrote me of the discovery of the Yellow Star of Bethlehem in his own Sibbertoft coombes. It is such an example as his that will, I trust, commend itself to some of you.

List of works consulted:—Pulteney's 'Sketches of Botany,' 1790; Meyer's 'History of Botany,' German; Bentley's 'Manual of Botany'; Pritzel's 'Thesaurus'; Rees' 'Encyclopedia'; 'Histoire des Herbier', by Le Sage; Ray's 'Historia Plantarum, etc.'; Clusius' 'Rariorum Plantarum'; Prior's 'Popular Names'; 'The Flora of Oxford'; Turner's, Gerarde's and Parkinson's 'Herbal,' etc., etc.

I owe many thanks to Professor Vines for his kindness in allowing me the use of the library and herbarium at Oxford.

The Chairman congratulated the members of the Association upon their good fortune in having the historical aspect of botany put before them in so masterly a fashion. He had been much struck by a point that the author had emphasized, the great dependence of medicine in its infancy upon the study of botany. It seemed, however, that in these later days the introduction of mineral and inorganic substances as aids in the healing art had in some measure ousted botany from its high place. It was a source of surprise and wonder to him that in the rush for novelties, greater attention was not paid to British plants; and in the case of some wild indigenous plants which had long been credited with therapeutic properties, he believed they might be made to yield valuable results if only they could be grown in greater profusion. This could best be accomplished by studying the particular soil and climatic influences under which these plants were most vigorous, investigations which could be well conducted by the country pharmacist. He endorsed Mr. Druce's statement that one of the most efficient ways to gain a knowledge of systematic botany, was to make a personal collection of plants. He thought as a general rule it was not want of opportunity that stood in the way of such a collection, it was rather the want of energy and application. He advocated that a student should study botany in company with his materia medica as faithfully and as earnestly as he studies chemistry in connection with pharmacy.

Mr. W. A. Salter referred to the pleasures a plant-hunter experienced, and advocated the pursuit of practical botany as a hobby. It was a hobby which sharpened the powers of observation and brought the collector into contact with many phases of nature. He touched upon the great differences that existed in the floras of Yorkshire and Somerset, with both of which he was familiar, and concluded by asking if Mr. Druce had tried boric acid as a preservative of plant colours. His own experience with sulphurous acid was not very satisfactory.

Mr. F. C. I. Bird had listened with much pleasure to Mr. Druce's historical survey, and was particularly struck with the manner in which the author had traced the evolution of the binomial nomenclature from the cumbrous phraseology which had previously been in use.

Mr. W. L. Williams, after indicating the numerous topics that Mr. Druce had incidentally alluded to in the course of his paper, inquired if the author could give him any information respecting the chemical constituents of the colouring principles of plants. In discussing the new nomenclature of plants he asked if the use of a capital in the specific name (when not taken from a botanist) was absolutely indicative of pre-Linnean classification. The botany of the B.P., he said, had escaped much of the drastic criticism that had been levelled against the other departments of that interesting volume, but ably as it had been done, the remark of Mr. Druce made it clear that it was not absolutely free from error.

Mr. Druce in reply said he was pleased to find that his remarks had interested them. He had had his fears on the subject, for the work had all been done in the small hours. Respecting the origin of species, upon which he had been questioned by Mr. Stark, he would not venture to express any forcible opinion. Doubtless a process of extinction was proceeding. One of the umbellifers, crambe, is not so vigorous as it was. He feared they were the pharmacists of plants. Whether other species were evolved he could not say. So far as his experience went the Italian plants of which he had spoken were precisely identical with the same species of to-day. The general rule was to use a capital for plants whose genus had been changed since the time of Linnæus, and when a small letter was used for the specific name, this being originally the generic name, it indicated that the genus was not known to or described by Linnæus. He could not give any information respecting the chemistry of the colours of plants. He did not recommend that the leaves of plants should be dipped into the sulphurous acid solution, and the flowers should be immersed for half a minute only. He had seen a very fine herbarium of dried and pressed plants in Berlin, with the natural colours magnificently preserved by this method. He believed the suggestion had first appeared in the 'Annals of Botany,' and subsequently in "The Month."

A very cordial vote of thanks, proposed by Mr. Stark and seconded by Mr. Fawsett, was accorded to Mr. Druce by the members of the Association, and after suitably acknowledging the same the proceedings terminated.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

The Association held its usual meeting on Wednesday evening, the 25th ultimo. After reading and approval of minutes of previous meeting, the President called on Mr. Alexander Boyd to read his essay on "Soap and Soap-Making."

The essayist said the subject was an interesting one on account of the great proportions of the soap interest in this country, and particularly to pharmacists, because from its use in medicine and pharmacy it was daily passing through their hands. In this, as in other industries, scientific principles have taken the place of "rule of thumb," the method by which from very ancient times soap was made. In almost all countries, and from the earliest times, soap has been in use. It is mentioned by Pliny, who gave it the names by which we still know it, "sapo mollis" and "sapo durus." Different peoples use it in different degrees, the British being the greatest soap users in the world. John Bull is as fond of his "tubs" as of his roast beef or beer.

The essayist then described soap as a salt of a fatty acid, produced by decomposing an organic compound containing such an acid by means of a metallic base, and in order to make that clear, went on to consider the composition of fat and oils. He described the researches of M. Chevreul, and said that his discoveries laid the foundation of our knowledge of the reaction which takes place when soap is formed. The chemical and physical differences between fixed and essential oils were then considered. From the former only can soap be made. By the action of the alkali on the fat at the proper temperature the latter is decomposed into its constituents of fatty acid and base. The alkali and acid combine to form soap, and the base, glycerine, is set free. The different fatty acids were noticed, and their characteristics pointed out. Sometimes soap contains a single acid only, but more frequently there are several, according to the kind of fat used in making it.

The oils and fats are roughly divided into oils, butters and tallows. At ordinary temperatures oils are liquid; butters solid, with a low melting point; tallows solid, with a higher melting point.

Oils are mostly used in making soft soaps, which if made with fresh oils have many advantages over hard soaps. Tallows are used for the hard soaps, and recently the previously prepared fatty acids have been used. Rosin was also noticed as one of the materials used in soap making on account of its cheapness, but declared to be inferior to fats.

The basic side of the soap was then considered. It was shown that a soap is formed when a metal takes the place of the basic hydrogen of a fatty acid, as in the case of lead plaster making. As, however, soap, for ordinary use, must be soluble, soda and potash are the metallic bases used in making it, the former for hard and the latter for soft soaps.

The process of soap boiling was described, as well as the subsequent processes of "salting" pressing, moulding, etc., preparatory to placing the finished article on the market. The cold process of soap making was also described and recommended as convenient for soap making on a small scale. Soft soap is made in the same way as hard soap, only run into firkins when saponification is complete, the subsequent processes being unnecessary. Glycerine as a by-product hardly pays the trouble of collecting and is thrown away.

The importance to the soap maker of being able to determine the saponification equivalent of his fats and the caustic strength of his alkalies was then noticed, and the means for such determination described.

The economic uses of soap were then dwelt on. Hard soap was recommended for toilet purposes; soft soap for scouring linen, cotton and woollen fabrics, the rank smell, which prevents its more extensive use, being declared to be absent when pure materials are employed in its manufacture. Although soap is a definite chemical compound, it sometimes contains, besides a varying percentage of water, unsaponified fat, free alkali, silicate of soda, chlorides, sulphates, sugar or starch, the two last purposely for certain scouring processes.

For medicinal uses soap must be pure. The soaps of the B.P., the preparations into which they enter, and the tests for their purity, were then considered, some amplifications of those tests being suggested.

The processes of preparing toilet soap were then fully described, particular attention being drawn to the necessity of careful melting, perfuming with natural perfumes, and colouring with harmless colours.

Medicated soaps were adversely criticized, so far as their therapeutic value is concerned, but antiseptic soaps were, in the opinion of the essayist, of great value against adherent germs.

The President thought the essay an excellent one in respect of design, material, and construction; and one that might well serve as a model for future essayists to improve upon.

Mr. Gilmour mentioned the great interest with which he had visited the scene of the many labours of M. Chevreul, remarking on the singular circumstance that a man of such attainments and fame should have spent all his long life in one district. He (Mr. Gilmour) was anxious to hear what information the meeting could give as to the source of arsenic which he had found in several samples of glycerine examined. He thought it possible that the presence of arsenic in glycerine might account for the therapeutic value of glycerine, which when pure he considered dermatologically of little value.

Mr. Watson referred to the use of artificial perfumes in soaps of German manufacture, and said that might account for the disfavour with which some of them are received. Mr. Boyd, having replied, was accorded a cordial vote of thanks. It was mentioned that about forty of the most valuable volumes were absent from the library.

We have been requested by Mr. John Stroud to publish the following additional sums promised in aid of the appeal in the case of the Pharmaceutical Society of Great Britain *versus* Wheeldon, in accordance with the resolution passed at a meeting of the Bristol Pharmaceutical Association:—

	s.	d.		s.	d.
J. Mortimer	10	6	E. Maish	10	6
J. G. Plumley	10	6	H. La Trobe	5	0
J. W. Dibble	10	6	T. Peake	5	0
J. Chandler	10	6	E. Presley	5	0
J. T. Wade	5	0	B. Allen	10	6
R. H. Freestone	5	0	H. Howell	2	6
D. Llewellin	5	0	T. D. Bramald	5	0
W. W. Jones	5	0	T. Bamfield	5	0
J. Bennett	10	6	T. Buxton	10	6
A. J. Weeks	10	6			

North Kensington Chemists' Association.—We have been requested to state that the next meeting of this Association will be held at 48, High Street, Notting Hill, on Tuesday, January 14, at 9 p.m. All chemists in the North Kensington and South Paddington divisions are invited to attend.

The next meeting of the School of Pharmacy Students' Association will take place on Thursday, January 9, when a paper will be read on "Aloes," by Messrs. J. Bainbridge and C. Morrow, and a report on "Inorganic Chemistry" will be given by Mr. L. W. Hawkins.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Gilbert, Hislop, Wrong either Way, Apprentice, Chamomile.

A CONVENIENT AND DELICATE TEST FOR NITROGEN COMPOUNDS IN SULPHURIC ACID.

BY JOHN HENRY WILSON, M.P.S.,
Pharmaceutical Chemist.

Having lately to examine samples of commercial sulphuric acid for the presence of nitrogen compounds, I used either the ferrous sulphate test, as given in the Pharmacopœia, or that recommended by Wittstein in his 'Practical Pharmaceutical Chemistry,' translated by Darby. But I found, when the quantity of nitrous compounds was small, say equal to ·0234 per cent. of nitrous acid, it requires some practice to see the colour produced, and when smaller, which is often the case, the colour is scarcely observable. In the Journal of September 28, according to Mr. Pattison, in a paper read by him at the Conference, "The presence of nitrous compounds can be easily ascertained by dropping a *drop or two** of *permanganate of potash* into 20 c.c. of sulphuric acid mixed with water; if free from nitrous compounds it would retain a pink colour, but if it contained them *that drop* and many others besides would be completely discolored." With respect to this test I have found, working on a cubic centimetre of an acid perfectly free from *nitrous* compounds, that two drops, dropped from an ordinary pipette, of a $\frac{N}{10}$ solution of permanganate, were required to produce a pink colour that would remain pink for some time; 20 c.c. of this acid would require forty such drops, so that an acid free from nitrous compounds might easily be condemned by this test.

A far better test for nitrous compounds in vitriol, and one which I venture to think worthy of bringing to the notice of readers of the Journal, I have found in resorcin (1·3 dihydroxybenzene). It is a reagent delicate and easy of application, which gives results immediately; and unlike the permanganate and the ferrous sulphate tests, the colour produced is permanent.

If a minute quantity of resorcin, taken up on the point of a penknife, be dropped into a cubic centimetre of sulphuric acid, previously diluted with 5 c.c. of water, a yellow colour is immediately produced if any nitrous compounds are present, which is more or less intense according to the quantity. In my hands this test has proved extremely delicate and convenient, far more so than either of the tests mentioned above, or of that recommended by Frankland, viz., the sulphanillic acid, phenol and ammonia test.

The resorcin test can be made *quantitative* in the following easy manner:—1 c.c. of the acid to be tested is diluted with 5 c.c. of water, allowed to cool, and a minute portion of resorcin is dropped into it and stirred with a glass rod until it is dissolved. The colour is noted. To 1 c.c. of pure acid, which has been proved not to give any colour on the addition of resorcin, diluted as above (1 to 5), a solution of potassic nitrite of known strength is added; then a minute quantity of resorcin is dropped into it, and the colour produced—after the resorcin has had time to dissolve, which only takes a few seconds—is compared with that of the sample to which the test has been added. If it be deeper it is only necessary to add to another portion of acid less of the potassic nitrite solution; if paler more of the potassic nitrite solution until the colour produced equals that of the sample of acid under examination.

To those accustomed to work with the Nessler reagent in the estimation of ammonia in water analysis by Wanklyn's method, measuring the amount of nitrous compounds in oil of vitriol by this method will be easy enough. I use small Nesslerizing glasses 10 centimetres long and 1·5 centimetres broad, the same as recommended by Wanklyn when operating on small quantities of water.

Half-a-dozen of these glasses, which can be obtained of most dealers in chemical apparatus, are sufficient to work with.

Any one using this test will find it extremely easy. Besides, it is much more convenient to work with 1 c.c. of a corrosive acid like sulphuric acid than with 20 c.c.

I have just had occasion to examine and estimate the quantity of nitrous compounds in a sample of oil of vitriol.

An example will make it plainer:—1 c.c. of the acid diluted (1-5) was treated with resorcin as above in one of the small Nesslerizing glasses placed on a white porcelain tile, and the colour produced by the reaction of the nitrous compound on the resorcin noted. Into another glass containing 1 c.c. of *pure* sulphuric acid diluted (1-5) a c.c. of a solution of potassic nitrite was run from a pipette; and a minute quantity of resorcin added, and the colour produced compared with that of the sample. In this case it was much deeper than the sample, although, like Nesslerizing, it is easy to hit the right shade by practice; to three other glasses, each containing 1 c.c. of pure acid diluted with water, smaller quantities of the potassic nitrite solution were treated in the same manner. It was found that one-fifth of a c.c. of the KNO_2 solution was sufficient to produce the same tint. One-fifth of a c.c. equals ·1 mm. of KNO_2, whence an easy calculation gives the percentage of nitrous compounds as N_2O_3 or HNO_2.

Calculated as HNO_2, 96 KNO_2 equal 47 HNO_2, ·1 mgm. KNO_2 equals (nearly) ·049 mgm. HNO_2.

The sp. gr. of the acid under examination was found to be 1·734 at 60° F. One c.c. of the acid would weigh 1734 milligrams.

Hence $\cdot049 \times 100 \div 1734 = \cdot0028$ p. c. of HNO_2.

It may be observed that there is nothing particularly new in the reaction that takes place when nitrous compounds are added to 1·3 dihydroxybenzene (resorcin). It is made use of in the synthesis of different dyes, and the reaction is familiar enough to those who have practically studied the chemistry of the benzene derivatives. Besides yielding dyes with N_2O_3, resorcin when heated with phthalic anhydride is converted into fluorescein. It is a test for *m*-dioxy-benzenes, and is prepared on a large scale, so that there is no difficulty in obtaining it. It was the above-mentioned reactions that led me to try it as a test for nitrogen compounds in oil of vitriol; and I think it will be found equally convenient for testing spirit of nitre, and for estimating the amount of nitrous ether contained in it. It will be far easier to estimate the ethyl nitrite with resorcin than by the usual method involving the use of a nitrometer, which every pharmacist does not possess.

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* The italics are mine.

I venture to think resorcin will be found a useful test to those who have occasion to examine sulphuric acid for aerated water manufacturers and others. Besides, there are many compounds in the production of which sulphuric acid is used, where the presence of nitrous compounds is objectionable, and in some cases inadmissible. In these cases the resorcin test will be found specially useful.

NOTE ON AROMATIC SULPHURIC ACID.

BY R. A. CRIPPS.

Having noticed that successive batches of aromatic sulphuric acid, although made according to the directions of the British Pharmacopœia, have not corresponded with the sp. gr. and acidity given in that volume, I thought it worth while to record this fact. The sp. gr. given in the B.P. is ·911, the acidity "about 12·5 per cent. of real sulphuric acid." I have found the sp. gr. to be about ·927 to ·928, and the acidity about 13·8 per cent. real sulphuric acid. If a public analyst can be found who is sufficiently energetic to advise a prosecution on account of deficiency of solid matter in tincture of rhubarb, it is clear that perfectly genuine aromatic sulphuric acid would be liable to condemnation as deficient in alcohol.

In order to definitely determine the sp. gr. I made a small quantity of this preparation, taking special precaution to avoid elevation of temperature during the mixing of the acid and spirit, all the ingredients being measured at 60° F., and the sp. gr. of each taken before use. The B.P. formula is as follows :—

Strong tincture of ginger .	2	fl. ozs.	(·864)
Spirit of cinnamon. . . .	2	„	(·843)
Rectified spirit	36	„	(·838)
Sulphuric acid	3	„	(1·843)

After mixing I found the whole (at 60° F.) measured 42 ozs., 2 drs., 40 m., showing a contraction of 5 drs. 20 m. in the B.P. quantity. The sp. gr. of this preparation was ·9285, or rather higher than I have usually found when working on quantities of 2 or 3 gallons. This does not quite agree with the sp. gr., as calculated from the initial sp. grs. of the various ingredients (given in brackets by the side of above formula), which is ·9234, but it must be remembered this experiment was performed with the use of ordinary measures such as would be used in pharmacy.

If the sp. gr. of the preparation be calculated from the quantities used *without allowing for contraction*, it becomes ·9096, or very nearly the B.P. requirement.

The acidity when calculated from the B.P. formula is equivalent to 13·89 per cent. of real sulphuric acid, or almost exactly the same as I have found it in practice. From these considerations I should suggest the following amendment to the B.P. tests: "Sp. gr. ·923 to ·929; 176 grains by weight require for neutralization 500 grain measures of the volumetric solution of soda, corresponding to about 13·8 per cent. of real sulphuric acid."

ANTISEPTIC DRESSING.*

BY SIR JOSEPH LISTER.

At a recent meeting of the Medical Society† I brought forward a kind of dressing which I believe will prove more satisfactory than any which has been hitherto employed. For the successful antiseptic treatment of a wound two essential points are of course necessary. In the first place, we should proceed so as to leave nothing septic in the wound before we apply the dressing, and in the second place we should put on such a dressing as we can thoroughly trust to keep out septic mischief until that dressing shall be changed. I had intended to bring before you this evening some points with regard to the former of these objects—the means by which the wound can be kept aseptic till the conclusion of the operation; but since the communication that I made to the Medical Society I have been led to make further investigation into some matters regarding the use of the materials I then described, which seem to me of sufficient importance and interest to warrant me in taking this opportunity of bringing them before you. The material, I may remind you, is a sort of double salt, an amorphous powder, insoluble in water, composed of cyanide of mercury in combination with cyanide of zinc. It does not seem to be a true double cyanide, inasmuch as the proportion of the mercurial element is considerably less than that which should be in a true double salt; nevertheless, the mercurial element, as I have found, is of essential importance to the full antiseptic efficacy of the material. It was necessary that this powder, if introduced into a gauze or other fabric, should be fixed so as to prevent it from dusting out; for it is highly irritating to the nostrils, and besides, if it dusted out, the dressing charged with it would lose more and more of its virtues. I described at the Medical Society a means by which this was prevented; how by the use of starch the powder might be fixed in any fabric which was charged with it. But I have long felt that it would be an exceedingly desirable thing if this material could in some way be coloured, because, being perfectly colourless, if a gauze is charged with it, we have to trust entirely to the manufacturer as to whether the antiseptic element is present in due proportion or is not. It would be very advantageous if it could be coloured, so that we might see by the tint where the antiseptic substance was, and whether it was uniformly distributed or otherwise. Therefore, before publishing the note which I had promised as to the preparation of the substance, I made attempts to stain this material. I tried various forms of dye, and I found that some of the aniline dyes are precipitated by this zinco-mercuric cyanide and some are not. For instance, magenta is not precipitated in the least, but methyl-aniline violet, and gentian violet, which seems to be a mere variety of the same thing,—these are precipitated, and an exceeding small amount of the dye is sufficient to give adequate colour to the double cyanide. I proceeded to charge a piece of gauze with some of this dyed cyanide, to see how it would tint it; and when it was dry I was much surprised to find that the gauze charged with the tinted cyanide did not dust in anything like the same degree as a gauze would have done which had received the untinted salt; so much so that a gauze charged with the tinted cyanide was very much on a par as to dusting with the gauze charged by means of starch.

Of course, if this were so, it would be a very satisfactory arrangement; we should dispense with the starch and also with a quantity of sulphate of potash which was used for purposes that I need not here refer to; we should greatly simplify the method of manufacture, and also, by getting rid of the starch, we should make our gauze softer and more comfortable to the patient. It seems a remarkable thing that the dye should thus be able to fix the powder. Of course, we understand how the starch does it. The starch particles, becoming attached to the particles of the cyanide, glue them, as it were, to the fibres of the fabric. But how can we explain this dye, in the minute quantity in which we use it, answering the same purpose? I have here some gentian violet dissolved in 50,000 parts of water, and you see the great colouring power that this dye possesses. If I take a piece of gauze and dip it in the solution up to a certain point you will see the gauze coloured up to that point, but the part that is moistened above by capillary attraction is colourless, showing the avidity with which the fabric seizes the dye. The dye has a remarkable fondness for the fabric; at the same time it is attached to the cyanide, for it is precipitated by it. We can thus understand that the dye may act as a go-between, attaching the cyanide to the fabric by virtue of its affinity for the fabric on the one hand and for the particles of the cyanide on the other. The mode of attachment is altogether different from that by starch, but the thing is done nevertheless. It seems to me astonishing that the dye should have this power. The quantity of gentian violet used is exceedingly small. We take, say, 20 grains of the salt, and diffuse it in 16 ounces of a liquid containing only $\frac{1}{50000}$th part of the dye, draw a piece of the fabric through it, and so charge it with the requisite amount of the cyanide. If now we consider what proportion the gentian violet bears to the cyanide which it fixes, we find that there is only about 1 grain of the dye to 140 grains of the salt. But more than that, the molecule, the atom of the dye, is an exceedingly complex and heavy one; so that if we consider how many there are in comparison with the atoms of the cyanide which it fixes, we find that there is only one molecule of the dye to nearly 600 molecules of the cyanide salt. It is simply wonderful that each molecule of the dye should have the power of fixing such a multitude of other molecules. It seems another instance of what I have ventured to call solid solution. It is not a chemical combination; it is not a combination of one atom with one atom, but it is an attachment of one molecule with a multitude of other molecules. I have often contemplated with amazement the familiar fact of the solution of a soluble salt in water. Put a bit of common salt into a tumbler of water, and, as everybody knows, it will be quite uniformly distributed in a second or two. This marvellous fact implies that every molecule of the chloride of sodium has an area of a multitude of molecules of water in relation to it. If there were not the arrangement of a definite number of molecules of water round every molecule of chloride of sodium, there would not be an equable solution. So, I conceive, on the same sort of principle, without chemical combination, this dye influences a multitude of particles of cyanide in its vicinity. Here is a piece of gauze charged in the way I have described, and you notice its delicate violet tint; and we have the satisfaction of knowing that, wherever we see the dye, there is the antiseptic salt. You also observe that, when freely handled, it does not dust materially. Thus we have the two advantages combined, one of which I had not hoped for—that while we have the material dyed so as to show its presence by its tint, it is also prevented from dusting.

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* Extract from an address delivered before the Hunterian Society, November 27, 1889. Reprinted from the *Lancet*, January.

† See the *Lancet* of November 9, 1889.

Note.—After the above paper had been read, I was mortified to find that some gauze charged by aid of gentian violet dusted to a very inconvenient degree. This appeared to be due to the influence of the bichloride of mercury, which was used in weak solution (1 part to 4000) along with the gentian violet in the water in which the cyanide salt was diffused. Bichloride of mercury interferes, to a certain extent, with the precipitation of the gentian violet, and, leaving some of the dye in solution, causes tinting of the gauze independently of the presence of the cyanide salt, and at the same time it impairs the efficacy of the dye in fixing the salt to the fabric. Yet the use of the bichloride of mercury is a matter of great importance, for reasons which I have given elsewhere,[*] and it became necessary to look for some other dye on which the bichloride might not exert this prejudicial influence. I have found that there are several colouring matters which answer the purpose fairly well. Thus both carmine and prussian blue attach the cyanide salt to a cotton fabric perfectly so long as it is moist, but when it is thoroughly dry they are not very good as regards the question of dusting. The dye which I have found to comply best with all the requisite conditions is logwood, or rather the essential ingredient of logwood—hæmatoxylin, which is a definite crystalline substance, and not unduly expensive.

The manner in which I have found it best to use this substance is the following. It is incomparably better to apply it to the freshly precipitated and wet cyanide than to mix it with the salt after its particles have been aggregated in the process of drying. It may be well to mention here the manner in which the cyanide is prepared. Cyanide of potassium, cyanide of mercury, and sulphate of zinc are mixed together in solution in quantities proportioned to the atomic weights of $2KCy$, $HgCy_2$, and $ZnSO_4+7H_2O$; the cyanide of potassium and cyanide of mercury being dissolved together in 1½ oz. of water for every 100 grs. of potassium cyanide, and added to the sulphate of zinc dissolved in three times that amount of water. The precipitate is collected on a strainer, and when well drained is washed with two successive portions of water, equal in quantity to that used for the solutions—viz., 6 oz. for every 100 grs. of potassium cyanide; at least this amount of washing being essential in order to free the precipitate sufficiently from the highly irritating soluble salts which are associated with it in its formation. The precipitate having been thus washed and drained, but not dried, it is thoroughly diffused with pestle and mortar in distilled water (6 ozs. for every 100 grs. of potassium cyanide), containing in solution 1 part of hæmatoxylin for every 100 parts of the cyanide salt, the amount of which is known from the circumstance that the dry product of cyanide salt is almost exactly equal in weight to the potassium cyanide employed. Hæmatoxylin is readily soluble in a small quantity of hot water, and remains in solution when added to a large quantity of cold water. The cyanide salt, while it precipitates the hæmatoxylin, changes its colour to a pale-bluish tint. This is advantageously enhanced by the addition of a little ammonia to the mixture, in the proportion of 1 atom of ammonia ($NH_3=17$) to each atom of hæmatoxylin ($C_{16}H_{14}O_6 3H_2O=356$). More than this proves prejudicial. The ammonia is added in a dilute form, and it is convenient to have the dilution such that 1 fluid drachm of the ammoniacal liquid shall correspond to 1 grain of hæmatoxylin. The dye is further economized by allowing the ammoniated mixture to stand for three or four hours and stirring it occasionally, so that the ingredients may react thoroughly upon each other. If the mixture is filtered immediately there is considerable loss of colouring matter. The dyed salt having been drained and dried at a moderate heat is levigated, and may then be kept for any length of time fit for use. When employed for charging a dressing, it is diffused by means of pestle and mortar in solution of bichloride of mercury (1 to 4000) in sufficient abundance to drench the fabric thoroughly, for which 4 imperial pints to 100 grs. of the salt will be found adequate. This will give a percentage of between 2 and 3 of the cyanide to the dry gauze. For reasons which I have stated elsewhere,* the gauze should always be used moist; and if it be prepared for immediate use, as by the dispenser of a hospital, the process of drying may be omitted, the gauze, after being hung up for a while to drain, being deprived further of superfluous moisture by placing it for a while in a folded sheet. It may afterwards be conveniently kept moist by wrapping it in a piece of mackintosh cloth. When obtained dry from the manufacturer, it should be moistened again with the weak corrosive sublimate solution before it is used.

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[*] *Vide the Lancet, loc. cit.*

THE SYNTHESIS OF ALKALOIDS.†

BY PROFESSOR SAMUEL P. SADTLER, PH.D.

While this introductory lecture is not designed to be one of the special chemical course, it is fitting that, as Professor of Chemistry, I should present to you some general observations taken from that branch of science.

Six years ago, in opening the course of 1883–84, I took as a subject for some remarks "Recent Studies on the Constitution of the Alkaloids." I propose to look at that subject again for a few minutes this evening, and to combine with it some mention of several classes of compounds of equal medicinal and pharmaceutical importance, viz., the hypnotics, antiseptics and antipyretics of synthetic manufacture, that have been so numerously brought forward in the last few years.

In the lecture of 1883, reference was made to the fact that recent discoveries pointed strongly to the derivation of many of the alkaloids from either pyridine C_5H_5N or quinoline C_9H_7N. Since that time this relation has been clearly established in a large number of cases, and several of the alkaloids have been made by distinct synthesis from pyridine and its derivatives. On the other hand, it has been shown that some of the organic bases found in the vegetable kingdom stand in much closer relation to the bases found in the animal organism, such as urea, than they do to the other plant bases. Thus caffeine and theobromine are undoubtedly urea derivatives, while quinine and morphine show no relation whatever to this base, but are pyridine derivatives.

Konigs, therefore, has proposed to limit the name alkaloid to the second of these two classes, and to define as alkaloids "those organic bases found in the plant kingdom, which are pyridine derivatives," and we doubt not that this will be the gradual practice as the different plant bases become more fully studied.

Quite an additional amount of literature on this subject has accumulated within the last six years, and we will therefore briefly refer to some of these newer results. First, clearer ideas of the general underlying compounds have been obtained. It has been seen that these compounds, pyridine C_5H_5N, quinoline C_9H_7N, and acridine $C_{13}H_9N$ correspond to benzene C_6H_6, naphthalene $C_{10}H_8$ and anthracene $C_{14}H_{10}$, and have analogous relations with each other; that the stability and behaviour towards reagents of analogous derivatives, for instance of benzene and pyridine, exactly correspond; that the reducibility of the molecules is perfectly analogous. As from benzene hexahydrobenzene is obtained, so from pyridine hexahydropyridine; as from naphthalene tetrahydronaphthalene is obtained, so from quinoline tetrahydroquinoline; as from anthracene dihydro-anthracene, so from acridine dihydroacridine. These are also in each case the most stable of the hydrogen addition products.

Of the derivatives of pyridine, one of the simplest and best studied is hexahydropyridine, or piperidine, as it proves it be. It can be formed from piperine, the alkaloid of pepper, direct from pyridine by the action of reducing agents, or as Ladenburg has shown, from pentamethylene diamine.

Conine, the alkaloid of hemlock, which in my previous lecture I said was probably derived from propyl-piperidine, has since been made synthetically by Ladenburg and its nature and derivation clearly shown. It is the dextro-rotatory α-normal propyl-piperidine. In obtaining it, pyridine is first converted into α-allyl-pyridine, which reduced by sodium in alcoholic solution yields an optically inactive α-normal propyl-piperidine. The tartrate of this base is made and crystallized when, following the analogy of the splitting of racemic acid into dextro-rotatory and lævo-rotatory tartaric acid, we get a dextro and a lævo conine, of which the first is the true alkaloid of the hemlock. The inactive conine can also be made synthetically from *conyrin*, or α-normal propyl-pyridine, by reduction with hydrogen iodide, or from *conydrin* (oxyconine), which occurs in hemlock along with conine. A. W. Hofmann has obtained three isomeric bases, α, β, and γ *coniceïn* of the formula $C_8H_{15}N$, and hence containing 2 hydrogen atoms less than conine. Of these bases, smelling like conine, the first and third are strong poisons.

The alkaloid *nicotine* $C_{10}H_{14}N_2$ is a derivative of dipyridyl $C_{10}H_8N_2$ and apparently hexahydrodipyridyl $C_{10}H_8(H_6)N_2$. The two dipyridyls known (the para- and the meta-compounds) yield, when reduced, hexahydrodipyridyls (isonicotine and nicotidine) isomeric, but not identical with nicotine. The *nicotinic acid*, obtained by the oxidation of nicotine with chromic or nitric acid, or with potassium permanganate, has been shown to be simply β pyridine-monocarboxylic acid $C_5H_4N \cdot COOH$.

If we turn now to the alkaloid *atropine* $C_{17}H_{23}NO_3$, which, as was known as long ago as 1863, splits up into *tropine* $C_8H_{15}NO$ and *tropic acid* $C_9H_{10}O_3$, we find some additional results. Tropine, according to Ladenburg, is a substituted tetrahydropyridine containing the methyl (CH_3) and the oxethyl (C_2H_4OH) groups in place of two H atoms. Tropic acid, it will be remembered, has been identified as a phenyloxy-propionic acid. Now, if instead of tropic acid we cause to combine with the tropine another aromatic acid we get a tropein, of which compounds a whole class have been obtained analogous in constitution to atropine. Thus benzoic acid, the ortho-, meta- and para-oxybenzoic acids, phenyl-acetic acid, the two isomeric phenyl-glycollic acids (of which one is called mandelic acid), phthalic acid, and cinnamic acid have all been combined with tropine to form tropeine. Of these, only one, that from mandelic acid, known as homatropine, has proved physiologically important. Tropine, decomposed by either hydrochloric or sulphuric acids, loses a molecule of water and yields *tropidine* $C_8H_{13}N$, which has also been shown to be a tetrahydropyridine derivative with methyl (CH_3), and ethenyl or vinyl (C_2H_3) as the replacing groups. This tropidine is a liquid base with a conine-like odour.

The acid derivatives of pyridine and its homologues in which a methyl (CH_3) group has been changed into the carboxyl group (COOH) have been much more fully investigated, and have shown in some cases unexpected relations to natural alkaloids. Thus β-pyridinemonocarboxylic acid has already been spoken of as nicotinic acid; it is also produced by the oxidation of pilocarpine. One of the pyridinedicarboxylic acids (cinchomeronic acid) is found in the oxidation of the natural alkaloids, cinchonine, cinchonidine, or quinine. This is also the case with one of the pyridine-tricarboxylic acids (carbocinchomeronic or oxcinchomeronic), which may be obtained by the oxidation of quinine, cinchonine, quinidine, cinchonidine and papaverine with potassium permanganate solution, while a second of these pyridine-tricarboxylic acids is produced by the oxidation of berberine with nitric acid.

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* *Vide* the *Lancet*, *loc. cit.*

† From an Introductory Lecture to the 69th course of the Philadelphia College of Pharmacy. From the *American Journal of Pharmacy*.

The acids of the pyridine series are capable of furnishing very interesting addition products, the constitution of which is analogous to that of the betaine of the beet juice. These betaines of the pyridine-carboxylic acids have assumed quite an importance since chemists have recognized the close relationship they bear to some of the natural alkaloids. Of the pyridine series, Hantzsch has prepared the betaines of nicotinic, picolinic and collidine-carboxylic acids, and Roser that of cinchomeronic acid. Quite recently Jahns has shown that the betaine of nicotinic acid is identical with trigonelline, the alkaloid of *Trigonella Fœnum-græcum*, and that the betaine of cinchomeronic acid, prepared synthetically by Roser, is identical with the apophyllic acid obtained by the oxidation of cotarnine, one of the decomposition products of narcotine.

Another series of these acid derivatives of pyridine have the pyridyl residues C_5H_4N, replacing an H atom in the formula of well-known acids. Thus, β-pyridine-α lactic acid results along with trimethylamine when the natural alkaloid pilocarpine is decomposed by prolonged heating with water. Pilocarpidine, which occurs along with pilocarpine in jaborandi leaves, is β-pyridine-α dimethylamidopropionic acid. Pilocarpidine has been made synthetically by Hardy and Calmels; and this by the action of methyl iodide and caustic alkali, followed by silver permanganate, has produced pilocarpine itself. The alkaloid jaborine, which accompanies pilocarpine in jaborandi leaves, can be obtained as a decomposition product from the latter.

The action of ammonia upon certain acids found in the vegetable kingdom, such as chelidonic and meconic acids, has been found to produce acids recognized as pyridine derivatives. Thus, *comanic acid* $C_6H_4O_4$, derived from meconic acid, is changed by ammonia into an oxypicolinic acid, while *comenic acid* $C_6H_4O_5$, from the same source, yields dioxypicolinic acid; and chelidonic acid $C_7H_4O_6$, which accompanies the alkaloids chelidonine and sanguinarine in *Chelidonium majus*, yields an oxypyridine-dicarboxylic acid.

To the tetrahydro derivatives of the higher homologues of pyridine belong *ecgonine* and its products, of which latter cocaine, the alkaloid of coca leaves, is the most important, from a physiological point of view.

Ecgonine, which, as is well known, results, along with benzoic acid and methyl alcohol, when cocaine is heated with hydrochloric acid, has been found to be methyltetrahydropyridyl-oxypropionic acid.

Cocaine can be made synthetically by heating this ecgonine with benzoic anhydride and methyl iodide, and a series of analogous artificial alkaloids have been made with phthalic, cinnamic, phenylacetic and isovalerianic acids, combined with the ecgonine. The production of both phenanthren and pyridine, when *morphine* is distilled over zinc dust, has been known for years, and was mentioned in my previous lecture on the subject.

Narcotine, it will be remembered, is decomposed under the influence of water into meconine $C_{10}H_{10}O_4$, and cotarnine $C_{12}H_{13}NO_3$. This latter is capable of yielding, under the influence of bromine, dibrompyridine.

Quinine is now considered to be a derivative of a partially hydrogenated diquinoline corresponding to the formula $C_9H_6(OCH_3)NC_9H_{11}(OH)N{\cdot}CH_3$.

That *cinchonine*, fused with caustic potash, yields quinoline, and that *strychnine*, under the same treatment, yields also quinoline, together with indol, while *brucine* yields homologues of pyridine, was noted in my previous lecture, in 1883.

Perhaps of greater present interest is the manufacture in the last few years of a large number of synthetic organic compounds which, while not generally basic or alkaloidal, are equally active, physiologically, in a variety of ways. We have had considerable additions made to our list of hypnotics, antiseptics, antipyretics and analgesics. In a lecture I delivered last January before the Franklin Institute of this city on the "Debt of Medical and Sanitary Science to Synthetic Chemistry," I attempted to classify the more important of these newer synthetic remedies. They were there arranged in five groups, according to their chemical relationship.

The first group was made to comprise the derivatives of methane CH_4, and was found to include almost, if not all, of the hypnotics and anæsthetics. The list as there given was as follows:—

Methylene dimethylic ether (methylal)	$CH_2(OCH_3)_2$
Ethylidene diethylic ether (acetal).	$CH_3.CH.(OC_2H_5)_2$
Tertiary amyl alcohol (amylene hydrate)	$(CH_3)_2.C.C_2H_5.OH$
Paraldehyde	$(CH_3.COH)_3$
Ethyl carbamate (urethane). .	$CO\left\{\begin{matrix}NH_2\\OC_2H_5\end{matrix}\right.$
Diethyl-sulphon-dimethyl-methane (sulphonal).	$(CH_3)_2.C.(C_2H_5SO_2)_2$
Ethylic ether	$(C_2H_5)_2O$
Methylene chloride (dichlor-methane).	CH_2Cl_2
Chloroform (trichlor methane).	$CHCl_3$
Iodoform (tri-iodo methane) .	CHI_3
Chloral hydrate	$CCl_3CHO + H_2O$
Butyl chloral hydrate (croton chloral)	$C_3H_4Cl_3,CHO + H_2O$
Ethylene chloride	$C_2H_4Cl_2$

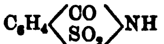
Ether, chloroform, iodoform and chloral hydrate are, of course, not new, but are added because of the analogy in both chemical and therapeutic properties. Since the publication of this lecture in March last, an additional compound has been announced under the name of "uralium," or a combination of chloral and urethane $CO\left\{\begin{matrix}NH.CHOH.CCl_3\\OC_2H_5\end{matrix}\right.$ and with therapeutic properties analogous to those of both chloral and urethane, and a compound of chloral with formamide under the name of "chloralamid." This last has the formula $CCl_3{\cdot}C\left\{\begin{matrix}OH\\NH.CHO\end{matrix}\right.$ and forms colourless crystals with a mild, slightly bitter taste. It is said to be an efficient hypnotic.

The second group comprised phenols and allied compounds, and along with a few of the older compounds, like carbolic and salicylic acids, included a number of quite recently studied substances, and was as follows:—

Phenol (carbolic acid). . . .	$C_6H_5.OH$
Cresol (cresylic acid)	$C_6H_4(CH_3).OH$
Resorcin (meta dioxy benzene). Hydroquinone (para dioxy benzene	$C_6H_4\left\{\begin{matrix}OH\\OH\end{matrix}\right.$
Thioresorcin	$C_6H_4\left\{\begin{matrix}SH\\SH\end{matrix}\right.$
α-Naphthol. . . . . β-Naphthol.	$C_{10}H_7.OH$
Tri-brom phenol	$C_6H_2Br_3.OH$
Tri-chlor phenol	$C_6H_2Cl_3.OH$
Salicylic acid	$C_6H_4(OH).COOH$
Phenyl salicylate (salol) . . .	$C_6H_4(OH).COOC_6H_5$
β-Naphthyl salicylate (betol) .	$C_6H_4(OH){\cdot}COOC_{10}H_7$
α-Oxy-naphthoic acid	$C_{10}H_6(OH)COOH$
Orthophenol-sulphonic acid (aseptol).	$C_6H_4(HSO_3).OH$
Di-iodo phenol-sulphonate (sozoiodol)	$C_6H_2(HSO_3)I_2.O$

Their general therapeutic character is that of antiseptics and anti-fermentatives. Since that publication there have been several additions to the list; the three compounds, ortho, meta and para cresyl salicylate, prepared by Nencki, the discoverer of salol and betol, to which they are analogous; anisic acid (methylated salicylic acid) and guiaicol, the monomethyl ether of pyrocatechin. This last is now advertised as "the sovereign remedy in pulmonary tuberculosis."

The third group comprised other phenyl derivatives and included:

Acetophenone (hypnone)	$C_6H_5.CO.CH_3$
Acetanilide or phenyl-acetamide (antifebrine)	$C_6H_5NH.C_2H_3O$
Brom-acetanilide . .	$C_6H_4Br.NH.C_2H_3O$
Benzanilide	$C_6H_5NH.C_7H_5O.$
Acetyl-amidophenol .	$C_6H_4(OH).NH.C_2H_3O$
Para-acetphenetidine (phenacetine). . .	$C_6H_4(OC_2H_5).NH.C_2H_3O$
Acetyl phenyl-hydrazine (pyrodine) . .	$C_6H_5.N_2H_2(C_2H_3O)$
Phenyl hydrazine-levulinic acid (antithermine)	$C_6H_5N_2H(CH_3)C(CH_2)_2COCH$
Benzoyl sulphinide (saccharin) . . .	 $C_6H_4\left\langle\begin{matrix}CO\\SO_2\end{matrix}\right\rangle NH$

Their therapeutic character is somewhat mixed, but in general they seem to be antipyretics and sedatives. To this list has since been added: methyl phenyl-acetamide, or methylated antifebrin, under the trade name of "exalgin," and para acetanisidin, or oxy-methylated antifebrin, known commercially as "methacetin," while what appeared in my list as bromacetanilide is now introduced as bromated antifebrin, or commercially as "antisepsin;" and the acetylphenylhydrazine, known at first under the trade name of "pyrodine," is now "hydracetin."

If we make this list to include both phenyl and naphthyl derivatives outside of the phenol and naphthol class, we may also put here tetrahydronaphthylamine, which has recently been introduced and claimed to have value as a mydriatic.

The fourth group comprised pyrrol and pyrazol derivatives, and included:

Tetraiodo pyrrol (iodol) . .	$C_4HI_4N.$
Diaphenyl-methyl pyrazol . .	$C_3(C_6H_5)_2(CH_3)NH_2.$
Phenyl-dimethyl-pyrazolon (antipyrine)	$(C_6H_5)(CH_3)_2C_3HN_2O.$

No recent additions have been made to this list.

The fifth and last group comprised quinoline derivatives, and included:

Quinoline	C_9H_7N
Methyl-tetrahydro-quinoline sulphate (M Kairoline)	$C_9H_{10}N(CH_3)H_2SO_4$
Ethyl-tetrahydroquinoline sulphate (A Kairoline) . .	$C_9H_{10}N(C_2H_5)H_2SO_4$
Methyl-tetrahydro-oxyquinoline hydrochlorate (M Kairine)	$C_9H_{10}NO(CH_3)HCl+H_2O$
Ethyl-tetrahydro-oxyquinoline hydrochlorate (A Kairine)	$C_9H_{10}NO(C_2H_5)HCl$
Tetrahydroparaquinanisol (thalline)	$C_9H_{10}N(OCH_3)$
Ethyl-tetrahydro-paraquinanisol (ethyl-thalline). .	$C_9H_9(C_2H_5)N(OCH_3)$
Methyl-trihydro-oxyquinoline carbonate of sodium (thermifugin)	$C_9H_8(CH_3)NCOONa$

Nor has this list been recently increased.

It will thus be seen that modern organic chemistry has entered upon a very fruitful field in taking up this synthetic work, and that the problem of the constitution of the alkaloids, so long apparently incapable of solution by any methods of analysis, may yet be solved by the combination of synthetical and analytical study now entered upon. It is eminently proper, however, to remind you that, as pharmacists first isolated the alkaloids morphine and quinine, they should be preparing actively to share the glory and profit of their artificial manufacture, which is certain to come in the near future.

JALAP AND JALAP RESIN.[*]

BY F. A. FLÜCKIGER.

The resin of jalap is a much used remedy, not yet supplanted by synthesis, which medicine, apparently, would not willingly be deprived of. But for nearly twenty years the fact has been becoming more and more evident that the tubers of *Ipomœa purga*, the only material used in Europe and America in the preparation of resina jalapæ, yield less of that substance than in former times. In 1842 Guibourt, experienced and careful in such matters, found no less than 17·65 per cent. of the resin, and statements varying between this amount and 10 per cent. were about that time not infrequent, if I read correctly. The authors of 'Pharmacographia' have brought together (p. 445) a few statements on the subject from the circle of their friends and acquaintances; the older drug-houses would probably be in a position to contribute towards making them more complete. But probably, for the last twenty years, as it appears to me, the statements of 10 per cent. yields, or upwards, have been fewer, and the larger proportion of the jalap has yielded less, frequently only a small percentage of resin.

Whence this phenomenon? The complaint that the drug appeared inferior or consisted of smaller tubers, has by no means been heard during the same time; indeed to my knowledge it has not been proved that the larger and older pieces are richer in resin. Reasons for an actual retrogression in the resin formation in the root organism of the jalap plant are not conceivable, so that one is brought to the presumption that a fraudulent abstraction from the jalap takes place. Of this Dr. Squibb in the latest number of the *Ephemeris* (July, 1889) presents an indication the importance of which should not be underestimated. He made applications in Hamburg, London and New York to be supplied with the finest jalap in considerable parcels, but obtained only one consignment that yielded more than 7½ per cent. of resin. One house in New York, not more exactly specified by him, sent a representative to the district in Mexico that formerly yielded jalap and authorized him to purchase the root at any price on the spot. Two hundred pounds obtained in this way yielded 16·9 per cent. of resin. A further quantity of some hundreds of pounds, from the neighbourhood of Xalapa and Perote, was on its way.

It may therefore be probably assumed that the dealer in Mexico has acquired sufficient chemical knowledge to wash the jalap with alcohol. If it were previously charred by suitable drying at a fire it would not undergo any remarkable change through a short immersion in alcohol; and it may easily be demonstrated that if the root is previously bruised this is never the case.

The jalap plant first reached Europe in 1830 through Schiede and was successfully cultivated in Cassel, Munich and other places; since that time many botanical gardens have possessed the plant. In July, 1834, Apotheker Widnmann, of Munich, examined a jalap tuber grown in that city, which was so juicy that there remained after drying only 10·9 per cent. This dried substance gave up to absolute alcohol a quantity of resin equal to 2·479 per cent., calculated on the fresh root, or 22·74 per cent. of the dried material. So far as I know a jalap richer in resin was never met with.

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[*] From the *Journal der Pharmacie* von Elsass-Lothringen, for November.

It is probable that the observer may be credited that he actually had to do with jalap resin (convolvulin), the more so as he adds that it was pale yellow, easily friable and insoluble in ether.* The dried root is described by Widnmann as being remarkably pale; no wonder therefore that the resin should be only yellowish and not brown.

The work of the Munich pharmacist moreover finds confirmation in an investigation carried out at Bonn by Clamor Marquart, of a jalap root, originating from the same consignment, by Schiede, as Widnmann's, and which was grown at Cassel by Wild. The root, when dried, yielded 12 per cent. of a yellow resin, soluble in caustic potash solution and fuming nitric acid, but not in ether, which only took up a minute quantity.

There is no doubt, therefore, that roots from jalap plants grown in Germany in the open air may be remarkably rich in resin; that in Munich over 20 per cent. of resin was produced and in Cassel only half as much does not affect the matter. It is only now necessary to bring these experiments again prominently into the light in order that agriculturists may be provoked to the cultivation of the jalap plant, which probably would bring greater profit than many more difficult crops. That any specially great difficulties would have to be overcome in the cultivation of the jalap plant is probably scarcely to be feared, since it is stated in the paper already quoted (p. 232), that Schiede's consignment of jalap tubers supported in the winter of 1829-30, on board ship in the Elbe, a temperature of − 20° R., and at Munich the plants did better in the cold house, and afterwards in the open, than in the hot house. Even at that time the gardener who had the matter in hand at Cassel recommended the cultivation of jalap in Germany.

Although however this may not turn out so simple as might be wished, it may be inferred from the few experiments recalled, that it must be practicable somewhere in Europe, by the cultivation of the jalap plant, to render a service to medicine and to make a good business.

The genera *Convolvulus* and *Ipomœa* are distributed in warm and hot countries especially, to the extent of some five hundred species. Probably all this enormous number of plants contain one or other of the resins jalapin (jalapurgin, convolvulin) or orizabin; possibly also other members of the same homologous series in which these two resins have up to the present stood alone. Accident has determined that medicine-requiring humanity in Mexico has lighted upon these two species of *Ipomœa*, *I. purga* and *I. orizabensis*, rather than upon some other American species.

Neither in Asia are there wanting powerfully drastic species of *Ipomœa*. Possibly the presumed fraudulent deprivation of the Mexican jalap may be successfully combated by means of the still longer used *Ipomœa Turpethum*, but this root appears to me to be less productive. On the other hand I have long since shown ('Pharmacographia,' 1st edit., p. 403) that from the seeds of *Ipomœa hederacea*, Jacquin (*I. Nil*, Roth.; *Pharbitis Nil*, Choisy) over 8 per cent. of resin can be obtained, which is identical with that from *Ipomœa purga*. This resin (jalapurgin or convolvulin) can be removed with the greatest ease by means of alcohol from the seeds, after they have been freed from fat and powdered, and is obtained nearly pure at the first attempt. Instead of the unsightly preparation to which European pharmacopœias give prominence under the name resina jalapæ, the kaladana seeds yield the same substance only slightly coloured. This far better looking resin obtained a place in the Pharmacopœia of India as far back as 1868, and probably it is only the power of habit that stands in the way of its general introduction. Even in England kaladana resin has met with no acceptance in comparison with less easily obtained scammonium, which is there so remarkably favoured. Further the kaladana plant (figured in the *Bot. Mag.*, t. 5720; not so well in Bentley and Trimen, 'Med. Pl.,' 185) has the great advantage over *Ipomœa purga* that it is an annual and extraordinarily widely distributed. Not only is it quite common in India (Dymock, 'Mat. Med. W. I.,' 1885, 561), but it flourishes everywhere in warm and hot countries. If, therefore, there were any demand established, presumably there would not be the slightest difficulty in harvesting suitable quantities of the seed. The 14 per cent. of fat that would have first to be separated would remunerate for a portion of the work.

It remains a question whether the presumption of an abundant yield of seed would be realized in an agricultural experiment with this *Ipomœa*. If this were actually the case it would seem to be folly that the English Government should take so much trouble to acclimatize the Mexican jalap plant in Jamaica and India. From the standpoint of the resin it would be much better to apply this care to the kaladana plant. Japan also possesses in *Ipomœa triloba*, or *Pharbitis triloba*, a species from the seed of which the same resin as from jalap was obtained last year in the laboratory of my colleague and friend Shimoyama, Director of the Pharmacological Institute of the University of Tokio.

THE ORIGIN OF FALSE SENEGA ROOT.*

BY JOHN M. MAISCH.

When in 1876 Mr. Wm. Saunders called attention to a suspicious senega root (*Proc. Amer. Pharm. Assoc.*, 1876, p. 661), which afterwards became known as *white* and *false* senega, I stated my belief that it came from a species of Polygala, though not from *Pol. Senega*. It disappeared from our market shortly afterwards (*Proc.*, 1877, p. 525); but through the aid of the late W. H. Crawford (*Ibid.*, 1881, p. 522), I had been enabled to trace it to the neighbourhood of Springfield, Mo., where it was said to have been collected. All subsequent efforts to ascertain the locality of collection, or to procure a living plant with root attached proved of no avail, though from time to time the same root was met with in commerce. In 1881 (*Amer. Journ. Pharm.*, 1881, p. 388), on receiving from Dr. J. H. Gunn, of Alabama, a specimen of *Polygala Boykinii*, Nuttall, I regarded it as the parent plant of the false senega, notwithstanding most of the latter roots were larger in dimensions than the root of the plant received.

The white senega, examined microscopically by Thos. Greenish (*Pharm. Journ. and Trans.*, Sept. 7, 1873; *Amer. Journ. Pharm.*, 1873, p. 523), was believed by him to be a true senega; but Geo. Goebel (*Amer. Journ. Pharm.*, 1881, p. 322) pointed out some striking structural and chemical differences.

That this white keelless root is derived from *Polygala Senega* has been maintained by many dealers; and this belief has doubtless been strengthened by papers on commercial senega by J. U. and C. G. Lloyd, who have made a special study of the indigenous medicinal plants. In *Proc. Amer. Pharm. Assoc.*, 1881, p. 453, and *Pharm. Rundschau*, New York, 1889, p. 86, they describe the different commercial varieties of (southern or western, or northern) senega, all of which are stated to come from the typical form and several varieties of *Pol. Senega*. In one of these papers (1881) it is stated that "*Polygala Boykinii* is the only native species that, to our knowledge, approaches in size the *Pol. Senega*;" and in the other (1889) that "continued inquiries regarding the root of *Pol. Boykinii* have lead to completely negative results; not a single commercial lot of senega from the southern states contained that root." Professor Chas. Mohr, of Mobile, who is well acquainted with the flora of the southern states, has shown (*Pharm. Rundschau*, 1889, p. 191) that the distribution of the two species is such, that an accidental intermixture of the two roots is impossible, and that the root of *P. Boykinii* cannot be collected in such a quantity and at a price as to become an article of commerce. (*Ibid.*, p. 89.)

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* Buchner's *Repertorium für Pharmacie*, vol. liv. (1835), p. 222.

* From the *American Journal of Pharmacy*.

While it is possible that white or false senega may occasionally be found as an admixture of officinal senega, I cannot make such a statement from personal observation; but have not doubted the difference in the botanical origin of the two roots, as I had occasion to state quite recently (*Amer. Journ. Pharm.*, 1889, p. 381). The papers just quoted seem to render untenable my belief in the origin of the false root from *P. Boykinii*; but I am pleased to be able now to definitely identify the species yielding it.

Quite recently Messrs. Peck and Velsor, of New York City, sent me a plant, which on examination seemed to be *Polygala alba*, Nuttall; the root to which the numerous stems are attached is fully four inches in length, and beneath the crown, one-fourth inch in diameter. On comparing it with a number of specimens in several herbaria, the roots of the latter, when present, were found to be considerably smaller, more slender and less branched. The resemblance of the specimen with senega root, notwithstanding the absence of the keel, suggested the plant possibly to be a variety of the latter species with linear leaves; but the narrow-leaved specimens of true senega were observed to differ essentially in the root, leaves and flowers. Not having the means to remove every doubt, it was deemed advisable to consult some of the best judges of the flora of the western states.

In one of the letters Messrs. Peck and Velsor wrote as follows: "The shipper informs us that it is gathered in Kansas, and that a few bales every year have passed through his hands to dealers and manufacturers, and that there had never before been any question as to its being *Polygala Senega* until we refused it."

In regard to the specimen plant, Professor Sereno Watson writes: "The Polygala sent must be *P. alba*, the root of which varies considerably in its character." Professor Thos. C. Porter writes: "The Kansas Polygala has all the characters of *P. alba*, Nuttall. In the specimens of our herbarium, from a number of widely different stations, some have roots fully as large as that of yours. The species is somewhat variable and includes *P. Beyrichii*, T. and G."

The original description of the plant as given by Nuttall in 1818 (*Genera of the North American Plants*, *II.*, p. 87), is as follows: *P. alba.* Perennial; flowers cristate; stem simple; leaves alternate, linear, revolute on the margin; flowers racemosely spiked; spike long pedunculate, bracts deciduous; wings of the calyx rounded, about the length of the corolla. Hab.: On the plains of the Missouri, common, and the only species of the genus in the upper part of Louisiana. Obs.: A small plant scarcely more than 6 inches high, considerably allied to *P. senega*, but more than a variety, as it has been considered by Mr. Pursh; leaves smooth and narrow; flowers and calyx white, nearly sessile; bracts lanceolate.

Some additional characters, giving also some of the variations of the plant, are copied from other works, namely:

Stems several from a somewhat woody root, erect or ascending, angular, at length branched above; leaves linear, narrowed towards the base, acute, or the lower ones obtuse. Stems ½ to 1 foot high. Spikes 1 to 3 inches long.—Chapman, *Flora of the Southern United States.*

Leaves linear to oblanceolate, sessile or barely petioled, margins slightly revolute; stem leafy half way to the summit; flowers deciduous, leaving the rachis roughened after their fall.—Rothrock, *Geographical survey west of the* 100*th meridian; VI., Botany.*

The lower leaves are often distinctly verticillate.—Sereno Watson, *Proc. Amer. Acad. of Arts and Sciences*, XVII. (1882), p. 325.

It will be observed that Pursh regarded the plant merely as a variety of *P. Senega*, and that Nuttall, in 1818, pointed out its near relation to the latter species. Twenty years later, Torrey and Gray stated (*Flora of North America*, I., 131): "We have not seen this plant, but we suspect that it is a variety of *P. Senega.*" Since the resemblance extends also to the root, the latter was most likely originally collected in good faith and sold as senega; and after the difference between the two roots had been pointed out, the opinion as to identity was probably adhered to without showing the plant to a botanist.

I append here the diagnostical characters of *P. Beyrichii* as given by Torrey and Grey (*loc. cit.*), and which are in part included in some of the quotations above: spike, dense, acute, flowers on a very short pedicels; wings orbicular-obovate, concave, rather longer than the broadly obovate lateral petals; capsule oblong: seed very villous with appressed hairs; lobes of the caruncle distant, about half as long as the seed; stems numerous, somewhat branched; leaves linear or linear-spatulate, somewhat glandular.

Regarding the distribution of this species, Nuttall states that it is common "on the plains of the Missouri" and "in the upper part of Louisiana." Nuttall had explored the country along the Missouri river in 1810, when the territory of Louisiana extended northward to the British possessions. From these northern plains the species extend southward to Texas and into Mexico. Rothrock's specimens were collected in Arizona at an altitude of over 7000 feet; and Watson's remarks quoted above refer to plants coming from several Mexican states.

It is but natural to expect considerable variation in a plant indigenous to such a large portion of the North American continent, and that these variations should apply not only to the size and shape of the stem and leaves, but likewise to the underground portion. Many of the Mexican plants in herbaria agree very well (root excepted) with the Kansas plant in my possession which has occasioned the present investigation; still other Mexican plants have been observed as *Pol. alba*, in which the inflorescence was decidedly thicker, more conical and less acute than in the other forms from Texas and farther north.

For a sample of this false senega root from Kansas I am indebted to Messrs. Peck and Velsor; it is of the same handsome light colour as the false senega of 1876, and agrees in all essential characters with the false senega root seen since then, except that some of these samples are somewhat darker in colour; but I have never seen it as deep brown in shade as the much larger northern senega, which has been in commerce for about ten years or more. The following description of the sample before me applies, therefore, with the variation mentioned, to all the samples seen during the past thirteen years.

Commercial false senega consists of but little broken roots, the total length of which varies between 4 and 6 inches. The head has a close resemblance to that found in senega root, is about ⅝ inch, sometimes an inch, in thickness, and bears above a large number of stem remnants. Beneath the head the root is suddenly contracted to the thickness of about ¼ inch; a few small roots may usually be picked out, scarcely ⅛ inch in thickness, while some larger roots are ⅜, or rarely ½ inch thick. The colour is pale brownish-yellow, much lighter than commercial senega is usually seen, and lighter than all other officinal roots, the white ones excepted; since the interior of the root, both bark and meditullium, is of a nearly white colour, it is obvious that in bulk the colour of false senega root must have a still lighter tint, approaching to white, in proportion to the abrasion of the outer layer. Older roots, particularly near the head, have a thin layer of cork of about the same shade of brown as gentian. The main root is nearly straight, and the six or eight thinner branches are descending or curved downwards, while true senega very frequently divides into almost horizontally spreading branches. The keel is absent; slight indications of it are very rarely observed, and only in the thickest roots, near the head; but even here the transverse section of the wood has a circular outline, the same as in every other part of the root and its branches. A similar regularity, regarding the cylindrical shape of the meditullium, has not been observed by me in the much thicker roots of northern senega; and that the typical form of senega has a cylindrical wood *only* in the part immediately below the head is well known. I may also mention that I have found the meditullium of the false senega, after freeing it completely from the bark, to be entirely tasteless, while the same portion of the northern senega has a gradually developed decidedly acrid taste.

The small roots in the sample agree well with *P. Boykinii*, but this species not growing in Kansas cannot be present in the sample under consideration. A histological investigation of the material on hand is contemplated, and it is hoped may reveal differences in addition to the macroscopical characters pointed out. Not having seen the southern senega, of which Professor Lloyd has handled some bales, and which was of excellent quality, but without any observable keel (*loc. cit.*, p. 88), I cannot say whether or not it was identical with false senega; but it should be noted that thus far the latter is not known to come from a southern state; the only two localities, as yet ascertained, have been pointed out by me, viz., southwestern Missouri and Kansas.

THE EFFECT OF LIGHT UPON MATTER.*

BY CAPTAIN W. DE W. ABNEY, C.B., R.E., F.R.S., F.R.A.S.

This year is the jubilee of the practical introduction of photography by Daguerre and Fox Talbot, and I have thought I might venture to take up your time with a few remarks on the effect of light on matter. I am not going into the history of photography, nor to record the rivalries that have existed in regard to the various discoveries that have been made in it. A brand-new history of photography, I dare say, would be interesting, but I am not the person to write one; and I would refer those who desire information as to facts and dates to histories which already exist. In foreign histories perhaps we English suffer from speaking and writing in a language which is not understanded of the foreign people; and the credit of several discoveries is sometimes allotted to nationalities who have no claim to them. Be that as it may, I do not propose to correct these errors or to make any reclamations. I leave that to those whose leisure is greater than mine.

I have often asserted, and I again assert, that there should be no stimulus for the study of science to be compared to photography. Step by step, as it is pursued, there should be formed a desire for a knowledge of all physical science. Physics, chemistry, optics and mathematics are all required to enable it to be studied as it should be studied; and it has the great advantage that experimental work is the very foundation of it, and results of some kind are always visible. I perhaps am taking an optimist view of the matter, seeing there are at least 25,000 living facts against my theory, and perhaps not 1 per cent. of them in its favour. I mean that there are at least 25,000 persons who take photographs, and scarcely 1 per cent. who know or care anything of the "why or wherefore" of the processes, so far as theory is concerned. If we call photography an applied science, it certainly has a larger number who practice it, and probably fewer theorists, than any other.

He would be a very hardy man who would claim for Nièpce, Daguerre, or Fox Talbot the discovery of photographic action on matter. The knowledge that such an action existed is probably as old as the fair-skinned races of mankind, who must have recognized the fact that light, and particularly sunlight, had a tanning action on the epidermis, and the women then, as now, no doubt took their precautions against it. As to what change the body acted upon by light underwent, it need scarcely be said that nothing was known, and perhaps the first scientific experiment in this direction was made rather more than a hundred years ago by Scheele, the Swedish chemist, who found that when chloride of silver was exposed to light chlorine was given off. It was not till well in the forties that any special attention was given to the action that light had on a variety of different bodies; and then Sir John Herschel, Robert Hunt, Becquerel, Draper, and some few others carried out experiments which may be termed classical. Looking at the papers which Herschel published in the 'Philosophical Transactions' and elsewhere, it is not too much to say that they teem with facts which support the grand principle that without the absorption of radiation no chemical action can take place on a body; in other words, we have in them experimental proofs of the law of the conservation of energy. Hunt's work, 'Researches on Light,' is still a textbook to which scientific photographers refer, and one is sometimes amazed at the amount of experimental data which is placed at our disposal. The conclusions that Hunt drew from his experiments, however, must be taken with caution in the light of our present knowledge, for they are often vitiated by the idea which he firmly held, that radiant heat, light, and chemical action, or actinism, were each of them properties, instead of the effects, of radiation. Again, we have to be careful in taking seriously the experiments carried out with light of various colours when such colours were produced by absorbing media. It must be remembered that an appeal to a moderately pure spectrum is the only appeal which can be legitimately made as to the action of the various components of radiation, and even then the results must be carefully weighed before any definite conclusion can be drawn. No photographic result can be considered as final unless the experiments be varied under all the conditions which may possibly arise. Coloured media are dangerous for enabling trustworthy conclusions to be drawn, unless the character of such media have been thoroughly well tested and the light they transmit has been measured. An impure spectrum is even more dangerous to rely upon, since the access of white light would be sure to vitiate the results.

Perhaps one of the most puzzling phenomena to be met with in photography is the fact that the range of photographic action is spread over so large a portion of the spectrum. The same difficulty of course is felt in the matter of absorption, since the one is dependent on the other. Absorption by a body we are accustomed, and indeed obliged by the law of the conservation of energy, to consider as due to the transference of the energy of the ether wave-motion to the molecules and atoms comprising the body by increasing the vibrations of one or both.

In the case where chemical action takes place we can scarcely doubt that it is the atoms which in a great measure take up the energy of the radiation falling on them, as chemical action is dependent on the liberation of one or more atoms from the molecule, whilst, when the swings of the molecules are increased in amplitude we have a rise in temperature of the body. I shall confine the few remarks I shall make on this subject to the case of chemical action. The molecule of a silver salt, such as bromide of silver, chemists are wont to look upon as composed of a limited and equal number of atoms to form the molecule. When we place a thin slab of this material before the slit of the spectroscope we find a total absorption in the violet and ultra-violet of the spectrum, and a partial absorption in the blue and green, and a diminishing absorption in the yellow and red. A photographic plate containing this same salt is acted upon in exactly the same localities and in the same relative degree as where the absorption takes place. Here, then, we have an example of, it may be, the vibration of four atoms, one of which at least is spectrum. The explanation of this is somewhat obscure. A mental picture, however, may help us. If we consider that, owing to the body acted upon being a solid, isochronous, or partially so, with the waves composing a large part of the visible spectrum, the oscillations of the molecules and atoms are confined to a limited space, it probably happens that between the times in which the atoms occupy, in regard to one another, the same relative positions, the component vibrations of, say, two of the atoms vary considerably in period. An example of what I mean is found in a pendulum formed of a bob and an elastic rod. If the bob be made to vibrate in the usual manner, and at the same time the elastic rod be elongated, it is manifest that we have a pendulum of ever-varying length. At each instant of time the period of vibration would differ from that at the next instant, if the oscillations were completed. It is manifest that increased amplitude would be given to the pendulum swings by a series of well-timed blows differing very largely in period; at the same time there would be positions of the pendulum in which some one series of well-timed blows would produce the greatest effect. In a somewhat similar manner we should imagine that the ethereal waves should produce increased amplitude in the swing of the atoms between very wide limits of period, and, further, that there should be one or more positions in the spectrum when a maximum effect is produced.* I would here remark that the shape of the curves of sensitiveness, when plotted graphically, of the different salts of silver to the spectrum have a marked resemblance to the graphically-drawn curves of the three colour sensations of the normal eye, as determined by Clerk Maxwell. May not the reason for the form of the one be equally applicable for the other? I only throw this out as evidence, not conclusive, indeed, that the colour-sensitiveness of the eye is more probably due to a photographic action on the sensitive retina than to a merely mechanical action. That this is the case I need scarcely say has several times been propounded before.

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* Extract from the Presidential Address to the Mathematical and Physical Section of the British Association.

The ease with which a silver salt is decomposed is largely, if not quite, dependent on the presence of some body which will take up some of the atoms which are thrown off from it. For instance, in chloride of silver we have a beautiful example of the necessity of such a body. In the ordinary atmosphere the chloride is of course coloured by the action of light; but if it be carefully dried and purified, and placed in a good vacuum, it will remain uncoloured for years in the strongest sunlight. In this case the absence of air and moisture is sufficient to prevent it discolouring.

If in the vacuum, however, a drop of mercury be introduced the coloration by light is set up. We have the chlorine liberated from the silver and combining with the mercury vapour, and a minute film of calomel formed on the sides of the vessel.

Delicate experiments show that not only is this absorbent almost necessary when the action of light is so strong or so prolonged that its effect is visible, but also when the exposure or intensity is so small that the effect is invisible, and only to be found by development. The necessity for this absorbent is not far to seek. If, for instance, silver chloride be exposed to light *in vacuo*, although the chlorine atoms may be swung off from the original molecule, yet they may only be swung off to a neighbouring molecule which has lost one of its chlorine atoms, and an interchange of atoms merely takes place. If, however, a chlorine absorbent be present which has a greater affinity for chlorine than has the silver chloride which has lost one of its atoms, then we may consider that the chlorine atoms will be on the average more absorbed by the absorbent than by the sub-chloride molecules. The distribution of the swung-off atoms between the absorbent and the sub-chloride will doubtless be directly proportional to their respective affinities for chlorine, and so for the other salts of silver. If this be so, then it will be seen that the greater the affinity of the absorbent for the halogen the more rapid will be the decomposition of the silver salt. This, then, points to the fact that if any increase in the sensitiveness of a silver salt is desired it will probably be brought about by mixing with it some stronger halogen absorbent than has yet been done.

The question as to what is the exact product of the decomposition of a silver salt by the action of light is one which has not as yet been fully answered. For my own part, I have my strong beliefs and my disbeliefs. I fully believe the first action of light to be a very simple one, though this simple action is masked by other actions taking place, due to the surroundings in which it takes place. The elimination of one atom from a molecule of a silver salt leaves the molecule in an unsatisfied condition, and capable of taking up some fresh atom. It is this capacity which seemingly shrouds the first action of light, since when exposure is prolonged the molecules take up atoms of oxygen from the air or from the moisture in it. Carey Lea, of Philadelphia, has within the last three years given some interesting experiments on the composition of what he calls the photochloride of silver, which is the chloride coloured by light, and Professor Hodgkinson has also taken up the matter. The conclusions the former has drawn are, to my mind, scarcely yet to be accepted. According to the latter experimentalist the action of light on silver chloride is to form an oxidized sub-salt. This can hardly be the case, except under certain conditions, since a coloured compound is obtained when the silver chloride is exposed in a liquid in which there is no oxygen present.

ESERIDINE.*

It has been stated of this new substance, prepared by Boehringer in a crystalline form, that it partakes only of the therapeutically useful but not of the obnoxious and dangerous properties of eserine. Particular stress has been laid on its possessing only one-sixth the toxic power of eserine. But Schweber of Prof. Kobert's Pharmacological Institute at Dorpat, after a series of experiments, concludes that eseridine possesses no advantages over eserine. The chief drawback to both, and equally shared by them, detracting in fact from the usefulness of the calabar alkaloids generally, is the ready susceptibility of the heart to their action. In short the assertion that eseridine is free from the toxic action of eserine is erroneous.

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* The effect of perfect and nearly perfect synchronism of one oscillation upon another is also to be found exemplified in my "Treatise on Photography." 'Text-Book of Science Series.'

* From Merck's *Bulletin*.

The Pharmaceutical Journal.

SATURDAY, JANUARY 11, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

THE first meeting of the Council for the new year was attended last Wednesday by sixteen members, the absentees on that occasion being Messrs. ABRAHAM, EVANS, GOSTLING, HARRISON and SCHACHT. It was announced that a letter had been received from the Privy Council approving the appointment of the Boards of Examiners. The President informed the Council that he had received from Dr. QUAIN, the Chairman of the Pharmacopœia Committee of the General Medical Council, a letter relating to the preparation of an Addendum to the Pharmacopœia, and expressing the satisfaction with which the readiness of the Pharmaceutical Society to co-operate in that work would be received. Ten persons who had been registered as Pharmaceutical Chemists were elected members of the Society, and one Chemist and Druggist was elected a member. Thirty-seven persons were elected associates and sixty-two were elected students. Several persons were restored to their former status in the Society and three persons were restored and one added to the Register of Chemists and Druggists.

The report of the Finance Committee presented no special feature. In that part of it relating to the Benevolent Fund it was stated that stock had been purchased of the value of £100, leaving £35 still in hand as a nucleus for a further subsequent investment. On the recommendation of the Benevolent Fund Committee, two grants of £15, one of £12, three of £10, and one of £5, were made to applicants for relief. Attention was also directed by the Vice-President to two applications for votes and influence in the election to the London Orphan Asylum. Both cases are well recommended, and the circumstances connected with them are such as to enlist the interest of members who have votes for the Watford Asylum. It was suggested that the opportunity of nominating a candidate for election to that or other orphanages might be usefully secured for the Society by subscribing to one or other of them, and the Vice-President promised to bring the question before the Committee at its next meeting.

In the Report of the Library, Museum, Laboratory and House Committee, reference was made to the consideration of Mr. LEIGH's proposal that the Society should offer book prizes and certificates to registered apprentices of the Society, and it was stated that after a long discussion of the subject, in which Mr. LEIGH had assisted, the conclusion was arrived at that the scheme proposed was at present impracticable and inexpedient. It was therefore recommended that no action should be taken at the present moment. The President, in commenting upon this decision, said that though it might at first sight appear harsh and inconsistent with the expressed desire of the Council to promote the education of apprentices, there are many reasons in favour of the conclusion that had been come to. The difficulty of taking any step for encouraging apprentices to study, without at the same time doing serious mischief, has first to be considered, and in this respect it is necessary to remember that the granting of certificates by the Society as a voluntary body might clash with the exercise of its functions in conferring certificates of qualification entrusted to it on behalf of the State. The mode in which the present state of the law requires that this latter duty shall be performed precludes the possibility of conducting any portion of the requisite examination apart from, and at another time than the rest of it. If apprentices who had gained prizes or certificates were subsequently rejected by the Boards of Examiners a serious difficulty would be created. Another reason mentioned for not attempting the scheme proposed was the probability that the proposed certificates would be used by those obtaining them to show their superiority, although they would not under existing conditions be evidence of education in the proper sense. Therefore he thought the Society dare not give any certificates implying qualification in any of the subjects forming part of the legal examinations. Though the scheme might have the effect desired by Mr. LEIGH of producing a friendly feeling towards the Society, it would involve the risk of a contrary effect upon those who failed in the examinations. It would also have too much of a centralizing influence, and thus tend to damage the local schools, which the Society desires to foster as much as possible. Again in regard to any influence that might be exercised in promoting study, it was regarded as doubtful whether that would extend to the class of apprentices which most of all requires to be stimulated, and whether apprentices would not in many instances be debarred from taking advantage of it. The case would be very different if the Council had power to lay down a course of study and to separate the qualifying examination into parts with intervals between them corresponding to different stages of that course, but until such a system is introduced it was felt that nothing could be done towards carrying out the views upon which Mr. Leigh's proposal is based.

The mode of appointment of the Society's local secretaries was also reported upon as having been under consideration by the same Committee, and the decision arrived at was to recommend no further alteration beyond that of making the appointments in December instead of the time when the Council election takes place. By that alteration it is thought that there may be a possibility of some greater attention being given to the nomination of persons to fill the positions of local secretaries, so as to secure the services, not only of those best fitted for the post, but also of those best able to devote their energies to the performance of the duties connected with it. The two qualifications are not always co-existent, and perhaps in many instances accomplished pharmacists of position are for these very reasons so absorbed with other work that they are unable to do much for the Society, and would willingly see some one else appointed, though they do not like to decline the office when nominated. It is from these considerations mainly that the Committee has decided to recommend that, for the present, at least, no change shall be made in the mode of appointment of local secretaries.

Other subjects reported upon by this Committee were applications for grants from the Dundee Chemists' Assistants' Association and the Midland Counties Chemists' Association. The latter had been deferred until further particulars were supplied, and in regard to the former it was recommended that the Society's Journal should be sent to the Dundee Association as it is published. The further request was not entertained on the grounds that the Association is not of the nature of a school, and that the Society does not make grants of money except with the object of making the school of a local association more efficient for the purpose of teaching. The principle upon which such grants are made is well expressed in the regulation that the relative claim of any town to receive aid from the Society must be indicated by the earnestness of the local effort to establish complete courses of chemistry, materia medica, pharmacy and botany. In speaking of this application the President took occasion to point out that it is not the business of the Council to vote money for educating persons to enter the business, but only to provide means for rendering more complete and efficient the education which must be paid for by pupils themselves. Obviously the members of the Society cannot be expected to sanction the expenditure of their money to afford almost gratuitous education to those seeking to be put on the register. The necessity of spending money in getting know-dge must be met by the individual students as ning part of the qualification they aim at. It is remarkable that this fact should have been so much lost sight of, for when regarded only as a matter of trade interest it lies so obviously on the surface that it ought not to escape observation.

The Chemists' Ball will take place next Wednesday, as on the previous occasion, at the Portman Rooms, Baker Street. This will be the twenty-fourth recurrence of that annual festival, and those who are desirous of taking part in it should apply at once for tickets to the Honorary Secretary, Mr. W. H. Francis, 38, Southwark Street, S.E.

* * *

We learn from the Honorary Secretaries of the Midland Counties Chemists' Association that the Annual Ball in connection with that body will take place on Thursday, the 23rd inst., at the Assembly Rooms, Edgbaston, and that early application must be made for tickets.

* * *

One of the orphans in favour of whom votes are requested in the approaching election to the London Orphan Asylum is Frederick H. Lees, whose father died in 1882, leaving a widow and five young children totally unprovided for. The other is Sarah Minnie Fennington, whose father died leaving eight children, seven of whom were unprovided for and one partially blind. Proxies sent to Mr. R. Bremridge, 17, Bloomsbury Square, would be thankfully received and duly appropriated for the benefit of the orphans.

* * *

The almost indecipherable handwriting of some prescribers is often a source of considerable difficulty, and if it were not for the care exercised by pharmacists in dispensing it might be a cause of more serious mischief. The *Medical Press and Circular* refers to a recent case in which a firm was subjected to heavy damages for a mistake in dispensing, though no blame could be attached to any person but the prescriber, who ordered a harmless drug, but wrote the name so badly and carelessly that any person not knowing what he wished to convey would have read the words as they were read by the dispenser. Our contemporary remarks that it is an opprobrium to medicine that physicians will endanger life by a neglect of the commonest precautions, and that although they may be very explicit in their directions to the nurse and the patient they are too often criminally negligent in their directions to the dispenser.

* * *

It will be seen from the reference in the review of the Conference Year-Book, at page 559, that the useful work commenced by the Committee appointed to prepare an Unofficial Formulary has been continued, with the result of adding an addendum comprising nine preparations, the details of which are given at the place referred to.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, January 8, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Cross, Greenish, Hampson, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Robbins, Southall and Watt.

The minutes of the last meeting were read and confirmed.

THE BOARDS OF EXAMINERS.

The Registrar reported that a communication had been received from the Privy Council approving the appointment of the Boards of Examiners.

THE ADDENDUM TO THE PHARMACOPŒIA.

The PRESIDENT read the following letter from Dr. Quain:—

"Medical Council Office,
"299, Oxford Street,
"London, W.
"*December* 9, 1889.

"Dear Sir,—I beg to acknowledge the receipt of your letter informing me that the Council of your Society will be willing to render any assistance in its power to the Pharmacopœia Committee in the preparation of an addendum to the British Pharmacopœia (1885), and that a Committee of your Society will be appointed for the purpose. This information will be received, I am quite sure, with much satisfaction by both the General Medical Council and the Pharmacopœia Committee.

"Yours very faithfully,
"R. QUAIN, M.D.,
"*Chairman of the Pharmacopœia Committee.*

"M. Carteighe, Esq.,
"President of the Pharmaceutical Society of
"Great Britain."

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Cheney, Henry Robert.
Gourlay, Henry Hamilton.
Greaves, Robert Bond.
Green, Herbert John.
Higgins, Charles Alfred.
Hollely, Thomas Lowe.
Hook, Richard Graves.
Masters, Henry.
Roper, Frederick Alfred.
Thorp, Edwin.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Cargill, David Allan	Sheffield.
Cheney, Henry Robert	Banbury.
Fuge, Harry Dixon	London.
Gourlay, Henry Hamilton	Manchester.
Greaves, Robert Bond	Sheffield.
Higgins, Charles Alfred	Manchester.
Hollely, Thomas Lowe	Retford.
Hook, Richard Graves	Bridgwater.
Peck, Ernest Saville	Cambridge.
Thorp, Edwin	Harrogate.

Chemist and Druggist.

George Tilsley, of Bath, who was registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

The following having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Brown, Joseph	Chester-le-street.
Hicking, Joseph	Barnstaple.
Hildyard, William	Thetford.
Hodder, George William	Frome.
Livesey, Alfred	Glasgow.
McKie, Robert	Blackburn.
March, Thos. Frederick	Westgate-on-Sea.
Monk, Frederick Albert	Redhill.
Smith, Catherine Love	Irvine.
Tomlinson, Charles Parker	Billinghay.
Tranter, Frederick James	London.
Turner, Charles Wall	Worcester.
Warner, George Oram	Clifton.
Wells, William George	New Romney.

ASSOCIATES.

The following, having passed the Minor examination and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Bethune, Andrew Wright	Lochgelly.
Brackenbury, Richard Hayes	Bardney.
Cowin, William Stephen	Union Mills.
Eyre, William Robert	Ashbourne.
Farnworth, Walter	Blackburn.
Fast, John Percival	Wellingborough.
Grice, Walter Thomas	Yardley.
Grieve, James	Hawick.
Heath, Victor Charles	Birmingham.
Hemens, Wilfred Frank	Hulton.
Jamieson, William Bannatyne	Rothesay.
Kershaw, Sam	Heckmondwike.
Le Cudennec, Louis Edourd	Mauritius.
Lovibond, James Joseph	Plymouth.
Mason, Joseph Edwin	Bexley Heath.
Merrick, W. Stephens Nickells	Exeter.
Nicol, George Henry	Dumfries.
Purchase, Francis William	Bideford.
Robinson, William Albert	Carlisle.
Sleight, Fred	Louth.
Symes, Charles Frederick	Liverpool.
Turver, Charles Henry	Newark-on-Trent.
Vincent, William	Truro.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students of the Society:—

Allenby, Henry Edmund	St. Albans.
Argles, Woodfield Henry	Aylesbury.
Barley, Alfred Henry	Broadstairs.
Bellamy, George William	Hoxton.
Bellatti, Alfred	Louth.
Burton, Percy H.	London.
Clear, Henry William	Potton.
Coles, Charles Nathaniel	Horsham.
Dickinson, George	Hackney.
Dusart, George Charles	Twickenham.
Ellis, Ernest Frederick	Topsham.
Evans, Ivor	Aberdare.
Gane, Charles Hillman	Nottingham.
Gaziello, Charles Joseph	London.
Gedge, Augustus Westly	Bristol.
George, John Arthur	Sheffield.
Gibson, Joseph	Keswick.

Hampson, Thomas	Leigh.
Hardman, Harry	Southport.
Holgate, Herbert	Catterick.
Howorth, Henry	Preston.
Hull, John Heber	York.
Hume, John Gordon	Gatehouse.
Jobbins, Edwin	London.
Lengden, David Maxwell	Cheltenham.
Lewis, Samuel Judd	London.
Lucas, Albert	Derby.
Mair, William	Dundee.
Marris, Frederick Lake	Grimsby.
Moir, William Sinclair	Aberdeen.
Moore, Clifford Bond	King's Bromley.
Moore, William	Wisbeach.
Morley, Charles	Beverley.
Mould, Charles	Chorley.
Nicol, Burton Alexander	London.
Paine, Charles Standen	Bowdon.
Palmer, Frank Elijah	Ipswich.
Pass, William Hall	Macclesfield.
Pembleton, Frederick Paul	Nottingham.
Perrett, Frederick James	Weston-super-Mare.
Quarmby, Thomas William	Market Drayton.
Ray, George Wheatcroft	Clifton.
Reynolds, Albert Bright	Bournemouth.
Richardson, H. N. Bardsley	Leicester.
Robbins, Percy John	London.
Russell, Edward John	London.
Russell, Joseph Jackson	Cleator.
Seccombe, Maurice Otto	Tavistock.
Shepheard, William Fredk. J.	Chester.
Skeeles, Arthur Edward	London.
Skinner, Gedwin John	Seaton.
Smith, Frank William	Bayswater.
Spafford, Henry John	Hull.
Steane, Edward Hands	Coventry.
Sturch, Harry Howes	Kidderminster.
Templeton, John	Kilmarnock.
Thomas, William Vaughan	Aberdovey.
Wade, Thomas	Oldham.
Waind, Walter Harry	Kirby Moorside.
Watson, Wilfred Lewis	Kettering.
Williams, Arthur Llewellyn	Pembroke Dock.
Williams, David Llewelyn	Colwyn Bay.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

John Bromfield, 54, Lister Street, Hull.
Joseph Sewell, 2, Pond Place, Fulham Road, London, S.W.
George Wrigglesworth, North Everard Street, King's Lynn.

ADDITION TO THE REGISTER.

The Registrar reported that

Thomas Townley, High Street, Tarporley, Cheshire, having made a declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was of the usual character, recommending the payment of sundry accounts.

The PRESIDENT, in moving the adoption of the report, said there was nothing calling for special comment with regard to the general account. On the Benevolent Fund Donation account there had been nineteen guineas received and £100 of stock purchased. There was still £35 in hand, which he hoped would soon grow to another £100, so that it also might be invested. He should state that the legacy of £19 19s. came from the late Mr. Forrest, one of the earlier examined pharmaceutical chemists, who had been for many years the representative of Messrs. Barron, Squire and Co. He was a member of a gifted family, his brother being Secretary to the Institution of Civil Engineers. Although Mr. Forrest died unfortunately too young to have become rich, it was very satisfactory to find that he had remembered the Society in his will.

The report and recommendation were unanimously adopted.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£15 to a former member (aged 73), who was an unsuccessful candidate for an annuity at the last election, and had a similar grant in February, 1889. (Essex.)

£10 to the widow (aged 66) of a member connected with the Society from 1853 to 1886, entirely dependent on her children. (Huntingdon.)

£10 to the widow (aged 68) of a registered chemist and druggist. Applicant has had three previous grants, amounting to £20; she is unable to work, and has only one friend able to help her. (Plymouth.)

£10 to a registered chemist and druggist (aged 61), who carried on business for ten years, but ill-health and deafness obliged him to dispose of it, and he is not now able to earn much. Has no children, but his wife is an invalid. (Birmingham.)

£12 to the widow (aged 59) of a registered chemist and druggist. Applicant, who was an unsuccessful candidate for an annuity at the last election, has had two previous grants, amounting to £27, and her late husband had five grants of £10 each. (Liverpool.)

£5 to a registered chemist and druggist (aged 62), a subscriber to the Fund for three years. Applicant has been in business for thirty years in various places, but had to give up in 1876. Has been confined to his bed for six months. (Liverpool.)

£15 to the orphans of Mr. Thomas, a registered chemist and druggist, of Cardiff.

Two cases had not been entertained.

The VICE-PRESIDENT, in moving the adoption of the report, said the applications had been rather more numerous than usual, but were of the ordinary character. The applicants were fully deserving of the assistance granted. He wished to call the attention of the Council to two applications which he had received for votes and influence at the ensuing election to the London Orphan Asylum at Watford. One was on behalf of Frederick H. Lees, age 9 years, whose father—a chemist—died in 1882, leaving a widow and five young children totally unprovided for. The other case was that of Sarah Minnie Fennington, age 7 years, whose father—a chemist and sub-postmaster, at Worksop—died, leaving eight children, seven unprovided for, and one of whom was partially blind. Both these cases were well recommended, and he hoped members who had votes or could influence votes would bear them in mind.

The PRESIDENT hoped any of their friends who had votes, or knew subscribers to the Watford Asylum, would consider these cases, and deal with them at once; because the election was close at hand. Both cases were very eligible, and in one case the Society had granted some assistance. Obviously, the greatest charity which could be bestowed on the children of a deceased chemist was to assist them to get into good schools such as that at Watford. It was an asylum open to the children of all persons who had been in a certain social position, and therefore the efforts which had to be made were greater than in the case of some institutions where the candidates came exclusively from one class of the community.

Mr. Cross said it occurred to him some time ago, when this question of orphanages was referred to, that it would be a good thing if the Society subscribed to one of these well known orphanages, so as to give it the opportunity of nominating a child. If the Council nominated a candidate, the case would be brought before the Society's friends more prominently than in any other way. He should be glad if the Committee would consider this matter.

The Vice-President said he would bring it before the Committee at the next meeting.

The President remarked that in such a case there would be a guarantee of respectability by those who were supposed to know most of the case.

The Vice-President said he feared that if the Society nominated a candidate it would be expected to secure his or her election, and that might involve a large expenditure.

The President said that would no doubt have to be considered. Probably the nomination would have to be made, not by the Society, but by some individual, the Treasurer, President or Secretary.

The Vice-President said he had found this system work well in connection with the Sailors' Home at Dover.

Mr. Richardson remarked that this question was considered some years ago. He thought it was worth the attention of the Committee whether some educational institution should not be started in connection with the Society.

Mr. Atkins remarked that a few years ago there was a gentleman on the Council who devoted a great deal of time to securing the election of orphans to asylums. He should be very glad for the matter to be considered by the Committee.

The President said the tendency of modern philanthropy was to support established, well managed institutions already existing, rather than to found new ones of a special character, or designed for one particular class.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
November	Day . .	853	42	14	33
	Evening .	244	19	7	12

Circulation of books.	Town.	Country.	Total.	Carriage paid.
November . .	154	155	309	£2 7 9

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Remington (J. P.), The Practice of Pharmacy, 2nd ed., 1889. From the Publishers.

Attfield (J.), Chemistry, 12th ed., 1889. From the Author.

Wills (G. S. V.), Vegetable Materia Medica, 11th ed., 1889. From the Author.

Whiteaves (J. F.), Contributions to Canadian Palæontology, vol. i., pt. 2, 1889. From the Geological and Natural History Survey of Canada.

Kaiserliche Leopoldinisch-Carolinische Deutsche Akademie der Naturforscher, Nova Acta, tomus 53.

— Katalog der Bibliothek, Lief. 2. From the Akademie.

New York State Pharmaceutical Association, Proceedings, 1889. From the Association.

Mathematical Questions, with their solutions, vol. 51, ed. by W. J. C. Miller. From the Editor.

Notes on Indian Economic Products, vol. 2, no. 2. From H.M. Secretary of State for India.

Allgemeiner österreichischer Apotheker-Verein, Zeitschrift, 1889. From the Verein.

American Druggist, 1889. From the Editors.

American Journal of Pharmacy, 1889. From the Philadelphia College of Pharmacy.

Analyst, 1889. From the Editor.

Archiv for Pharmaci og technisk Chemi, Aug. 1888 to Aug. 1889. From the Publishers.

Asclepiad, 1889. From Dr. B. W. Richardson.

Australasian Journal of Pharmacy, 1889. From the Pharmaceutical Society of Australasia.

British Medical Journal. From the British Medical Association.

Canadian Pharmaceutical Journal, 1889.

Annual Announcement, 1889. From the Ontario College of Pharmacy.

Chemical News, 1889. From the Editor.

Chemical Society of London, Journal, 1889.

—Abstract of the Proceedings, 1889. From the Society.

Chemist and Druggist, 1889.

Chemists' and Druggists' Diary, 1890. From the Proprietors.

Journal de Pharmacie, 1889. From the Société de pharmacie d'Anvers.

Kaiserliche Akademie der Wissenschaften in Wien, Anzeiger, mathematisch-naturwissenschaftliche Classe, 1889.

— Sitzungsberichte, math.-naturw. Classe, Abthlg. 2b, no. 1-3. From the Akademie.

Linnean Society of London, Journal, Botany, 1889. From the Society.

Ny pharmaceutisk Tidende, nos. 18 26, 1888; nos. 1-18, 1889. From the Publishers.

Pharmaceutical Record, 1889. From the Editor.

Pharmacie Centrale de France, L'Union pharmaceutique et le Bulletin commercial, 1889. From the Pharmacie Centrale.

Photographic Society of Great Britain, Journal and Transactions, 1889. From the Society.

Royal Botanic Society, Quarterly Record, 1889. From the Society.

Royal Gardens, Kew, Bulletin of Miscellaneous Information, 1889. From the Director.

Royal Society of London, Proceedings, 1889. From the Society.

Sei-I-Kwai, Medical Journal, 1889. From the Society for the Advancement of Medical Science in Japan.

Société botanique de France, Bulletin, 1889. From the Société.

Société française de Botanique, Revue de Botanique, 1889. From the Société.

Society of Chemical Industry, Journal, 1889. From the Society.

Timehri, new series, vol. 2. part 2, 1888; vol. 3, part 1, 1889. From the Editor.

Western Druggist, 1889. From the Proprietors.

Sundry numbers of the Journal of the Chemical Society. From Messrs. T. and H. G. Greenish.

For the Library in Edinburgh—

Australasian Journal of Pharmacy, 1889. From the Pharmaceutical Society of Australasia.

Pharmaceutical Record, 13 nos., 1889. From Messrs. T. and H. Smith and Co.

Society of Chemical Industry, Journal, 1889. From Mr. J. R. Young.

Chemist and Druggist, vol. 1, 1887.
From Mr. John Robertson.

Chemist and Druggist, vol. 2, 1887; vol. 1, 1888.
From Mr. G. Coull.

The Committee recommended that the undermentioned books be purchased:—

For the Library in London—

Remington, The Practice of Pharmacy, 2nd ed.

For the Library in Edinburgh—

Attfield, Chemistry, 13th ed.
Remsen, Organic Chemistry.
Richter, Organic Chemistry.
Squire, Companion to British Pharmacopœia, 15th ed.
Valentin, Qualitative Chemical Analysis.

The Committee recommended that the *Pharmaceutical Journal* be sent weekly to the Boston Medical Library Association.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
November.	Morning	590	39	10	22
	Evening	92	10	3	3

The following donations to the Museum had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of False Kola Seeds and of crude and purified Ouabain.
From Messrs. T. Christy and Co.

Specimen of Crystallized Potassium and Sodium.
From Messrs. Harrington Brothers, Cork.

Specimen of Batjentjor Root from West Africa.
From Messrs. Hearon, Squire and Francis.

Specimen of Anhydrous Lanolin.
From M. H. Helbing.

Specimen of leaves and fruit of *Pilocarpus Selloanus*. From Mr. J. O. Braithwaite.

Specimen of Bissa Bôl.
From Messrs. Wright, Layman and Umney.

Specimen of Johor Ipecacuanha. From Mr. Mays.

To the Herbarium.

Specimen of *Scopola Japonica*, some with rhizome attached. From Professor Maximowicz, Moscow.

The report stated that the staff of the School had attended and reported on their respective classes.

Prizes for Apprentices.

The Committee had had under its consideration the resolution passed at the last meeting of Council with regard to the desirability of offering book prizes and certificates to the registered apprentices of the Society. Mr. Leigh was present at the meeting by invitation of the President. After a long discussion the Committee came to the conclusion that the scheme referred to in the resolution was at present inexpedient and impracticable.

Local Secretaries.

The duties of local secretaries and the method of appointing those officers had been again under consideration, and it was eventually decided that it was not advisable to make any change for the present, with the exception of the time of appointment, which it was recommended should take place in December each year, the nomination papers being sent out in October.

Dundee Chemists' Assistants' Association.

The application from the Dundee Chemists' Assistants' Association had been again considered, and the Committee recommended that the Journal be sent to the Association as published, but that the further request contained in the application be not entertained, as the conditions under which grants are made have not yet been complied with.

Midland Counties Chemists' Association.

The application from the Midland Counties Chemists' Association had been considered and deferred.

The President moved the adoption of the report. There was nothing special in the ordinary business, but there were two matters which had been specially considered, on which it was necessary to say a few words. With reference to Mr. Marshall Leigh's motion the Committee had had the advantage of Mr. Leigh's presence, and the whole subject had been very carefully considered, with the result that the Committee did not recommend any action being taken at the present moment. There were a great many reasons in favour of this conclusion, which at first sight looked a little cruel, because it appeared as though the Council, with its desire to encourage education amongst its apprentices, was refusing to move in a direction which seemed so simple and natural and likely to carry out that object. They all desired to encourage apprentices during the period of pupilage, but the difficulty was how to do it effectually and without producing serious mischief. The first point which was brought before the Committee was one which he mentioned at the last meeting, namely, how far it was possible or desirable that a voluntary Society to which the State had committed the power of granting certificates of competency, should at the same time grant other certificates to different members of the body spread throughout the country. The proposal would be perfectly practicable and desirable if they had the power of associating these examinations with, and regarding them as part and parcel of the qualifying examination. But at present the Society could only give certificates and prizes which would not count in the slightest degree before the Board of Examiners. The statute did not allow of any portion of the examination being separated by any serious portion of time from the rest. There was, therefore, this difficulty. Supposing those apprentices who had gained prizes presented themselves before the Board of Examiners and failed—perhaps in the very subjects in which they had obtained prizes or certificates—there would be this anomaly, that the Society as an official body certified that the man was not qualified, while the same Society as a voluntary body said he was qualified. There would be this further objection, that the certificates would be used naturally by those who gained them to indicate their superiority to their fellows; and it seemed to the Committee, after careful consideration, that there was positive danger in this, and he personally felt very strongly about it. He thought the Society dare not give any certificate implying competency in any of the subjects which were part of the legal examinations, unless it were granted by the Board of Examiners. Mr. Leigh had in his mind, no doubt, the fact that there was a school in the Society's house which granted certificates; but those certificates were very carefully worded, and were merely class certificates. No doubt Mr. Leigh wished the certificates to be guarded as much as possible, so that they should not be made to appear anything more than an encouragement to study, but in practice even the school certificates were used by their possessors as evidence of superior qualification, and this could not be prevented. But when he contemplated the possibility of such certificates being obtained by men all over the country who might in the ordinary course of things fail before the Board of Examiners he felt it was a serious matter, and having regard to the fact that the carrying out of this scheme did not involve education, properly so called, but merely answers to questions, the conclusion the Committee came to was that this form of encouragement would not be as beneficial to the apprentice as the assistance offered him by local associations. It was felt also that this system would be one of centralization, fixing the attention and interests of all apprentices on 17, Bloomsbury Square, and that the local schools which the Society wished to foster as much as possible would suffer in consequence. Mr. Leigh thought a scheme of this sort would tend to produce a feeling of friendship towards the Society, and sympathy with it, and no doubt it would if all the candidates passed, for they and their parents and employers would be pleased; but those who had been examiners in other places as well as in that house knew well the dislike with which an examining body was regarded by the parents of candidates who failed. Nothing pained him so much as to reflect on the communications he had received during his association with the Pharmaceutical Society, as an officer, from the parents of rejected candidates. Even in the case of the Preliminary examination, which was conducted by the College of Preceptors, and in which the Society could not be supposed in any way to interfere, instead of a parent feeling grateful at the examiners finding out that his son was not so well up as he should be, he regarded it as a grievance, and wrote complaints about it, and this was still more the case with regard to the Minor. He believed the same effect would be produced in the case of the proposed local examinations. It would not stimulate the class of students which required stimulating. The majority of the apprentices were possessed of medium abilities, and were not over desirous of working their brains; many of them perhaps had not much opportunity of doing so, being kept occupied a large part of the day in such a way as made it difficult for the brain to work properly when the apprentice had a chance of studying in the evening. But be that as it might, the impression on the minds of the Committee—apart from the other serious drawback of the Society granting two classes of certificates as distinguished from school certificates—and that which carried most weight with the Committee, was the fact that this sort of stimulus would not, after all, produce the effect which Mr. Leigh hoped for. Under these circumstances the Committee decided unanimously that it was inexpedient at present to recommend the adoption of the proposal. If the Council had power to impose a course of study, as was contemplated in the curriculum scheme, or to separate the qualifying examination into parts with intervals between each, the matter would stand on a different footing, but until such a change was introduced it was felt that this proposition would not work. With regard to the local secretaries, the feeling of the Committee was that it was not practicable to make any material change in their duties or in the mode of election, but it was thought that it would be desirable, and would probably produce more interest, if the election took place at a different time from that of the Council. Each member and associate in business now received a bundle of papers with a voting paper for the Council and for the local secretary at the same time, and it was feared that sufficient attention was not given to the latter. If this election took place at a different time it would enable special attention to be called to it, and possibly there would be more likelihood of obtaining the services of the men best fitted for the post. He could not help feeling that in many cases the gentlemen who were nominated were in many respects the best-fitted, being highly accomplished pharmacists and men of position, but very often from that very fact they were so absorbed in other work that they were unable to do much work for the Society, and would be not unwilling to see someone else appointed, but being nominated they did not like to decline the office. He thought the appointment in large towns might be made contingent on the activity of the individual and his being able to do a little work for the Society when necessary. He had stated previously that he thought it would be well in some respects if the duty of collecting subscriptions were taken from the local secretaries, but on going into the matter it was found that this view of the case was not practicable. It told both ways, and it was feared that any change of this sort would be not only detrimental to the interests of the Society generally, but especially to the Benevolent Fund. Under all these circumstances, for the present at all events, the Committee thought it was not desirable to make any other alteration than the time of election. As to the applications for grants from local associations one had been deferred for further particulars, but the application from the Dundee Chemists' Assistants' Association was really not from a school. Their Dundee friends did not probably understand that the Society did not grant money to associations of that kind, where the members must necessarily change from year to year, but only with a view of making the existing school of a local association more efficient for the purpose of teaching. The first consideration was that there should be local effort, and when that was shown to have been the case the Society was willing to come forward and make a grant. The conditions were very well expressed in this excerpt from the regulations, "The relative claim of any town to receive aid from the Society must be indicated by the earnestness and efficiency of local effort; a complete curriculum of chemistry, practical chemistry, materia medica, pharmacy and botany, is the standard to be aimed at." Clearly it was not the business of the Society to vote money for the purpose of affording direct education to those coming into the business; the pupil must pay for that; it must be to provide apparatus and books to make the education afforded more complete and efficient. That was the important difference, and it could not be too much borne in mind. It was obvious that the members would never sanction money being voted to afford education for nothing, or next to nothing, to those who were coming on the Register. It was part of the necessary qualification that the individual should spend money in getting his knowledge; he must buy his own text-books, and get his necessary instruction. But the Society had always been willing to facilitate and improve education, and where there was no museum, no specimens, or no library, it had given assistance to make an established local school as valuable as possible.

Mr. MARTINDALE seconded the motion.

Mr. LEIGH said he had no wish to re-open the question of giving prizes to apprentices, but he desired to express his sense of the courtesy with which the motion was considered by the Committee. Of course, the decision was a disappointment to himself, and he might say that he had been gratified by receiving a number of communications from chemists in the country, mostly unknown to him personally, which indicated that there was a desire on the part of country chemists that the apprentices should be considered and encouraged by the Society. Although it was decided for the present not to adopt the scheme, he hoped on a future occasion some method of obtaining the end desired, which would not be open to the objections now raised, would be considered and approved by the Council.

The motion was then put and unanimously agreed to.

THE SALE OF POISONS BY UNQUALIFIED ASSISTANTS.

The Honorary Secretary of the Chemists' Assistants' Association had sent a letter enclosing a resolution carried at a recent meeting to the following effect:—"That this meeting of the Chemists' Assistants' Association is of opinion that no sale of poisons should take place except under the supervision of a registered chemist who would undertake all responsibility."

GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor, stating the progress made with cases placed in his hands. One defendant had paid penalty and costs before trial.

Several fresh cases of alleged infringement of the Pharmacy Acts had been reported to the Committee, and proceedings were recommended.

The Council as usual went into committee to read and consider this report.

On resuming, the report and recommendations were unanimously adopted.

REPORT OF EXAMINATIONS.

December, 1889.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (12th)	7	5	2
" (13th)	8	2	6
" (17th)	7	3	4
	—22	—10	—12
Minor (12th)	25	9	16
" (13th)	23	13	10
" (17th)	24	4	20
" (18th)	32	15	17
" (19th)	29	10	19
" (20th)	26	9	17
	—159	—60	—99
Modified (17th) . . .	1	0	1
	182	70	112

Preliminary Examination.

Fifteen certificates by approved Examining bodies were received in lieu of the Society's Examination.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, December 19. Dr. W. J. Russell, F.R.S., President, in the Chair, when the following papers were read:—

Frangulin. By Professor T. E. THORPE, F.R.S., and H. H. ROBINSON, M.A.—The authors prepared the glucoside frangulin from the bark of the alder buckthorn (*Rhamnus frangula*) by first extracting with low boiling petroleum to remove plant fat, and next with methylated spirit, which removed the frangulin together with resins, etc. To this extract lead acetate was added to precipitate tannins, and after removing the excess of lead in the filtrate by means of sulphuretted hydrogen, the frangulin was obtained from it. 14 lbs. of the bark gave about 5½ grams of frangulin. Seven analyses were made of four different portions of frangulin which had been purified by different methods, and the results agreed with one another and corresponded to the formula $C_{22}H_{22}O_9$: for every analysis the frangulin was dried at 120° until constant. The frangulin was hydrolysed and the yellow product insoluble in water was analysed, in two cases after crystallizing from alcohol and drying at 120° until constant, and in two cases after crystallizing from benzene and drying at 180°. The results corresponded to the formula $C_{15}H_{10}O_5$. The product was directly compared with some emodin from rhubarb, and was found to give the same colour reactions, and the authors are satisfied as to its identity with that substance. A phenylhydrazine-derivative of the product, soluble in water, and which has the power of reducing Fehling's solution, was prepared and compared with that obtained from glucose, and was found to possess quite different properties: hence it is concluded that the soluble product of the hydrolysis is not glucose. The investigation of the nature of this soluble product, and of the equation representing the hydrolysis, will be continued by one of the authors.

Arabinon, the Saccharon of Arabinose. By C. O. SULLIVAN, F.R.S.—In a former communication (*cf. Chem. Soc. Trans.*, 1884, p. 55), under the name of α-arabinose, the author has described a substance obtained by hydrolysis of arabic acid, having an optical activity "well above $[\alpha]j = 140$"; this is more fully considered in the present communication. The details of its preparation from geddic acid, an acid obtained from Gedda gum—which the author will describe in a future notice—are fully given. As yet it has not been obtained in a crystalline state: when dried over sulphuric acid in vacuo, and then at a temperature gradually increasing to 75—80°, it is obtained as a glassy mass, which when pulverized forms a white hygroscopic powder. It has a specific rotatory power of $[\alpha]D = 198{\cdot}8°$; and 100 parts have the same cupric reducing-power as 58·8 parts of dextrose. It yields arabinose on hydrolysis, and appears to bear a similar relation to this carbohydrate that saccharon (cane-sugar) bears to glucose: the author therefore terms it *arabinon*, preferring the vowel system of nomenclature to that proposed by Scheibler. Combustions were simultaneously made of saccharon and arabinon, with the following results:—

	Saccharon.	Arabinon.	Theory for $C_{10}H_{18}O_9$.
Carbon . .	42·11	42·46	42·58
Hydrogen. .	6·61	6·55	6·38

The molecular weight found by Raoult's method was 239·2; that of a carbohydrate of the formula $C_{10}H_{18}O_9$ is 282, and although the number obtained is low, bearing in mind the fact that this is the case with the "on" carbohydrates, and that the preparation may not have been free from ash constituents, there can be no doubt that the compound belongs to the "on" and not to the "in" or dextrin class. The amount of arabinose obtained on hydrolyzing 100 parts arabinon was 104·9; the theoretical yield if $C_{10}H_{18}O_9 + H_2O = 2C_5H_{10}O_5$ is 106·3.

Parliamentary and Law Proceedings.

ACTION UNDER THE PHARMACY ACT.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN v. PRESTON.

Before His Honour Judge Abdy, at the Edmonton County Court, on the 8th inst., the Council of the Pharmaceutical Society of Great Britain sued Thomas Preston of 6, Albion Terrace, Broad Lane, Tottenham, to recover a penalty of £5 under Section 15 of the Pharmacy Act, 1868, incurred by defendant on November 29 last, in selling or keeping open shop for the retailing, dispensing, or compounding of poison, to wit "belladonna," or a preparation thereof.

Mr. Flux appeared for the plaintiffs.

Mr. Avory, solicitor, for the defendant.

Mr. Flux stated that this was an action to recover a penalty under Section 15 of the Pharmacy Act, 1868, a statute which had already been under His Honour's consideration. On this occasion he did not think the case would give trouble, as from a communication just made to him he believed the cause of action would be admitted.

Mr. Avory, on behalf of the defendant, admitted the offence, and urged the judge to give the defendant time for payment.

Mr. Flux mentioned that the defendant carried on an apparently prosperous business, and reminded his Honour that the Pharmacy Act was passed for the public safety. The plaintiffs were suing in a public capacity and for the public protection.

The defendant entered the witness box and stated that he was quite unable to pay, and that all the money in the business belonged to his wife, who was blind.

His Honour said that the case would be met by an order for 20*s.* a month.

Mr. Flux: Of course I submit to the exercise of your Honour's discretion, but the Defendant must not continue to offend.

His Honour: If he offends again you will bring him here again. Judgment for the penalty of £5 and costs, payable by monthly instalments of 20*s.*

Review.

YEAR-BOOK OF PHARMACY, with the TRANSACTIONS of the British Pharmaceutical Conference at the Twenty-Sixth Annual Meeting held at Newcastle-on Tyne, 1889. London: J. and A. Churchill, 1889.

The first days of the new year have brought with them the annual contribution from the British Pharmaceutical Conference to the pharmacist's bookshelves in the shape of another Year-Book. As is well-known, this volume is usually made up of two parts, the first consisting of abstracts of papers relating to pharmacy, materia medica and chemistry, contributed to British and foreign journals during a period of twelve months, and the second consisting of a report of the proceedings of the Conference at its last annual meeting. In the new volume the extracts occupy rather more space than in 1888, but not so much as in previous years; but they are made in a somewhat more abbreviated form than formerly, so that the number is as great as before. Altogether, they present an admirable *résumé* of the pharmaceutical literature of the year. With the proceedings at the annual meeting the readers of this Journal have already had an opportunity of becoming familiar. In addition the volume contains the following—

ADDENDUM TO THE UNOFFICIAL FORMULARY.

Acidum Hydrocyanicum (Scheele).

Hydrocyanic Acid (Scheele).

Take of—

Ferrocyanide of potassium . . .	2½ oz.
Sulphuric acid	1 fluid oz.

Distilled water, 24 fl. ozs., or a sufficient quantity.

Dissolve the ferrocyanide of potassium in 10 ounces of the water, then add the sulphuric acid, previously diluted with 4 ounces of the water, and cooled. Put the solution into a flask, to which are attached a condenser and a receiver arranged for distillation, and having previously put 1 ounce of distilled water into the receiver, and provided efficient means for keeping the condenser and receiver cold, cautiously apply heat to the flask, until by slow distillation the liquid in the receiver is increased to 10 fluid ounces. Add to the product as much water as may be sufficient to bring the acid to the required strength.

Characters and Tests.—A colourless liquid. Specific gravity, 0·994. A fluid drachm of it leaves on evaporation no fixed residue. It gives no precipitate with chloride of barium, but with nitrate of silver it yields a white precipitate, entirely soluble in boiling concentrated nitric acid. Its strength, as determined by the process of the British Pharmacopœia by means of volumetric solution of nitrate of silver, corresponds to 4 per cent. of hydrocyanic acid.

Dose.—1 to 4 minims.

Acidum Hypophosphorosum.

Hypophosphorous Acid.

Take of—

Hypophosphite of barium	8 oz.

(Containing not less than 95 per cent. $Ba2(PH_2O_2)H_2O$).

Diluted sulphuric acid Distilled water	of each a sufficient quantity.

Dissolve the hypophosphite of barium in 36 fluid ounces of hot distilled water. Add slowly to the solution 17 fluid ounces of diluted sulphuric acid, after which continue the addition, drop by drop, until no further turbidity is produced. Set aside in a warm place, and pass the clear liquid through a filter. Wash the precipitate by decantation with successive portions of hot distilled water, until the washings have no longer an acid reaction. Filter, unite the filtrates, and evaporate the liquid on a water-bath to the prescribed density. The product will weigh about 11½ ounces.

Characters and Tests.—Colourless. Specific gravity, 1·1367. Its strength, as determined by volumetric solution of soda, corresponds to 30 per cent. of hypophosphorous acid. Its aqueous solution is not precipitated by diluted sulphuric acid, nor by an excess of ammonia, nor by oxalate of ammonia after neutralization, and gives not more than a faint opalescence with chloride of barium. If solution of ammonio-sulphate of magnesium be added after an excess of ammonia, no precipitate is produced. Chloride of calcium added to a neutralized solution yields no precipitate.

Dose.—2 to 5 minims.

Chloroformum Aconiti.

Chloroform of Aconite.

Take of—

Aconite root	20 ozs.
Strong solution of ammonia . . .	1½ fl. oz.
Distilled water	1 pint.

Chloroform, a sufficient quantity.

Bruise the aconite root, and moisten thoroughly with the strong solution of ammonia and distilled water previously mixed. Macerate for four hours, dry carefully, and reduce to No. 40 powder. Pack tightly in a percolator provided with a tap and closely-fitting cover. Macerate for twenty-four hours with 20 fluid ounces of chloroform, then pour on successive quantities of chloroform, percolating slowly until 30 fluid ounces are obtained.

Chloroformum Belladonnæ.

Chloroform of Belladonna.

Prepared as chloroform of aconite (*q.v.*), substituting belladonna root for aconite.

Chloroformum Camphoratum.

Camphorated Chloroform.

Take of—

Camphor	2 ozs.
Chloroform	1 fl. oz.

Dissolve.

Elixir Sennæ.

Elixir of Senna.

Take of—

Alexandrian senna	1 pound.
Refined sugar, in coarse powder .	12 ozs.
Rectified spirit Distilled water	of each a sufficient quantity.

Mix 4 fluid ounces of rectified spirit with 12 fluid ounces of water, and with it moisten evenly the senna. Pack tightly in a closed vessel, and macerate for three days. Express forcibly, and pour the product on the sugar. Break up the marc, and add to it sufficient of the same menstruum to furnish in all 16 fluid ounces of product. Express again after twenty-four hours' maceration, add the liquor to the previously obtained product and the sugar, heat in a closed vessel by means of a water bath to 200° F., and maintain at that temperature for ten minutes. When cold strain and add, after mixing—

Chloroform	2¼ minims.
Oil of coriander	2½ „
Tincture of capsicum	½ fluid drm.
Rectified spirit	3 „

Agitate thoroughly, and if necessary, add proof spirit to make the product measure 24 fluid ounces.

Dose.—1 to 3 fluid drachms.

Extractum Hæmatoxyli Liquidum.

Liquid Extract of Logwood.

Take of—

Unfermented logwood in No. 16 powder .	20 ozs.
Distilled water	6 pints.

Boil the logwood with two pints of water in a covered copper or enamelled pan for half an hour, and strain. Add two pints of water, boil for another half-hour, and again strain. Repeat the process for a third time, and having mixed the strained liquors, evaporate over a water-bath (or preferably *in vacuo*) until the product measures 1 pint. Set aside for seven days, and then decant the clear liquor by means of a syphon from any sediment that may have been deposited.

Dose.—½ to 2 fluid drachms.

Syrupus Calcii Hypophosphitis.

Syrup of Hypophosphite of Calcium.

Take of—

Hypophosphite of calcium . .	160 grains.
Distilled water	9 fluid ozs.

Dissolve and filter. To the filtered solution add

Refined sugar . . . . 1 pound.

Dissolve with the aid of a little heat, strain, and add after cooling,

Hypophosphorous acid . . . 20 minims.

Distilled water, sufficient to produce 1 pint.

Mix. Each fluid drachm contains 1 grain of hypophosphite of calcium.

Dose.—1 to 4 fluid drachms.

Syrupus Sodii Hypophosphitis.

Syrup of Hypophosphite of Sodium.

Take of—

Hypophosphite of sodium . .	160 grains.
Distilled water	3 fluid drms.

Dissolve, filter, and wash the filter with distilled water, 1 fluid drachm. To the filtered solution add

Syrup, sufficient to produce . . 1 pint.

Mix. Each fluid drachm contains 1 grain of hypophosphite of sodium.

Dose.—1 to 4 fluid drachms.

Obituary.

Notice has been received of the death of the following:—

On the 16th of December, Mr. Samuel Beanland, Chemist and Druggist, Great Horton, Bradford. Aged 63 years.

On the 17th of December, Mr. Alfred Reginald Fresson, Chemist and Druggist, Queen Street, Burslem. Aged 24 years. Mr. Fresson was an Associate in Business of the Pharmaceutical Society.

On the 20th of December, Mr. Arthur Ballard, Chemist and Druggist, Market Place, Farringdon. Aged 49 years.

On the 22nd of December, Mr. George Fowlie, Chemist and Druggist, High Street, Turriff. Aged 63 years.

On the 25th of December, Mr. Harry Walter Brown, Chemist and Druggist, Blackfriars Road, London. Aged 27 years.

On the 5th of January, of pneumonia, Mr. Thomas Oliver Sandell, Pharmaceutical Chemist, F.C.S., Keane Terrace, West Kensington. Aged 45 years. Mr. Sandell had been a member of the Pharmaceutical Society since 1879, and at the time of his death was Divisional Secretary for the borough of Fulham.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

UNQUALIFIED ASSISTANTS.

Sir,—Your correspondent, Mr. E. Cullinan, omits, perhaps purposely, to mention the men who registered under the Pharmacy Act, 1868. Did they pass the Society's examination? Are they qualified? A man may hold the Society's diploma and be graceful at the same time.

J. WOOD.

[⁂ We fail to perceive what application the above query has to Mr. Cullinan's argument. The fact that men received legal qualification in 1868 in virtue of vested rights does not constitute any reason for perpetuating such a proceeding —ED. P. J.]

STERCULIA GUM.

Sir,—In a letter I have just received from Dr. Dymock some further light is thrown on the occurrence of acetic acid in this gum. He writes as follows:—

"*Sterculia urens* gum, when fresh, does not smell of acetic acid, and Mr. Prebble has some, gathered six months or more ago, which has no smell. I have a *Sterculia urens* in my garden and have had daily opportunities of observing it. Mr. Prebble has been making experiments with it since the appearance of Mr. Maiden's paper in the Journal, which clearly prove that the statements in that paper do not apply to sterculia gum of tolerable freshness, at any rate."

It would appear, therefore, either that there must be some ferment present in the gum which causes the subsequent development of acetic acid; or that the gum is derived from another tree, possibly *Cochlespermum gossypium*. This seems the more probable, inasmuch as Mr. Maiden does not state that either of the Australian gums (*Sterculia diversifolia*, G. Don., and *S. rupestris*, Benth.) possess the odour of acetic acid. We may hope however that Mr. Prebble will be able to clear up the source of the gum with certainty and to ascertain whether the acetic acid is developed subsequently to collection.

E. M. HOLMES.

Chamomile.—Cigarettes made from the leaves of *Datura Tatula* have been recommended for the purpose. The following formula has been published for Vaquelin's "Anti-asthmatic Cigarettes": Sodium arsenate, 3 grains; extract of belladonna, 8 grains; extract of stramonium, 8 grains. Dissolve the arsenate of sodium in a small quantity of water, rub it with the two extracts, then soak up the whole mixture with fine blotting paper, which is dried and cut into twenty-four equal parts, each of which is rolled up in a piece of cigarette paper. Four or five inhalations from a cigarette as a dose.

Wrong Either Way.—Where no harm would result from dispensing the prescription as written, as is probably the case in the instances submitted, it is advisable to follow the directions of the prescriber.

Gilbert asks what is formed when liquor ammoniæ and hydrogen peroxide are mixed, and in what proportions they should be mixed to be useful to clear the throat for singers.

T. J. Jones.—After a preliminary treatment with solution of carbonate of ammonia the hair is steeped in a bath of peroxide of hydrogen, neutralized with ammonia. See a paper on "Peroxide as a means of Bleaching," in the *Pharmaceutical Journal* [3], vol. xii., p. 745.

Argentum.—If the term "bifatty molecule" has any significance chemically it would mean a molecule in which two combining proportions of fat acid were united with one of base, or, in other words, a molecule in which only half the replaceable hydrogen of a fat acid was replaced by a metal. The statement that soap can be of this nature appears to belong to the category of bunkum.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Tyrer, Wilson, Squire, Tweedie, Sowerby, Wright, Spero, Inquirer.

RECENT DONATIONS TO THE MUSEUM.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

ALOES.

Two specimens of aloes from the Dutch West Indies were presented by Professor Van Eeden to the Museum a few weeks ago, one of which was stated to have been prepared from *Aloe vulgaris* and the other from *Aloe spicata*. Both, however, seemed extremely similar in odour, and also in appearance. The statement that one of them was prepared from *A. spicata* aroused my curiosity, the more so that the information concerning Curaçao aloes in 'Pharmacographia' is extremely meagre, and it is there (2d. ed., p. 679) said to be derived from *A. vulgaris*.

Curaçao aloes has a distinctive odour as met with in English commerce, and differs also from the Barbadoes variety (comparatively little of which is, I believe, now imported) in its more pitch-like character of losing its shape and in its more glossy surface. In appearance it is sometimes translucent and sometimes opaque, the translucent varieties, even when retained in the original packing cases, becoming opaque on keeping, apparently due to the aloin assuming the crystalline form. Sometimes the colour is yellowish brown and sometimes blackish brown. But the probable reasons for these variations have not, that I am aware of, been hitherto published, and the information that I have been able to obtain through the kindness of Professor Van Eeden concerning Curaçao aloes, and from Mr. F. Watts, late of Montserrat, concerning Barbadoes aloes, may perhaps throw a little light upon this point. Professor Van Eeden writes as follows in reply to my inquiry whether *Aloe spicata* is cultivated to any extent in the Dutch Colonies, and if he could supply any details as to the mode of preparation of Curaçao aloes.

"In Curaçao, Aruba and Bonaire only *Aloe vulgaris* is cultivated. *A. spicata* is rather rare.

"About the years 1853–60 Professor Vriese introduced *A. succotrina* into Curaçao, probably under the belief then current that this plant yielded Socotrine aloes, but Professor Suringar, who visited the island in 1886, could not find one specimen. On his return to Holland he also sent plants of *A. succotrina* to Curaçao and Aruba. What became of those sent to Curaçao I do not know. The plants sent to Aruba arrived in a very bad condition, and died after having been planted. It seems, however, to be very desirable for Curaçao that the cultivation of a better kind than *A. vulgaris* should be tried, for the low price of the Curaçao aloes, always considered as a very inferior kind, does not pay the wages given for cutting. In Curaçao the product is only used as a remedy for animals; a few years ago also for the preparation of the Bismarck colours then in fashion. The cultivation of the *A. vulgaris* is carried on in Curaçao in a very simple fashion.

"As soon as the trees and bushes are removed from the ground desired for the aloe cultivation, the field is fit to receive the young plants. No manure whatever is required, nor any further preparation of the soil. Hedges are unnecessary, as no animals attack the plants, except perhaps the pigs, which will sometimes dig up the roots. The young plants are put into the ground at the distance of 2 feet at the most and soon begin to grow, even if, by ill luck, the young roots have to find their way on a piece of rock or between two stones. When the plant has had during its growth a sufficient quantity of rain, it not only produces every year an abundance of juice, but also many young sprouts, growing all round the mother plant. These young plants are sold by thousands on the Curaçao market. I do not believe, at least in Curaçao, aloes are ever cultivated from the seed.

"A short time after sufficient rain the aloe plant is cut, the juice directly after the rain being too watery, and in the dry season too thick. In Aruba the cutting of the leaves is done by men, and in Curaçao and Bonaire by women. Armed with an ordinary bread-knife for this purpose, the crown of the plant is seized in one hand, while with the other a horizontal cut is made all round the stem immediately over the so-called bottom, so that by one stroke all the large leaves are loosened. In Bonaire the young sprouts at the base of the large leaves are spared in this operation, not so in Aruba, where the plant is said to form new sprouts notwithstanding the mutilation.

"In the neighbourhood of the cutters long wooden troughs are placed, one end of which is open. The trough is supported on four wooden legs, in trestle fashion, the two legs supporting the open end of the trough being shorter, so that the trough slopes downwards to its open end. Under the open end of the trough is placed a round tin, generally one of those in which the North American butter is imported into these islands. At the closed end of the trough the aloe leaves are placed upright, and close together, the juice from the cut ends running down the sloping bottom of the trough into the tin placed beneath. As soon as the tin is filled the contents are poured into an empty barrel. The leaves are then spread upon the ground, and when dry are sometimes used as fodder for asses and other animals.

"When the aloe field has its own brick furnace the contents of the barrels are immediately poured into a large copper kettle, in which the juice is heated over a large naked fire up to a certain point, under perpetual stirring. After that it is thrown whilst still hot into the square wooden chests, in which it is allowed to cool. These chests are afterwards fastened down and brought into commerce.

"When there is no furnace on the plantation, the full barrels are taken on carts to a so-called boiling house. In the boiling house the aloes has to remain some time until several barrels have accumulated, and here fermentation may take place between the time of collecting and boiling.

"In Aruba there exists but one boiling house driven by steam, so that the aloes prepared here are not heated over the open fire.

"In this boiling house, situated south of Orangestad, the aloes is also sold. The export of aloes from the Dutch W. Indies from 1885-1887 was as follows:—

	Kilograms.		
	1885.	1886.	1887.
Curaçao . . .	2080	500	—
Bonaire . . .	5821	18,640	2075
Aruba	123,115	158,011	189,925

"Probably these three kinds of aloes pass on the market as Curaçao aloes, for Bonaire and Aruba bring their produce to Curaçao, as the great commercial firms have their counting-houses there. Aruba aloes is sent regularly to the English market, at least it was so three years ago.

"The present condition of aloe cultivation is far from flourishing, which is due, according to the Governor's report, to the low price it fetches in the European market."

In addition to the above interesting information contributed by Professor Van Eeden, that given by Mr. F. Watts, of Montserrat, may with propriety be mentioned here. A year or more ago Mr. Watts brought me a small sample of the juice of *Aloe vulgaris* very carefully prepared, I believe in vacuo, in a form closely resembling that of the dry French extracts. This really excellent preparation he thought of placing on the London market, but I presume, on learning the low price paid here for Barbadoes and Curaçao aloes, he found it could not compete in price with them, as I have heard no more of it. I took the opportunity presented by his visit, to make inquiry concerning the mode of preparation and the reason of the great variation in colour and quality of the Barbadoes aloes. The information he gave me as to the mode of preparation closely resembled that more recently given by Professor Van Eeden concerning Curaçao aloes. He stated, however, that the juice was generally evaporated at boiling houses, the owners of which would not boil down less than 50 gallons at a time, and, consequently, unless five persons brought 10 gallons or ten persons 5 gallons at one time, the boiling would not be commenced, and fermentation took place during the time elapsing before the proper quantity was brought. Under such cases the resulting aloes became darker in colour. Only *Aloes vulgaris* was employed, so far as he had observed.

In conclusion I may remark that the Dutch with their usual practical wisdom and promptitude propose to cultivate the best procurable variety of aloes, so that in a few years we may expect to receive socotrine aloes of good quality from the Dutch.[*]

The two specimens of aloes first received, as well as one from Aruba and another from Bonaire, sent still more recently by Professor Van Eeden, have been tested at my request by Messrs. Bainbridge and Morrow, with the following results:—

No. 1. "*Aloe vulgaris*."—This specimen gave with nitric acid an evanescent crimson colour and with sulphuric acid and the vapour of nitric acid a slight bluish-green tint; with Cripps and Dymond's test (see p. 570) an orange red colour, and on the addition of ammonia a claret colour.

No. 2. "*Aloe spicata*."—The reactions with this specimen were exactly identical with those given with No. 1.

No. 3. Aruba Aloes.—This specimen gave with nitric acid a permanent deep red, and with sulphuric acid and the vapour of nitric acid no reaction; with the Cripps and Dymond test a deep orange red and on the addition of ammonia a dark claret colour.

Bromine water in sufficient quantity to form a paste gave a purplish-pink permanent coloration.

No. 4. Bonaire Aloes.—With this specimen nitric acid produced a permanent deep red colour with sulphuric acid and the vapour of nitric acid no reaction; with the Cripps and Dymond test a deep orange red, and on the addition of ammonia a dark red bromine water gave a pinkish-brown tinge only.

If the reactions given by these samples be compared with those obtained by Messrs. Bainbridge and Morrow with aloe juice from authenticated plants (see p. 571) the inference may, I think, be fairly drawn that No. 1 and 2 of Professor Van Eeden's specimens are identical, and that some mistake must have occurred in the packing, and that in the Aruba and Bonaire specimens the ordinary reactions for aloes derived from *Aloe vulgaris* have been modified to a greater or less extent by the introduction of *A. succotrina* and *A. spicata* into these islands.

AUSTRALIAN AND TASMANIAN SANDARACH.[*]

BY J. H. MAIDEN, F.L.S., F.C.S., ETC.,

Curator of the Technological Museum, Sydney.

It was a specimen of resin from the Oyster Bay pine of Tasmania, sent to the Exhibition of 1851, which first drew the attention of experts to the possibilities of Australian sandarach. For "the fine pale resin of the Oyster Bay pine (*Callitris australis*), from the eastern coast of Van Diemen's Land," and other gums and resins, Mr. J. Milligan was awarded honourable mention (Jury Reports, 1851 Exhibition, p. 182).

This is one of the most valuable of Australian[†] vegetable products, a market is ready for it, and it seems strange that it should have been so long neglected. There are no statistics available in regard to the importation of sandarach into these colonies, but to bring it here at all is a veritable "carrying coals to Newcastle."

Ordinary sandarach exudes naturally, but the practice in Northern Africa is to stimulate the flow, making incisions in the stem, particularly near the base. In various parts of Australia and Tasmania there are vast numbers of *Callitris* trees, their resin, often abundant, can readily be collected, and the author is sure that, even with the cheap labour of Northern Africa to contend against, it can be profitably gathered during a portion of the year, by parties of men, or the families of settlers. The approximate price of sandarach, in London, is 60–115*s.* per cwt., and there is no difference between it and the colonial article. As to the cultivation of the trees, Baron von Mueller ('Select Extra-Tropical Plants,' Victorian edition), states, "Probably it would be more profitable to devote sandy desert land, which could not be brought under irrigation, to the culture of the sandarach cypresses, than to pastoral purposes, but boring beetles must be kept off." It is also to be borne in mind that *Callitris* timber is valuable.

The sandarach, or gum juniper of commerce, is the product of a *Callitris* (*quadrivalvis*), and the latest classification of Australian sandarach trees (that of Baron von Mueller), places them under *Callitris* likewise. The following summary of the uses of sandarach, is taken from Morel (*Pharm. Journ.*, [3], viii., 1024). "According to Gubler, the Arabs used it as a remedy against diarrhœa, and to lull pain in hæmorrhoids. The Chinese employed it (*C. sinensis*) as a stimulant in the treatment of ulcers (as promoting the growth of flesh), as a deodoriser, and to preserve clothes from the attacks of insects. In Europe it is used very little in medicine. It is most frequently employed as an ingredient in varnish, to increase its hardness and glossiness. It is used also as a fumigant, and in powder ('pounce') to dust over paper from which the surface has been scraped, to prevent the ink running. Rarely, it enters into the composition of plasters." In Southern New South Wales (Snowy River), *Callitris* resin is often mixed with fat by the settlers, to make candles.

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[*] Some time since I induced Mr. J. Medley Wood to experiment with the *Aloe Perryi* plant at Natal, but he informed me the plant received from Kew did not flourish, and, I believe, eventually died.

[*] From the 'Proc. of the Royal Soc. of Tasmania.'

[†] This word is here used in its widest sense, and, of course, includes Tasmania.

All our native sandarachs possess a pleasant aromatic odour, similar in character to that emitted by sandarach.

When the trees are wounded the resin exudes in an almost colourless, transparent condition. It has obviously high refractive power, and is much like ordinary pine resin in taste, smell, and outward appearance, when the latter is freshly exuding. This transparent appearance is preserved for a considerable time, the resin meantime darkening a little with age. Old samples possess a mealy appearance, but this is merely superficial. The origin of this appearance has been explained as follows in regard to sandarach, and doubtless the simple explanation holds good here:—

"The surface of the tears appears to be covered, more or less, with powder, but this character is not to be attributed, as alleged by Herlant ('Etude sur les produits résineux de la famille des conifères,' p. 38), to the friction of the fragments one against another, but, as has been ascertained by a microscopical examination by Dr. Julius Wiesner ('Die chemisch-technisch verwendte Gummiarten, Harze and Balsame,' 1869, p. 129), to the unequal contraction of the resin while drying, resulting in a mass of fissures that form, as in the case of several kinds of copal, facets that gradually separate from the mass, and constitute the 'powder' of many authors" (Morel, *op. cit.*). Evidence against Herlant's supposition is also found in the fact that resins of the sandarach class are mealy *while on the trees*, after they have been exuded some little time, showing that the appearance is brought about by exposure to the weather.

The *Callitris* resins soften slightly, but do not melt in boiling water, and a sample of commercial sandarach behaves similarly. In the mouth they feel gritty to the teeth, and in no way different from sandarach. When freshly exuded they are very irritating to a cut.

Following are descriptions of actual specimens of resins of different species. For the results of analyses of sandarach for comparison, see 'Gmelin,' xvii., 429.

CALLITRIS CUPRESSIFORMIS, Vent. Muell., 'Cens.,' p. 109. Syn. *C. australis* (ined.). *Frenela rhomboidea*, Endl. Var. *Tasmanica*, Benth. *F. Ventenatii*, Mirb., 'B. Fl.,' vi., 238, and others.

"The Oyster Bay Pine of Tasmania." Found in all the colonies except Western Australia (normal species).

This is the pine already referred to, and a brief account of the resin has been copied into many of the text-books. I have collected resin of this species from Port Jackson, clear and transparent as water. It turns pale amber coloured in twelve months if placed in a bottle, but its brilliancy shows no sign of diminution in that time. The Sydney trees readily exude their resin on slightly wounding, and the same remarks apply to the Tasmanian.

CALLITRIS CALCARATA, R. Br. Syn. *Frenela Endlicheri*, Parlat., 'B. Fl.,' vi., 238.

Found from Northern Victoria to Central Queensland. "Murray Pine," "Black Pine," "Red Pine," "Scrub Pine," "Cypress Pine."

Sample 1. "Murray Pine," Quiedong, 3rd March, 1887. Has a pale, bleached appearance, much lighter than ordinary sandarach. Externally it has a very mealy appearance. Water has no effect on it. In rectified spirit it almost wholly dissolves, leaving a little whitish, resinoid substance. Petroleum spirit dissolves 5 per cent. of a perfectly colourless and transparent resin.

Sample 2.—I have received a quantity of flesh-coloured resin from the Snowy River, N.S.W., belonging to this species. It is so different in appearance from the normal resin, that no market can at present be found for it, and as this is the first time such resin, in quantity, has come under my notice, it is well worth describing. It is of the consistence and general appearance of Manila elemi, differing from that substance in being of a flesh-colour and having a pure turpentine odour, instead of a turpentine-fennel one. There is no doubt that it would form a valuable ingredient in plasters, and an enterprising pharmacist would doubtless find it worth his while to follow the matter up.

It is a remarkable circumstance that the trees yielding this resin had also, at other portions of the stem, more or less of the normal sandarach.

Sample 3. "Red Pine." Lachlan River, N.S.W. Feb. 1885. This has comparatively freshly exuded, and has the colour and appearance of the best selected sandarach.

Rectified spirit nearly wholly dissolves it, forming a beautifully clear, slightly yellowish liquid; 1·3 per cent. of residue remains. Petroleum spirit extracts 22·1 per cent. of an apparently perfectly colourless and transparent resin.

CALLITRIS COLUMELLARIS, F. v. M. Syn. *Frenela robusta*, A. Cunn., var. *microcarpa*, Benth. 'B. Fl.,' vi., 237.

Sample 4. "Cypress Pine," etc. Found in New South Wales and Queensland. Received from the Botanic Gardens, Sydney, Dec., 1887.

This is in much larger masses than the others, and some of it has been exuded for a considerable time. It is next lightest in colour to No. 1.

It almost wholly dissolves in rectified spirit, forming a pale yellow solution. The insoluble residue amounts to 4·6 per cent. Petroleum spirit, when digested on the residue, removes no less than 35·8 per cent. of a transparent colourless resin. This is a remarkable percentage, and it would be worth while to inquire whether Australian sandarach becomes increasingly soluble in that menstruum by age. An ordinary sample of commercial sandarach yielded 8·9 per cent. to petroleum spirit.

CALLITRIS VERRUCOSA, *R. Br.* Syn. *Callitris Preissii*, Miq. *Frenela robusta*, A. Cunn. and others. 'B. Fl.,' vi., 236. The following note by Dr. Julius Morel (*Pharm. Journ.*, [3], viii., 1025), in regard to a South Australian specimen, is interesting. "With Sandarach resin may be connected another resinous substance, which was exhibited in the Paris Exhibition of 1867 from South Australia, under the name of 'pine gum.' It is the resin of *Callitris Reissii*, Miq. (a misprint for *Preissii*). This product resembles sandarach, and might become an important article of commerce . . . . This resinous substance occurs in the form of slightly yellowish tears, thicker and longer than those of ordinary sandarach. In consequence of unequal contraction, it presents, like sandarach, numerous facets, and consequently the surface appears to be covered with a white powder. By examining this resin under the microscope, Wiesner ascertained that the finer fissures were derived from the larger ones. In its transparency and hardness the resin corresponds to sandarach. Its odour is very agreeable and balsamic, and its taste is bitter and aromatic."

"Mountain Cypress Pine," "Desert Pine." "A sandarach in larger tears than ordinary sandarach is yielded by this species. It yields it in considerable abundance, eight or ten ounces being frequently found at the foot of a single tree, but although this exudes naturally, the supply is stimulated by incisions" (Victorian Cat. Col. and Ind. Exhib., 1886).

"It is a transparent, colourless, or pale yellow body, fragrant and friable, fusing at a moderate temperature, and burning with a large, smoky flame, very soluble in alcohol and the essential oils, and almost totally so in ether; turpentine at the ordinary temperature does not act upon it, nor do the drying oils, but it may be made to combine with these solvents by previous fusion" (Report on Indigenous Veget. Subst. Victorian Exh., 1861).

Sample 5. Obtained from the Botanical Gardens, Sydney, December 29, 1887; no particulars available.

Of a dark amber colour, and externally possessing the dulled appearance found with lumps of amber. It is the darkest resin examined by me.

It almost wholly dissolves in rectified spirit, yielding a bright yellow liquid, leaving 2·5 per cent. of insoluble residue. Petroleum spirit removes 22·8 per cent. of a clear resin when the original substance is digested in it.

DO PLANTS ABSORB NITROGEN DIRECTLY FROM THE ATMOSPHERE?

Since the apparently conclusive experiments of Boussingault, which were completed as long ago as 1854, it has been accepted as an axiom in physiological botany that the free nitrogen of the atmosphere is useless to plants for the purpose of assimilation, and that the exclusive source of their nitrogenous compounds is the soluble nitrates in the soil. But, like so many generally accepted beliefs, very grave doubt is now thrown on the correctness of this view by several papers in the "Landwirthschaftliche Jahrbücher," by Dr. B. Frank. In these papers the results are given of a series of experiments which he considers to prove the point that the amount of nitrogen in the tissues of the plant is in excess of that which could possibly be due to the soluble nitrates absorbed from the soil. The nitrogen which must thus have been absorbed through the leaves directly from the atmosphere, is perhaps in the tissues in the form of organic nitrogenous compounds, not of nitrates. The nitrates present in the tissues of plants, the amount of which varies greatly with different plants, are entirely absorbed as such through the roots. Dr. Frank believes that the low forms of vegetable life, such as *Oscillaria*, *Ulothrix*, *Pleurococcus*, *Chlorococcum*, and the protonemes of mosses, have especially this power of removing free nitrogen from the atmosphere, and forming therefrom nitrogenous compounds; but that the property is probably common to all vegetable organisms which contain chlorophyll, and that, like the assimilation of carbon, it is a function of their chlorophyll.

Drs. Hellriegel and Willfarth have put forward another view,—that there is an essential difference between the way in which Leguminosæ obtain their nitrogen, and that of other plants. They claim to have determined by experiment that the growth of barley and oats is in direct proportion to the amount of nitrates absorbed from the soil, and that they are totally unable to live in a soil entirely deprived of nitrates. This is not the case, on the other hand, with vetches, which may grow luxuriantly in a soil containing no nitrogen, and which must, therefore, obtain their nutriment from some other source, viz., the free nitrogen of the atmosphere. The authors advance the theory that they do not do this directly, but through the instrumentality of the microbes contained in the tubers which occur on the roots of the vetch, bean, and many other plants belonging to the Leguminosæ. These microbes, therefore, carry on a symbiotic existence with the host-plant, the microbes contained in the soil not being available for this purpose.

To this Dr. Frank replies, dissenting from the distinction drawn by Hellriegel and Willfarth between Leguminosæ on the one hand, and grasses and other orders of plants on the other hand; all of which, he maintains, are, in certain conditions, capable of assimilating directly the free nitrogen of the air. He further points out that there is no single direct observation to connect the "bacteroids" in the root-tubers of Leguminosæ with this supposed function, that the fact of their being living organisms is subject to considerable doubt, and that their structure and mode of life are altogether different from those of "mycorhiza," in which a true symbiosis between the fungus and the root which it envelopes has been satisfactorily demonstrated.

THE EFFECT OF LIGHT UPON MATTER.*

BY CAPTAIN W. DE W. ABNEY, C.B., R.E., F.R.S.

(*Concluded from page* 550.)

The coloration by light of the chloride of silver naturally leads our thoughts to the subject of photography in natural colours. The question is often asked when photography in natural colours will be discovered. Photography in natural colours not only has been discovered, but pictures in natural colours have been produced. I am not alluding to the pictures produced by manual work, and which have from time to time been foisted on a credulous public as being produced by the action of light itself, much to the damage of photography and usually to the so-called inventors. Roughly speaking, the method of producing the spectrum in its natural colours is to chlorinize a silver plate, expose it to white light till it assumes a violet colour, heat till it becomes rather ruddy, and expose it to a bright spectrum. The spectrum colours are then impressed in their natural tints. Experiment has shown that these colours are due to an oxidized product being formed at the red end of the spectrum and a reduced product at the violet end. Photography in natural colours, however, is only interesting from a scientific point of view, and, so far as I can see, can never have a commercial value. A process to be useful must be one by which reproductions are quickly made; in other words, it must be a developing and not a printing process, and it must be taken in the camera, for any printing process requires not only a bright light but also a prolonged exposure. Now it can be conceived that in a substance which absorbs all the visible spectrum the molecules can be so shaken and sifted by the different rays that eventually they sort themselves into masses which reflect the particular rays by which they are shaken; but it is almost—I might say, quite—impossible to believe that when the sifting has only been commenced, as it would be in the short exposure to which a camera picture is submitted, the substance deposited to build up the image by purely chemical means would be so obliging as to deposit in that the particular size of particle which should give to the image the colour of the nucleus on which it was depositing. I am aware that in the early days of photography we heard a good deal about curious results that had been obtained in negatives, where red brick houses were shown as red and the blue sky as bluish. The cause of these few coincidences is not hard to explain, and would be exactly the same as when the red brick houses were shown as bluish and the sky as red in a negative. The records of the production of the latter negatives are naturally not abundant, since they would not attract much attention. I may repeat, then, that photography in natural colours by a printing-out process—by which I mean by the action of light alone—is not only possible but has been done, but that the production of a negative in natural colours from which prints in natural colours might be produced appears, in the present state of our knowledge, to be impossible. Supposing it were not impracticable, it would be unsatisfactory, as the light with which the picture was impressed would be very different from that in which it would be viewed. Artists are fully aware of this difficulty in painting, and take their precautions against it.

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* Extract from the Presidential Address to the Mathematical and Physical Section of the British Association.

The nearest approach to success in producing coloured pictures by light alone is the method of taking three negatives of the same subject through different coloured glasses, complementary to the three colour sensations which together give to the eye the sensations of white light. The method is open to objection on account of the impure colour of the glasses used. If a device could be adopted whereby only those three parts of the spectrum could be severally used which form the colour sensations, the method would be more perfect than it is at present. Even then perfection could not be attained, owing to a defect which is inherent in photography, and which cannot be eliminated. This defect is the imperfect representation of gradation of tone. For instance, if we have a strip graduated from what we call black to white (it must be recollected that no tone can scientifically be called black, and none white), and photograph it, we shall find that in a print from the negative the darkness which is supposed to represent a grey of equal mixtures of black and white by no means does so unless the black is not as black nor the white as white as the original. The cause of this untruthfulness in photography has occupied my attention for several years, and it has been my endeavour to find out some law which will give us the density of a silver deposit on a negative corresponding with the intensity of the light acting. I am glad to say that at the beginning of this year a law disclosed itself, and I find that the transparency of a silver deposit caused by development can be put into the form of the law of error.

This law can be scarcely empiric, though at first sight it appears that the manipulations in photography are so loose that it should be so. It is this very looseness, however, which shows that the law is applicable, since in all cases I have tried it is obeyed. That there are theoretical difficulties cannot be denied, but it is believed that strictly theoretical reasoning will eventually reconcile theory with observation.

This want of truth in photography in rendering gradation, then, puts it out of the range of possibility that photography in natural colours can ever be exact, or that the three negatives system can ever get over the difficulty.

One of the reproaches that in early days was cast at photography was its inability to render colour in its proper monochromatic luminosity. Thus whilst a dark blue was rendered as white in a print—that is, gave a dense deposit in a negative—bright yellow was rendered as black in a print or nearly so—that is, as transparent or nearly transparent glass in the negative. To the eye the yellow might be far more luminous than the blue, but the luminosity was in the photograph reversed. I need scarcely say that the reason of this want of truth in the photograph is due to the want of sensitiveness of the ordinarily used silver salts to the least refrangible end of the spectrum. Some fifteen years ago Dr. H. W. Vogel announced the fact that when silver salts were stained with certain dyes they became sensitive to the colour of the spectrum, which the dyes absorbed. This at once opened up possibilities, which, however, were not at once realized, owing perhaps to the length of exposure required when the collodion process was employed. Shortly after the gelatine process was perfected, the same dyes were applied to plates prepared by this method, which, although they contained the same silver salts as the old collodion process, yet *per se* were very much more sensitive. A new era then dawned for what has been termed isochromatic and orthochromatic photography. The dyes principally used are those belonging to the eosin group and cyanin—not the ordinary cyanine dye of commerce, but that discovered by Greville Williams. For a dye to be of use in this manner it may be taken as an axiom—first propounded by the speaker, it is believed—that it must be fugitive, or that it must be capable of forming a silver compound. The more stable a dye is the less effective it is. If we take as an example cyanine we find that it absorbs in the orange and slightly in the red. If paper or collodion stained with this colouring matter be exposed to the action of the spectrum, it will be found that the dye bleaches in exactly the same part of the spectrum as that in which it absorbs, following, indeed, the universal law I have already alluded to. If a film containing a silver salt be dyed with the same, it will be found that, whilst the spectrum acts on it in the usual manner—viz., darkening it in the blue, violet, and ultra-violet—the colour is discharged where the dye absorbs, showing that in one part of the spectrum it is the silver salt which is sensitive, and that in the other it is the colouring matter. If such a plate, after exposure to the spectrum, be developed it will be found that at both parts a deposit of silver takes place; and further, when the experiment is carefully conducted, if a plate with merely cyanine-coloured collodion be exposed to the spectrum and bleached in the orange, and after removal to the dark room another film containing a silver salt be applied and then a developer, a deposit of silver will take place where the bleaching has occurred. This points to the fact that the molecules of a fugitive dye, when altered by light, are unsatisfied, and are ready to take up an atom or atoms of silver, and other molecules of silver will deposit on such nuclei by an action which has various names in physical science, but which I do not care to mention. This is the theory which I have always advocated, viz., that the dye by its reduction acts as a nucleus on which a deposit of silver can take place. It met with opposition; a rival theory which makes the dye an "optical sensitizer"—an expression which is capable of a meaning which I conceive contrary to physical laws—being run against it. The objection to what I may call the nucleus theory is less vigorous than it has been, and its diminution is due perhaps to the more perfect understanding of the meaning of each other by those engaged in the controversy. To my mind, the action of light on fugitive dyes is one of the most interesting in the whole realm of photography, as eventually it must teach us something as to the structure of molecules, and add to the methods by which their coarseness may be ascertained. Be the theory what it may, however, a definite result has been attained, and it is now possible to obtain a *fair* representation of the luminosity of colours by means of dyed films. At present the employment of coloured screens in front of the lens, or on the lens itself, is almost an essential in the method when daylight is employed, but not till some dye is discovered which shall make a film equally sensitive for the same luminosity to the whole visible spectrum will it be possible to make orthochromatic photography as perfect as it can be made. The very fact that no photograph of even a black and white gradation will render the latter correctly must of necessity render any process imperfect, and hence in the above sentence I have used the expression "as perfect as it can be made."

The delineation of the spectrum is one of the chief scientific applications to which photography has been put. From very early days the violet and ultra-violet end of the spectrum have been favourite objects for the photographic plate. To secure the yellow and red of the spectrum was, however, till of late years, a matter of apparently insurmountable difficulty; whilst a knowledge of that part of the spectrum which lies below the red was only to be gained by its heating effect. The introduction of the gelatine process enabled the green portion of the spectrum to impress itself on the sensitive surface; whilst the addition of various dyes, as before mentioned, allowed the yellow, the orange, and a portion of the red rays to become photographic rays. Some eight years ago it was my own good fortune to make the dark infra-red rays impress themselves on a plate. This last has been too much a specialty of my own, although full explanations have been given of the methods employed. By preparing a bromide of silver salt in a peculiar manner one is able so to modify the molecular arrangement of the atoms that they answer to the swings of those waves which give rise to these radiations. By employing this salt of silver in a film of collodion or gelatine the invisible part of the spectrum can be photographed and the images of bodies which are heated to less than red heat may be caused to impress themselves upon the sensitive plate. The greatest wave-length of the spectrum to which this salt is sensitive so far is 22,000λ, or five times the length of the visible spectrum. The exposure for such a wave-length is very prolonged, but down to a wave-length of 12,000 it is comparatively short, though not so short as that required for the blue rays to impress themselves on a collodion plate. The colour of the sensitive salt is a green blue by transmitted light; it has yet to be determined whether this colour is all due to the coarseness of the particles or to the absorption by the molecules. The fact that a film can be prepared which by transmitted light is yellow, and which may be indicative of colour due to fine particles, together with an absorption of the red and orange, points to the green colour being probably due to absorption by the molecules. We have thus in photography a means of recording phenomena in the spectrum from the ultra-violet to a very large wave-length in the infra-red—a power which physicists may some day turn to account. It would, for instance, be a research worth pursuing to photograph the heavens on a plate prepared with such a salt, and search for stars which are nearly dead or newly born, for in both cases the temperature at which they are may be such as to render them below red heat, and therefore invisible to the eye in the telescope. It would be a supplementary work to that being carried out by the brothers Henri, Common, Roberts, Gill, and others, who are busy securing photographic charts of the heavens in a manner which is beyond praise.

There is one other recent advance which has been made in scientific photography to which I may be permitted to allude, viz., that from being merely a qualitative recorder of the action of light it can now be used for quantitative measurement. I am not now alluding to photographic actinometers, such as have been brought to such a state of perfection by Roscoe—but what I allude to is the measurement and interpretation of the density of deposit in a negative. By making exposures of different lengths to a standard light, or to different known intensities of light on the same plate on which a negative has to be taken, the photographic values of the light acting to produce the densities on the different parts of the developed image can be readily found. Indeed, by making only two different exposures to the same light, or two exposures to two different intensities of light, and applying the law of density of deposit in regard to them, a curve is readily made from which the intensities of light necessary to give the different densities of deposit in the image impressed on the plate can be read off. The application of such scales of density to astronomical photographs, for example, cannot but be of the highest interest, and will render the records so made many times more valuable than they have hitherto been. I am informed that the United States astronomers have already adopted the use of such scales, which for the last three years I have advocated, and it may be expected that we shall have results from such scaled photographs which will give us information which would before have been scarcely hoped for.

One word as to a problem which we may say is as yet only qualitatively and not quantitatively solved. refer to the interchangeability of length of exposure for intensity of light. Put it in this way. Suppose, with a strong light, L, a short exposure, E, be given, a chemical change, C, is obtained: will the same change C be obtained if the time is only an *n*th of the light L, but *n* times the exposure? Now this is a very important point, more particularly when the body acted upon is fairly stable, as, for instance, some of the water-colour pigments, which are known to fade in sunshine, but might not be supposed to do so in the light of an ordinary room, even with prolonged exposure. Many experiments have been made at South Kensington as regards this, more especially with the salts of silver, and it is found that for any ordinary light, intensity and exposure are interchangeable, but that when the intensity of light is very feeble, say the $\frac{1}{1000000}$ of ordinary daylight, the exposure has to be rather more prolonged than it should be, supposing the exact interchangeability always held good; but it has never been found that a light was so feeble that no action could take place. Of course it must be borne in mind that the stability of the substance acted upon may have some effect; but the same results were obtained with matter which is vastly more stable than the ordinary silver salts. It may be said in truth that almost all matter which is not elemental is, in time and to some degree, acted upon by light.

I should like to have said something regarding the action of light on the iron and chromium salts, and so introduced the subject of platinotype and carbon printing, the former of which is creating a revolution in the production of artistic prints. I have, however, refrained from so doing. Photogravure and the kindred processes were also inviting subjects on which to dwell, more especially as at least one of them is based on the use of the same material as that on which the first camera picture was taken by Nièpce. Again, a dread of trenching on the domains of art restrains me. Indeed, it would have been almost impossible, and certainly impolitic, to have entered into the many branches of science and art which photography covers. I have tried to confine myself to some few advances that have been made in its theory and practice.

The discovery of the action of light on silver salts is one of the marvels of this century, and it is difficult to overrate the bearing it has had on the progress of science, more especially physical science. The discovery of telegraphy took place in the present reign, and two years later photography was practically introduced; and no two discoveries have had a more marked influence on mankind. Telegraphy, however, has had an advantage over photography in the scientific progress that it has made, in that electrical currents are subject to exact measurement, and that empiricism has no place with it. Photography, on the other hand, has laboured under the disadvantage that, though it is subject to measurement, the factors of exactitude have been hitherto absent. In photography we have to deal with molecules the equilibrium of whose components is more or less indifferent according to the process used; again, the light employed is such a varying factor that it is difficult to compare results. Perhaps more than any other disadvantage it labours under is that due to quackery of the worst description at the hands of some of its followers, who not only are self-asserting, but often ignorant of the very first principles of scientific investigation. Photography deserves to have followers of the highest scientific calibre; and if only some few more real physicists and chemists could be induced to unbend their minds and study the theory of an applied science which they often use for record or for pleasure, we might hope for some greater advance than has hitherto been possible.

Photography has been called the handmaid of Art; I venture to think it is even more so the handmaid of Science, and each step taken in perfecting it will render it more worthy of such a title.

The Pharmaceutical Journal.

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SATURDAY, JANUARY 18, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SEARCH FOR IMPROVED ANTIPYRETICS.

THE records of failures, when fairly told, are not unfrequently as instructive as those that register success. An instance of this occurs in two communications recently read before the Medical Faculty of the University of Dorpat, and published in the *Deutsche medicinische Wochenschrift* for January 9. These papers record little more than negative results, but are full of interest as indicating the direction in which some pharmacologists have been and are still searching for the perfect antipyretic. Upon the assumption that fever is associated with intensified oxidation processes in the system it has been thought that the introduction of reducing agents might at least affect favourably those symptoms depending upon increased body temperature. Further, it has been pointed out that one feature most modern antipyretics have in common is that they contain an amide group combined with a larger and more complex molecule. It seemed therefore that substances containing a double amide group would be particularly likely to exercise an antipyretic action, especially as diamide or hydrazin ($H_2N \cdot NH_2$) is known to possess enormous reducing properties. But hydrazin hydrate and the salts of hydrazin have been shown to be powerful protoplasm poisons, exercising their full influence immediately, and therefore too intense and poisonous to be administered to human beings. In seeking to modify this action by combination of hydrazin with a more complex radical the aromatic compounds were naturally thought of, because they possess generally antiseptic properties. Phenylhydrazin had proved, however, to be a powerful poison, causing a rapid and fundamental decomposition of the blood, being itself split up into hydrazin and carbolic acid. But as hydrochlorate of phenylhydrazin, when given cautiously in centigram doses, had manifested an antipyretic action, further modifications with still more complex groups were tried. Such were acetylphenylhydrazin, which was first introduced as "pyrodin" and afterwards in a purer form as "hydracetin," and levulinic-acid-phenylhydrazin, more briefly named "antithermin;" but the former of these, while possessing reducing and antipyretic properties, has been sometimes attended in its administration by very serious symptoms, whilst the latter does not possess reducing properties, and is an inferior antipyretic.

On these grounds Dr. Kobert sought to replace the poisonous phenyl group by a relatively non-poisonous one, and chose for the purpose paraoxybenzoic acid. Orthohydrazin-paraoxybenzoic acid was prepared, a compound in which hydrazin is represented as combined with paraoxybenzoic acid, taking the ortho position to the oxy-group. This compound, which has been named for convenience "orthin," although from a chemical point of view an acid still possesses basic properties. In the free state it is very unstable, rapidly changing, either when dry or in solution, into a humus-like inactive substance; but in combination with hydrochloric acid, especially if the acid be in excess, it may be preserved for months as a white mass, though a solution exposed to light becomes coloured in a few days. A freshly prepared aqueous solution is colourless, and possesses enormously powerful reducing powers towards oxides of the heavy metals and reddens Fehling's solution immediately in the cold; it has also considerable antiseptic powers. Orthin was administered to animals in considerable quantities without appearing to cause any untoward symptoms. For instance, a dose of 5 grams, dissolved in water, was given to a young fasting goat, but beyond a slight intoxication, lasting about an hour, the animal remained quite healthy and lost neither appetite nor liveliness. The urine passed forty-five minutes after the administration possessed a strong reducing power in the cold, and this property continued nearly a fortnight. The principal reducing substance could be removed by means of ether, after which the urine still contained a considerable quantity of grape sugar, which did not ferment in the presence of the orthin. Dr. Kobert also experimented with favourable results upon animals with a salicylic acid compound, parahydrazin-ortho-oxybenzoic acid, but this does not seem to have been included in the clinical experiments reported upon.

The foregoing result seemed to show that a dose of orthin sufficiently large to keep the system under a reducing influence for a week could be safely administered, and the result of other experiments seeming to exclude the probability of injurious results, it was decided to try its effect on human beings. The clinical experiments were made in the Dorpat University Hospital by Professor Unverricht, who, however, failed to obtain the favourable results expected. When given to fever patients in doses of 0·3 to 0·5 gram the action of orthin was uncertain; in some cases the dose was raised to 0·5 gram without causing lowering of temperature and in others 0·4 gram caused such a depression as to indicate that the dose was excessive. The administration of 0·4 gram of orthin hydrochlorate to a twenty-one year old typhus patient at noon was followed by symptoms of collapse, and in about six hours the rectal temperature had fallen to 35·6° C. By four the next morning the temperature had risen, under violent shivering, to 39·9°, but it fell again to 37·3°, and by two in the next afternoon, under renewed shivering, had reached about its original temperature, 40·2. These oscillations of temperature are considered to be entirely referable to the orthin. In two cases, through a mistake of the dispenser, 2·0 grams were given instead of 0·2 gram; in both cases profuse vomiting followed, which probably accounted for neither antipyretic nor more serious toxic effects resulting. As an anodyne in rheumatism and neuralgia also orthin was unsuccessful, but in several cases shivering fits followed its administration without lowering of temperature. A medical student who took 0·1 gram for supraorbital neuralgia suffered severe indisposition, accompanied by cold sweat, dizziness and nausea. Vomiting was artificially provoked, and upon recovering the neuralgia had disappeared and did not return. Lastly, orthin was tested in two cases of psoriasis, a 10 per cent. ointment being used; it effected a softening and removal of the scales, but not so quickly as chrysarobin. Upon a renewal of the experiments after an interval the orthin appeared to have undergone some change and become inert.

About two years since some little curiosity was excited by the announcement that an Austrian professor had discovered a plant that gave unfailing indications of changes in the weather three or four days beforehand. At first this weather-plant was described as "*Abrus peregrinus*," but it turned out to be identical with the jequerity plant, *Abrus precatorius*. According to Professor Nowack, plants of this species fall into two physiological groups, one of which he speaks of as weather-plants proper and the other he credits with indicating coming changes in the temperature. The leaves of healthy plants, which are alleged when allowed to grow undisturbed always to point either N., S., E. or W., are classified according to age, the oldest leaves being said to indicate weather for the immediate locality only; leaves of intermediate age for a zone of from five to ten miles distance, and the youngest leaves for an outer zone extending to fifty miles. The "indications" for weather consist in movements of the leaflets, while movements of the rachis are taken as indicating coming earthquakes and *schlagwetter* (*i.e.*, escape of fire-damp in mines). How these indications are read may be briefly illustrated as follows. At night the leaflets of the *Abrus precatorius* hang vertically downwards, so that their under sides are approximated, but during the day they are more or less raised towards a horizontal position. When this is not reached the "negative" indication is held to be a forecast of wet weather; if they attain the horizontal position it is looked upon as indicating "change;" and when the ends of the leaflets rise beyond the horizontal, this "positive" position is looked upon as a forecast of clearing up or fine weather. If during these movements the leaflets remain at right angles to the main leaf rachis calm weather is indicated, but when the leaflets are inclined so as to make angles of less than 90°, it is considered to indicate wind coming from the direction in which the leaflets point. Professor Nowack succeeded in arousing sufficient interest in his supposed discovery to obtain a very influential recommendation for its consideration to the botanical authorities at Kew, but as there was a commercial element involved in the patented apparatus used in making the observations, neither trial nor exhibition could be made in the Royal Gardens. Arrangements were, however, made for the deposit of plants in the Jodrell Laboratory, where Professor Nowack demonstrated his method, the observations and forecasts being checked by Dr. Francis Oliver, whose report on the subject, with an introduction by Mr. W. T. Thiselton Dyer, appears in the new number of the Kew *Bulletin*. As might have been anticipated, Dr. Oliver does not confirm the "discovery" of Professor Nowack, and in fact he contends that "all the movements exhibited by the leaves of *Abrus precatorius* depend on causes not so far to seek as those suggested." The ordinary rising and falling movements of the leaflets are, in Dr. Oliver's opinion, called forth in the main by changes in the intensity of the light, and are more sluggish in a humid atmosphere than in a relatively dry one, when the conditions are more favourable for transpiration. The "snow" or "hail" position, in which some of the leaflets are bent in an undulating manner, was in the cases that came under his observation always connected with a spotting or biting by insects, whilst an irregular arrangement of the leaflets, looked upon as the position for "fog and mist" and "electricity" in the air, he considers to be due to disturbance caused by varying light. In the report a number of Professor Nowack's forecasts are quoted, side by side with statements of the actual weather on the days to which they are supposed to apply; but it cannot be admitted that they are satisfactory, if even they are not involved in a dash of the comical by the statement that in "about half the cases given the final determination of the day for which the forecast was made out was only made *after the event*."

* * *

The attendance at the Chemists' Ball, which took place on Wednesday evening last at the Portman Rooms, was somewhat interfered with by the epidemic now prevalent; but the number present amounted to nearly two hundred. The one toast of the evening was given by Mr. Michael Carteighe, President of the Pharmaceutical Society of Great Britain, who occupied the chair at the supper, and it was cordially received. All the arrangements were well carried out under the supervision of the Committee, and Mr. Francis, the Honorary Secretary.

Transactions of the Pharmaceutical Society.

FIRST OR PRELIMINARY EXAMINATION.

January 14.

The following are the questions that were set at the examination on Tuesday, January 14.

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin*:—

1. This girl was very like her mother.
2. Sulla lost one hundred and twenty of his men.
3. On the journey he was killed by the enemy.
4. Of what city were the walls two hundred feet high?
5. Hasdrubal having been conquered, Carthage soon perished.

II. Translate into English either A. (Caesar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CAESAR.

1. Eodem tempore Aedui Ambarri, necessarii et consanguinei Aeduorum, Caesarem certiorem *faciunt*, sese, depopulatis agris, non facile ab oppidis vim hostium *prohibere*; item Allobroges, qui trans Rhodanum vicos possessionesque habebant, fuga se ad Caesarem *recipiunt*, et demonstrant, siber praeter agri solum nihil esse reliqui. Quibus rebus *adductus*, Caesar non exspectandum sibi *statuit*, dum, omnibus fortunis sociorum consumptis, in Santonos Helvetii *pervenirent*.

2. Hoc proelio trans Rhenum nuntiato, Suevi, qui ad ripas Rheni venerant, domum reverti coeperunt; quos Ubii, qui proximi Rhenum incolunt, perterritos insequuti, magnum ex his numerum occiderunt. Caesar, una aestate duobus maximis bellis confectis, maturius paulo, quam tempus anni postulabat, in hiberna in Sequanos exercitum deduxit; hibernis Labienum praeposuit; ipse in citeriorem Galliam ad conventus agendos profectus est.

Grammatical Questions.—For those only who take Caesar.

1. Give the genitive singular and plural, and state the gender, of *proelio*, *ripas*, *aestate*, *tempus*, *hiberna*, *exercitum* (par. 2).
2. Give the principal parts of the verbs in italics (par. 1).
3. What is it that determines to what declension or to what conjugation a word belongs?
4. Explain the different constructions after verbs of *fearing* and *forbidding*.

B. VIRGIL.

1. Extemplo Aeneae *solvuntur* frigore membra;
Ingemit, et, duplices tendens ad sidera palmas,
Talia voce refert: O terque quaterque beati,
Quis ante ora patrum, Trojae sub moenibus altis,
Contigit oppetere! O Danaum fortissime gentis,
Tydide, mene Iliacis occumbere campis
Non *potuisse*, tuaque animam hanc *effundere* dextra?
Saevus ubi Aeacidae telo jacet Hector, ubi ingens
Sarpedon; ubi tot Simoïs correpta sub undis
Scuta virum galeasque et fortia corpora *volvit*.

2. Postquam prima quies epulis mensaeque remotae,
Crateras magnos statuunt, et vina coronant.
Fit strepitus tectis, vocemque per ampla volutant
Atria; dependent lychni laquearibus aureis
Incensi, et noctem flammis funalia vincunt.

Grammatical Questions.—For those only who take Virgil.

1. Give the genitive singular and plural, and state the gender of *crateras*, *tectis*, *atria*, *lychni*, *noctem* (par. 2).
2. Give the principal parts of the verbs in italics (par. 1).
3. What is it that determines to what declension or to what conjugation a verb belongs?
2. Explain the different constructions after verbs of *fearing* and *forbidding*.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. Multiply thirty-seven millions six hundred and fifty-four thousand two hundred and nineteen pounds seventeen shillings and sixpence by 5, 11, and 45; add together the three products, and write in words the value of the result.
2. The remainder of a division is 37, the quotient 326, the divisor $2\frac{1}{3}$ times the sum of both. Find the dividend.
3. Divide 4 tons 3 qrs. 8 lbs. 5 oz. by $16\frac{1}{13}$.
4. Divide 73·8 by ·0018, and multiply the quotient by $\frac{2}{19}$ of ·0009747.
5. Write down the Metric Table of Length, and give the English equivalents.
6. What will be the value of 9 hectog. 9 dekag. 3 centig. of silver at 5*s.* 6*d.* an ounce?
7. If $5\frac{1}{2}$ per cent. be gained by selling goods at £5 5*s.* 6*d.* per cwt., what will be the gain per cent. by selling them at 1*s.* 3*d.* per lb.?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following:—

"Full many a gem of purest ray serene,
The dark unfathomed caves of ocean bear;
Full many a flower is born to blush unseen,
And waste its sweetness on the desert air."

2. Parse fully:—

"Let not Ambition mock their useful toil."

3. Illustrate, by examples, the adjectival and the adverbial use of *wide*, *pretty*, *much*, *right*.

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—o my child my child he said in a forlorn manner i am an unhappy man to see you thus what avails it to me that you do not reproach me if i so bitterly reproach myself he bent his head and spoke low to her louisa i have a misgiving that some change may have been slowly working about me in this house by mere love and gratitude that what the head had left undone and could not do the heart may have been doing silently can it be so she made him no reply.

*5. Write a short composition on one of the following subjects:—

(i.) Advantages of a good Education.
(ii.) Resignation under affliction.
(iii.) Flattery.
(iv.) "Necessity is the mother of invention."

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* This must be attempted by every Candidate.

Pharmaceutical Society of Ireland.

JANUARY EXAMINATIONS.

PRELIMINARY.

The following were successful in passing the Preliminary examination:—Messrs. Gillespie, Deans, O'Riordan, Foster, McSwiney, Weir and Cleland. Five failed.

LICENCE.

The following were successful in passing the Licence examination:—Messrs. Agnew, O'Connell, MacKillip, Ewen, Irvine and Williams. Five failed.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, January 9, Mr. E. B. Sherlock in the chair.

The following paper was read:—

ALOES.

BY J. BAINBRIDGE AND C. MORROW.

Commercial aloes vary considerably in appearance in different samples. Thus socotrine aloes as found in museums has a garnet red colour, is translucent, and has an agreeable odour, but an inferior quality is black, opaque, and has a butyraceous odour. The variety now in commerce under the name of socotrine is evidently a different article: it has a disagreeable odour and gives a different chemical reaction.

Some samples of very different aloes, on the other hand, closely resemble one another, such as the "true hepatic" and the Natal or "hepatic Cape," as it is sometimes called, so that it is only by constantly handling samples that it becomes possible to discriminate between them. The reason for these differences it is not our intention to enter into to-night, as we have no really good evidence to offer on this point at present.

Certain chemical tests have been published by which it is claimed that the various aloins obtained from aloes can be discriminated, and we are taught that the same tests are applicable to the crude drug.

But these chemical tests do not appear to have hitherto been applied to Cape aloes. In the hope that we might be able to add a little to the facts that have already been published, we have undertaken a series of experiments, the results of which we now have the pleasure of submitting to you.

The reagents in common use for the detection of commercial aloes are nitric acid, and sulphuric acid with vapour of nitric acid.

The action of nitric acid is as follows:—

I. With Barbadoes or Curaçao aloes it gives a crimson colour, which soon fades to a light red.

II. With Natal it gives a deep permanent crimson.

III. With Socotrine or hepatic it gives no crimson.

Sulphuric acid, with vapour of nitric acid, is useful chiefly as a test for Natal aloes. When sulphuric acid is mixed with Natal aloes and vapour of nitric acid is blown over the liquid, a deep-blue colour results. This colour is not given by any other variety of aloes. True socotrine aloes gives no reaction with nitric acid, nor with sulphuric acid and vapour of nitric acid, but every commercial specimen examined gave an evanescent crimson with nitric acid, and some a faint blue colour with sulphuric acid and vapour of nitric acid.

These reagents were applied to a large number of specimens, authenticated and otherwise, and were found to be fairly constant in their action. Besides these reagents we have made use of two tests, as proposed by Messrs. Cripps and Dymond in the *Pharmaceutical Journal* of February 7, 1885.

Briefly stated the tests are as follows.—(No. 1) 1 grain of aloes is triturated with sixteen drops of strong sulphuric acid until dissolved, four drops of strong nitric acid are then added, and lastly 1 ounce of water. No. 2 consists of the addition of ammonia to No. 1. Effects are produced by these tests which vary considerably according to the variety of aloes operated upon. In our hands these tests have yielded practically the same results as those obtained by the authors, though there are some slight discrepancies.

With Cripps and Dymond's tests the colours produced with commercial socotrine aloes were practically identical with those obtained from Barbadoes aloes, proving them to be the product, either of *Aloe vulgaris*, or of some allied species or variety. If aloes, which has been procured from *Aloe Perryi* is required or desired, the hepatic aloes will be found to answer the requisite tests, and is identical with true socotrine as far as these reactions can prove identity, although it is so different in appearance.

Natal aloes is usually supposed to be derived from the same plant as the Cape drug, but as its reactions are so very different, and its appearance does not in the least degree denote any similarity, we consider it at least probable that they are the produce of different plants.

In fact, according to the reactions we have obtained, and which are described later on in this paper, Natal aloes would seem to be derived from *Aloe Succotrina* rather than the species to which it has hitherto been attributed.

There is one point to which we wish particularly to call your attention. When nitric acid is added to Cape aloes on a white plate a reddish colour is produced, but this is not a colour by which Cape aloes could be identified. If the two be allowed to remain in contact for some time, five minutes, for instance, a green colour is produced which is permanent for some hours. This is a reaction which we found constant with all specimens of Cape aloes, whether museum specimens, or those bought in the ordinary course of trade.

This result has not, to our knowledge, been noted before, and as it is not obtained from any other commercial variety, we think it is a fairly good test for Cape aloes. Seeing that this reaction is constant with all the specimens of Cape aloes examined, we thought an effort ought to be made to ascertain the species yielding this variety of aloes. It has been stated to be obtained from various species, viz., *Aloe spicata*, *A. platylepis*, *A. plicatilis*, *A. ferox*, *A. arborescens*, *A. perfoliata*, *A. linguaformis*, *A. purpurascens*, etc., or it has been thought to be the product of the mixed juices of several species or of the hybrids obtained by crossing them.

It was suggested by Mr. E. M. Holmes, F.L.S., that it might be possible to determine this point by testing the aloes obtained from leaves of authentic specimens of the various species of aloe as grown at the Royal Gardens, Kew.

By the kindness of Mr. W. T. Thiselton Dyer, F.R.S., Director of Kew Gardens, to whom Mr. Holmes applied on our behalf, we were enabled to follow up this idea. The leaves of a number of different species of aloe were obtained. The juice from them was evaporated over a water-bath, and the residue tested as ordinary aloes. On evaporation, the juices of *Aloe ferox*, *A. purpurascens* and *A. Succotrina* were of a distinct purple colour. The results of our experiments on these aloes were hardly what we expected.

The only variety of the Kew aloes which gave the reactions of Cape aloes was *Aloe Africana*, and in this case the reaction with nitric acid was the same, viz., a green colour resulting on standing for a few minutes. The colours with Cripps and Dymond's tests were also identical. We think it is at least likely that *some* of the Cape aloes of commerce is yielded by *A. Africana*, especially as the leaf is very large and succulent, and we are informed that it is plentiful at the Cape.

We were unfortunately unable to obtain a genuine specimen of *Aloe spicata*, so that we are unable to say anything about that species.

With regard to Cape aloes being derived from *A. plicatilis*, we think this is rather improbable, as it is, according to Mr. Watson (Assistant-Curator of Kew Gardens), a comparatively rare species at the Cape, and the leaves are much smaller, and not so succulent as in the other species.

With several of the specimens of aloes obtained by us from plants grown at Kew, a reaction was obtained which we did not find with any commercial specimen,* viz., 1 drop of bromine water, added to a little of the powder, developed a colour varying from pale to dark purplish-red or damson colour.

We do not consider this reaction as a proof that the commercial aloes are not derived from these species, but think it possible that the property may be lost on keeping or by fermentation. The species which gave this reaction were *Aloe ferox*, *A. purpurascens*, and *A. Succotrina*. Of these we wish to particularly notice *A. Succotrina*. The inspissated juice of this plant gives reactions which are exceedingly like those of commercial Natal, viz.:—

(1) A crimson colour with nitric acid which remained for a considerable time.

(2) A deep blue colour when mixed with sulphuric acid and vapour of nitric acid blown over it.

(3) A deep purplish-red or damson colour with bromine water.

TABLE OF RESULTS.

Commercial Specimens.	HNO_3.	H_2SO_4 and vapour of HNO_3.	Cripps and Dymond.	C. and D. with NH_4HO.	Bromine Test.	Fe_2Cl_6.
Aloes hepatic .	reddish-brown	nil	orange-red	intense brownish-red	nil	All varieties of aloes give an olive-green coloration with the above reagent.
True socotrine .	reddish-brown	„	orange-red	intense brownish-red	„	
Commercial socotrine . .	faint crimson	„	crimson	deep claret	„	
Cape	permanent green after standing a few minutes	„	orange-red	pale claret	„	
Curaçao . . .	evanescent crimson	„	crimson	intense claret	„	
Natal	permanent crimson	deep blue	deep crimson	intense brownish-red	„	
Barbadoes . .	crimson soon fading	slight bluish-green occasionally	crimson	deep claret	„	
KEW SPECIMENS.						
Aloe ferox . .	evanescent crimson	green	pale yellow	red	violet	
— *Succotrina* .	permanent crimson	deep blue	crimson	intense brownish-red	deep purplish-red	
— *vera* . . .	nil	slight green	—	—	nil	
— *Perryi* . .	„	nil	—	—	„	
— *purpurascens*	crimson fading to light red	„	—	—	violet	
— *platylepis* .	nil	„	—	—	nil	
— *arborescens*, var. *frutescens*	„	„	—	—	„	
— *Africana* .	evanescent red changing after a few minutes to green	„	orange-red	pale claret	„	
— *Chinensis*. .	nil	„	—	—	„	

Comparing these results with those obtained from commercial Natal aloes, we find that they agree perfectly except in the matter of the bromine reaction.

This plant, we are informed by Mr. Watson, was formerly thought to grow in Socotra, and to yield socotrine aloes, but he says it is undoubtedly a South African species.

Thus it is probable that this plant yields Natal aloes. *Aloe plicatilis* gave no definite reactions, although it is mentioned as a source of Cape aloes in 'Pharmacographia' (edit. 2, p. 699), nor did we obtain any better results with *Aloe Chinensis*, or with *A. arborescens*, var. *frutescens*.

We conclude, therefore, from our experiments:—

1. That Cape aloes may be produced from *A. Africana*, but chemical tests afford no evidence that it is obtained from the other species which have been stated to yield it.

2. That Natal aloes may be obtained from *A. Succotrina*, but that chemical tests do not indicate that the other species whose inspissated juice we examined are likely to produce it.

3. That the aloes at present sold in commerce as Socotrine aloes is not obtained from *Aloe Perryi*, but probably from some variety of *Aloe vulgaris* or species allied to it, and

4. That the hepatic aloes of commerce is probably obtained from *Aloe Perryi*.

We take this opportunity of expressing our obligations to Mr. W. T. Thiselton Dyer for the facilities he so liberally afforded us in our investigations, to Mr. Watson for the information he so kindly gave us concerning the Cape species, which he has seen growing in their native country, and to Mr. E. M. Holmes for the many suggestions he has so freely given us in the course of our experiments.

After discussing the paper, and examining the specimens of aloes, leaves, etc., exhibited, the meeting adjourned.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting of the twelfth session was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, January 8, at 9.15 p.m., Mr. A. Russell Bennet, President, in the chair.

The minutes of last meeting having been read and approved, the following communications were read:—

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* We have since obtained this reaction from two commercial specimens, one a "Barbadoes aloes," the other an "extract of Barbadoes aloes" from a different source.

NOTE ON "A DIGESTIVE EXTRACT OF TEA."

BY PETER BOA.

A few days ago a sample of a preparation which was called "A digestive extract of tea," came into my hands. It was stated in regard to it that "the aroma and the caffeine are preserved, while the tannin is neutralized and rendered innocuous."

The extract was in the form of a rough powder, apparently a mixture of brown and white particles. It had the aroma of tea, and tasted sweetish with just a trace of bitterness.

Curious to know how the tannin was "neutralized," I subjected a portion of the extract to examination.

I first made a cup according to the directions with hot water. The extract dissolved, and formed a clear beverage with less colour than is generally possessed by a cup of tea prepared in the ordinary way. It was pleasant to the palate, the aroma being good.

A little of this solution in a test tube gave a deep bluish-black colour with a few drops of ferric chloride solution, indicating plenty of tannin, apparently in its usual condition.

A little of the dry extract was then burned on the point of a knife. In the process of burning it emitted a smell which is generally associated with burning bones.

A small quantity shaken up in a test tube with cold water left adhering to the sides of the tube many minute specks which swelled and became soft after standing a few minutes. A few of these specks picked out dissolved readily on warming with a few drops of water, and gave with solution of tannin a precipitate characteristic of gelatine.

The preparation therefore appears to be a powdered extract of tea with sugar and gelatine. The way in which the gelatine neutralizes the tannin of the tea is left to the imagination. It is my experience that gelatine and infusion of tea react only after long standing.

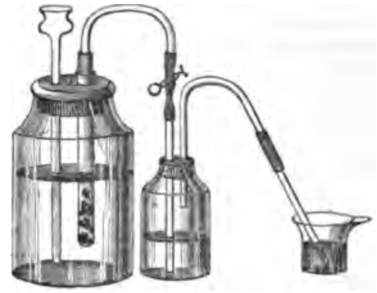
The next communication was on :—

A CONVENIENT GAS GENERATOR.

BY J. H. HOSEASON.

I have pleasure in bringing before you a simple and easily constructed gas generator which I have found very useful. The advantage of being able to obtain a constant supply of sulphuretted hydrogen and other gases for experimental and analytical purposes is very great. To obtain such a supply it has till quite recently been usual to employ the ordinary Wolfe bottle arrangement, but this method occasions great loss of material on account of the operator being unable to check the action of the acid on the ferrous sulphide, etc., used. To obviate this, Kipp's apparatus is now generally used in well-appointed laboratories. The great objections, however, to Kipp's machine are its cost, and the fact that any part of it being broken renders the whole useless. The arrangement on the table consists of an empty 1-ounce quinine bottle, a small wide-mouthed bottle, a test-tube, a thistle funnel, three corks, some common glass and indiarubber tubing and a burette clip. It will be seen at a glance that this apparatus can be fitted up at the cost of a little trouble and a few pence, and that any part of it coming to grief can be replaced with the greatest ease. This apparatus could also be used to perform Marsh's test for arsenic, and it would give the operator time to make his experiments at his leisure instead of hurrying through them. I have prepared a vertical section of the apparatus.

It consists of the usual bottles for generating sulphuretted hydrogen, but instead of placing the ferrous sulphide in the large bottle and pouring the dilute sulphuric acid over it, the ferrous sulphide is placed in a test tube having a small hole in the bottom of it (a very common article in a practical laboratory); the test tube is closed by means of a tight fitting cork which is perforated for a delivery tube. The delivery tube consists of a glass and guttapercha tubing fitted with a burette clip so that it may be opened or closed at pleasure. This test tube containing the ferrous sulphide and corked (the delivery tube being closed) is inserted in the large bottle and the dilute sulphuric acid added through the thistle funnel. If gas is required open the burette clip, slide it up or down till it stretches over the glass tubing, leave it in this position till the desired quantity of gas has been obtained, then slide it over the guttapercha tubing and allow it to stop the tube. On closing the delivery tube the gas generated forces the acid out of the test tube and all action ceases. On opening the delivery tube again the confined gas escapes, the acid again flows into the test tube and more gas is evolved. A wash bottle is attached, but this can be dispensed with if desired.



I should point out that before introducing the ferrous sulphide, a few pieces of broken porcelain or other insoluble material should be placed in the bottom of the test tube. The advantage of this is to prevent the escape of gas into the acid bottle.

The next communication was a paper on "Thermometry for Junior Students" by John Findlay, in which the author gave an interesting description of the history, construction and practical working of the various thermometers which have been or are at present in use. The paper was illustrated by diagrams and apparatus, among the latter being one of the deep sea reversible thermometers used in the "Challenger" expedition.

The next communication was a—

NOTE ON SYNONYMS.

BY JOHN FINDLAY.

In his report on the British Pharmacopœia for 1888 Professor Attfield mentions that the suggestion regarding the introduction of "Laudanum" as a synonym for Tinctura Opii and "Paregoric" for Tinct. Camphoræ Comp. had been adopted in the reprint for that year. He considers the result encouraging and suggestive of a similar course being taken with other popular household remedies. A recent article in the *Chemist and Druggist* concludes as follows: "Such then is the Pharmacopœia report for 1888; and all that need be added is a hint to investigators who wish to take up any of the subjects in it to begin where Dr. Attfield leaves off."

At the present time there is great variation in the appearance and composition of many articles regularly sold under the same name. It not infrequently happens that a patient, for instance, is supplied with lin. saponis in one pharmacy and lin. opii in another when opodeldoc is asked for. The result is that either one or other of the pharmacists is condemned for having made a mistake. Any plan that would obviate so undesirable a state of affairs deserves consideration. The method of inserting synonyms in the Pharmacopœia would go far to secure uniformity, and would at the same time put a stop to unfair competition by unprincipled vendors, and remedy some of the anomalies of the Medicine Stamp Act. With this object in view, and acting on the hint above referred to, I venture to suggest that the following might be added in the forthcoming issue of the Pharmacopœia:—

B.P. Name.	Synonym.
Acid. sulph. aromat.	Elixir of vitriol.
Emplast. cantharidis.	Fly blister.
Lin. opii.	Anodyne liniment.
Lin. opii.	Lin. saponis co.
Lin. saponis.	Opodeldoc.
Liq. ammon. acet.	Mindererus spirit.
Liq. bismuth et amm. cit.	Solution of bismuth.
Liq. plumbi subacet.	Goulard's extract.
Liq. plumbi subacet. dil.	Goulard's lotion.
Lotio hydrarg. nig.	Black wash.
Mist. ferri aromat.	Heberden's ink.
Mist. ferri co.	Griffith's mixture.
Pil. colocynth. co.	Gregory's pill.
Pil. colocynth. et hyos.	Hamilton's pill.
Pil. hydrarg. subchlor. co.	Plummer's pill.
Potassii carbonas.	Salt of tartar.
Potassii nitras.	Nitre, saltpetre.
Pulv. ipecac. co.	Dover's powder.
Sulphur præcipitatum.	Milk of sulphur.
Tinct. benzoini co.	Friar's balsam.
Tinct. ferri perchlor.	Steel drops.
Tinct. camph. co.	English paregoric.
Tinct. opii ammon.	Scotch paregoric.
Ung. chrysarobin.	Ointment of chrysophanic acid.
Ung. hydrarg.	Blue ointment.
Ung. hyd. nit. dil.	Citrine ointment.
Ung. hyd. ox. rub.	Red precipitate ointment.
Ung. hyd. subchlor. co.	Calomel ointment.
Ung. resinæ.	Basilicon ointment.
Zinci oxidum.	Tutty powder.

The Secretary read a letter from Mr. W. Duncan, who had arranged the meeting, intimating that he was suffering from influenza and could not attend. The "Notes and Queries" to have been contributed by him were therefore postponed.

The reading of the papers gave rise to a discussion, which was taken part in by Messrs. Bell, Bennet, Boa, Dougall, Findlay, Henry, Hill, Hoseason and Lunan. It was stated that the value of tea as a beverage was in direct proportion to the percentage of tannin in the leaves, and this raised a doubt as to the propriety of "neutralizing" what seemed to be the most important constituent. On the motion of the Chairman votes of thanks were awarded to the various authors.

The Chairman intimated that the next meeting would take place early in February, when there would be a debate on the question, "Is a Compulsory Curriculum Desirable?" to be opened by Messrs. J. Lothian and J. B. McCurrie.

The meeting then closed.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

This Association held its usual fortnightly meeting on Wednesday, the 8th inst. The President presided. The minutes of the former meeting were read and sustained. Thereafter Mr. William Fisher read an essay on—

The Drug Trade as It Is.

The author said that the druggist and his profits have been the butt of jokers for long and that the public was ready to believe almost any story illustrating the enormity of the druggist's profits. What truth there is in these stories he would not stop to inquire; all present were able to appraise them at their proper value. He thought the druggist might expect something of the nature of a professional fee for services of a somewhat professional nature, but the public was slow to admit any such claim. If he claimed that the present was perhaps a better time for the drug trade than any former period, they might be disposed to doubt the assertion, but some who were entitled to speak with authority were decidedly of that opinion. He recalled the remarks of one of the Vice-Presidents (Mr. Kinninmont) in his opening address in support of the statement. In what was called the "good old times" the assistant had harder work, longer hours and less pay; while the master laboured under a want of scientific knowledge now so necessary to the trade. There were exceptions to this as to other rules; as examples of such he mentioned Jacob Bell, Dinneford, Savory, etc., the founders of the Pharmaceutical Society in 1841. They had held out a helping hand to their less gifted brethren and put it in their power to raise themselves to a better position. To them and the Society which they inaugurated the drug trade owed most of its present state of advancement. The brotherhood which the Society aimed at establishing among druggists was not yet complete, and it was to be deplored that there was so much trade jealousy among those whose interests should prompt the closest fellowship. To such as asked what good the Society had done the essayist pointed out that the compulsory examinations had been a stimulus to study to many who otherwise would have taken no thought of studying the sciences of botany, chemistry, etc., with which all druggists are now more or less familiar. While the examinations could not produce geniuses they could not fail to be of great value in improving the individual, and, through him, the trade at large. Chemists and druggists treated the Society badly in picking holes in its garment while they do nothing to support it and fail to bring their influence to bear on its policy to make it more influential for good than it is. The present state of the drug trade was one of "opposition," and as such it should partake of the "life" that flows from that state. Not only was every man's hand against druggists but in many cases druggists' hands were against those of their "own household." No matter of what politics a druggist might be he must be a liberal in business. The conservative bias in the druggist had been the cause of his present unhappy condition. To this was due the loss not only of the trade in patents, but also the encroachment on the dispensing and other branches of his business. Instead of fighting the opposition with their own weapons, he began by pitying them, and ended by pitying himself and reducing his prices. Had he read the signs of the times aright, he would have done so much sooner, thus conserving his business and giving no cause to his customer to think that after all there was truth in the stories of his extortions. Another cause of harm to the drug trade was the doctor's shop, where, owing to the absence of the restrictions obtaining in the case of the druggist an unfair competition is possible. While not approving of the action of the Pharmaceutical Society in its recent action the essayist thought that all branch shops should be in charge of qualified assistants. He also thought that new legislation on the subject was called for. With regard to the future of the drug trade it seemed needless to expect anything from legislation; anything in the nature of protection being opposed to the idea of free trade. Yet it seemed hard to be compelled to pass examinations to fit them to keep open shop and retail poisons and not have that sale confined to them. Noticing the opinions of such as thought to command the confidence and custom of the public by increased educational attainments the essayist, while not undervaluing the power of knowledge, thought the present examinations were sufficiently exacting to ensure the possession of all the knowledge required by the ordinary druggist. He quoted with approval an extract from an address by Mr. Gilmour, Edinburgh, advising the druggist to cultivate the "living, intelligent personal element" which should pervade "every department and every action." He should make himself indispensable to the doctor by being well acquainted with the newest remedies, their doses and the best ways of dispensing; discard patents; work up a private proprietary trade; study the tastes of the public and win their confidence by neatness in every detail and the practice of elegant pharmacy. So making prosperity and happiness to flow from the "drug trade as it is."

Messrs. Gilmour, McKillan, Robinson, Harley, Watson, etc., took part in the criticism, which was favourable to the essayist. The general opinion was that the Pharmaceutical Society had done a great deal for the trade, gets very little support, and ought to get more. The examinations may be a little exacting, but have been of great benefit in cultivating a taste for more extended knowledge of science. Local societies were recommended as deserving of a greater measure of support than is accorded them and as tending to foster good feeling among opponents.

On the motion of the President, the essayist having replied, was awarded a vote of thanks.

A Committee was appointed to make arrangements for a conversazione.

Mr. Geo. Robertson is in attendance every meeting-night at 8.30 to exchange books and show materia medica specimens, microscope, etc.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

In connection with the Association a musical and social evening was held on Friday evening, January 3. Mr. John W. Russell occupied the chair. There was a large turn out of assistants and apprentices along with their lady friends and several of the employers. A lengthy programme of vocal and instrumental music was gone through by several well-known local amateurs in splendid style. Refreshments were provided during the evening, an ample supply of aerated waters having been presented by Mr. D. Nicoll, Henchar Craig.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the session was held on Wednesday evening, January 8, in the Mosley Street Café. Mr. John Pike, President, in the chair. There was a very good attendance. The minutes of the last meeting were read and adopted. The dinner, proposed at the last meeting to be held on the 30th ult., had been abandoned until some future date.

The President, after expressing the great pleasure he felt at seeing Mr. B. S. Proctor among them, and trusting he would frequently favour them with his presence, called upon Mr. T. Maltby Clague, Pharmaceutical Chemist (Hon. President), to give his lecture on the

Examination of Urine.

Mr. Clague said that his reason for choosing this subject was that in many districts a knowledge of it was required from the chemist's assistant, and as it did not in that neighbourhood form part of an apprentice's or assistant's training a want might be supplied by the lecture and demonstration which he proposed to ve them. He held that not only did this work properly belong to the chemist but also the fee for it. After some explanatory remarks as to the part which urine played in the human economy, he pointed out that abnormal urine—like all things human—sinned by omission and by commission, containing things which it ought not to contain, or exhibiting deficiency in those things which it should contain, removing useful matters or storing up hurtful matters. Samples were then shown, physical appearances pointed out, specific gravity taken, and acidity noted, etc. Three or four tests were given for albumen—equations showing the various reactions being placed upon the board by Mr. Clague—but the preference was given to the well known mode of heating the upper part of a test-tube full of urine, and then adding HNO_3: a cloudy layer below indicated a considerable quantity of water; a cloud in the upper layer, clearing up when HNO_3 was added, indicating the phosphates; while permanent coagula were proof of albumen. If the albumen were coloured, bile and blood should be tested for. For sugar, Moore's, Trommer's and Fehling's tests were reviewed and the superiority of the latter shown. Quantitative tests were also reviewed, as Fehling's solution and yeast tests with measurement of CO_2 and also by loss of weight. Various instruments for estimation of urea were described, and a sample was examined by means of a modification of Dr. Squibb's apparatus which by its simplicity and prompt action gained approval. For convenience the following table was given for the customary examination of urine drawn up in the form in which students of chemistry so much delight.

Take specific gravity.	Test with litmus paper.
Normal 1·010 to 1·025.	Normal slightly acid.

If sandy deposit reserve for microscope. To sample in long test tube apply heat to the upper part.

Cloudy when cold. Clear when heated. Urates.	Cloudy when heated. Clear with HNO_3 Phosphates.	Cloudy when boiled in presence of HNO_3 coagula. Albumen.	Add boiled and filtered sample to Fehling's solution: red precip. Sugar.

The lecturer was very attentively listened to and frequently applauded, and it was the universal opinion that the communication was one of the best and most interesting of the session.

Mr. John Pike proposed a hearty vote of thanks to Mr. Clague for his very instructive paper. He stated that he (Mr. Pike) had had very little to do with the subject, still he felt convinced that the matter which Mr. Clague had so ably put before them would be very useful and had been most interesting. This was seconded by Mr. Merson in a few appropriate words. Mr. Weddell and Mr. F. Park having supported it.

Mr. B. S. Proctor stated he had studied the analysis of urine since 1851. He was connected with the first chemists' association in Newcastle, which consisted of Mr. Jos. Swan, Mr. John Pattinson and himself. He gave several incidents which had occurred in his experience of urine testing, one of which was that a medical man left him a sample to test. After applying his various reagents, he got no results, sp. gr. same as pure water. On inquiring, the doctor found out that the gentleman's butler, who had been instructed to procure a sample of his master's water, had misunderstood his orders, giving a sample of his drinking water instead of urine.

Mr. Clague having briefly replied, and the President having announced that all those who intended going in for the competitions already announced must give in their names not later than Febuary 5 the meeting closed at 10.15 p.m.

The next meeting will take place on Wednesday evening next, January 22, at a quarter past 8 o'clock in the Mosley Street Café.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The last ordinary monthly meeting was held in the rooms of the Chemical Club, Victoria Hotel, on Wednesday, January 8, Mr. F. Baden Benger in the chair. There was a good attendance.

The Committee (Messrs. W. Bowden, A. Smith, J. L. Smith, W. Lane, H. Kemp and H. Wilson) appointed to consider what form the next social evening should take, reported that in their opinion a supper would be the most desirable; they recommended that this should take place on Tuesday, February 4, at the Spread Eagle Hotel, that the tickets should be 3*s*. 6*d*., and the invitations not to be confined to members of the Association, but be issued to the trade generally in the district. The proposal was accepted.

Contrary to the usual custom no paper was read at this meeting, the members being called together for social intercourse. Several subjects were discussed during the evening, including the proposed new Pharmacy Bill, and also the desirability of nominating a gentleman from this district for the next Council election of the Pharmaceutical Society.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

Owing to the inclement weather and the fact that several of the members were laid up with the prevailing epidemic, there was only a poor attendance to hear Mr. Wokes' paper on "The Manufacture of Glyco-Gelatine and some of its Uses." It was therefore decided to postpone the meeting until Thursday, the 23rd inst.

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE DRUGGING OF ANIMALS ACT.

ILLEGAL SALE OF ARSENIC.

At the Kesteven Petty Sessions, at Lincoln, on Friday, the 10th inst., before G. E. Jarvis, Esq., and C. C. Sibthorp, Esq., Francis Reast, described [incorrectly] as a chemist and druggist, of Metheringham, was summoned for having sold a quantity of arsenic without having attached to the packet a label bearing the name and address of the seller, on December 30.

Mr. Scorer said he appeared on behalf of the police, and also on behalf of the Association for the Prevention of the Administration of Poisonous Drugs, etc., to Horses. The Committee of that Association attached considerable importance to the case, because it was a case of a man, unauthorized by the Pharmaceutical Society, selling poisons, the defendant not being duly registered as a chemist and druggist. The facts of the case were very simple. The police had reason to believe that the defendant was carrying on business without being duly authorized, and instructed a man, named Brown, to go and buy some arsenic. Brown asked for half a pound, but defendant said he had only about 3 ounces, and that he produced. Brown took that away, the mixture being wrapped up in a packet with a label bearing the name "Messrs. Battle, Son and Maltby," from whom it was presumed Reast purchased the arsenic in the first instance. He (Mr. Scorer) asked the bench to inflict such a penalty as would deter such men as the defendant selling arsenic in a similar manner, also to generally protect the public and the unwary.

In reply to a question from the Bench, the clerk said it had been decided that the seller was the person who disposed of the poison to the actual purchaser.

Jas. Brown proved purchasing the arsenic, and Sergeant Vickers said on December 28 he bought an ounce of laudanum and some spirits of salts. Witness got Brown to fetch the arsenic from defendant's shop, and subsequently saw Reast about the sale. Witness pointed out the fact that defendant's name and address was not on the packet, and he admitted such was the case. Witness then asked the defendant if he was a registered chemist and druggist. He first stated that he was, but afterwards admitted that his name was not on the Society's Register of this year.

Defendant pleaded ignorance of the law, and said he thought it was quite sufficient if the packet bore the name and address of the party or parties from whom he himself obtained the arsenic.

It was mentioned in the course of the hearing of the case that the packet of arsenic sold by the defendant was sufficient wherewith to poison a hundred men.

Mr. Scorer stated other proceedings would be taken against Reast in the County Court, for acting as a chemist and druggist without being duly registered. He was liable to a penalty of £5 for each offence that could be proved against him. The Committee of the Association alluded to above considered it was a most dangerous practice for unregistered chemists to sell poisons, and they had reason to fear that cases of poisoning that have recently happened might be traced to men like the defendant. In one case of poisoning at Metheringham it was clearly proved that the poison was obtained from the defendant.

The Chairman said it was just men like the defendant professing ignorance of the law that did a lot of mischief. They sold arsenic to servant lads, who administered it to their master's horses, thinking thereby to improve their appearance. The animals died, and considerable loss was thereby created. If there were no other proceedings to be brought against the defendant, they would no doubt have imposed the full penalty; as it was he would be fined £2 5*s*. and have to pay 15*s*. costs.—*Lincolnshire Chronicle.*

ALLEGED ADULTERATION OF SACCHARIN TABLETS.

On Wednesday morning the magistrates at the Nottingham Summons Court, Mr. R. Evans and Mr. W. A. Blain, had before them two charges brought by the Inspector of Nuisances for Nottingham against Boot's Pure Drug Company, Limited, of Island Street, Nottingham.—The company was summoned on the information of George Baines Willbond, Inspector of Nuisances, for having on December 20, 1889, unlawfully sold to the said inspector, and to his prejudice, a certain drug, to wit, twelve saccharin tablets, which were not of the nature, substance and quality of the article demanded. A second information by the Inspector of Nuisances had reference also to December 20, 1889, when the defendant company was charged with selling a certain article of food, to wit, twelve saccharin tablets, which were not of the nature, substance, and quality of the article demanded by the Inspector.—Mr. Harris (from the Town Clerk's office) appeared to prosecute, and Mr. Stanger (instructed by Messrs. Wells and Hind) defended.

Mr. Harris said there were two cases, but he proposed to take them together.

Mr. Stanger said he had been discussing the question with Mr. Harris, and as both informations referred to a same alleged offence, he had no objection to taking both cases together.

Mr. Harris said that in the present case the purchase was made at the premises of the company at 159, Alfreton Road, by Mr. Willbond, Inspector of Nuisances. He went to the shop and handed in a prescription for saccharin tablets. An assistant in the shop took the prescription, and the inspector left the shop, but returned subsequently, and the tablets were handed to him in a box, upon which there was no label stating that there was any addition to the saccharin. A certain proportion of the tablets were handed to the public analyst of the borough, who found that they contained 75 per cent. of milk sugar. There were two reasons why there was prejudice to the purchaser. First, the value of saccharin was about 4*s.* per ounce, and milk sugar was about 6*d.* per pound, and therefore the purchaser only got 25 per cent. of the article for which he paid. The second ground was that of injury to the patient for whom saccharin was prescribed. Saccharin was taken by diabetic patients, and by others suffering from certain diseases. The object was to give a sweet taste without there being an injurious effect upon the patient. Milk sugar or any saccharine matter independent of the drug saccharin would be injurious to the patient. If no injury was done to the patient the question of the money value of the article still remained unanswerable, because the purchaser did not get value for his money. If an addition to the tablets was necessary, the last thing that should be added should be milk sugar, where the special object of saccharin was to prevent injury to a patient by the addition of sugary matter.

Charles James Willbond, Inspector of Nuisances for the borough of Nottingham, said he went to Boot's branch shop in Alfreton Road, and tendered the prescription produced. He gave it to the assistant and told him to make it up. The assistant told him that it could not be made up then, but if he called again in twenty minutes the prescription would be ready to take away. Witness called again in twenty minutes, and the tablets were handed to him in the box produced. He paid 1*s.* for the whole of the prescription, and he received a receipt for it. Witness then told the assistant that he was a nuisance inspector, and that he had bought the saccharin with the intention of having it analysed. He divided the articles bought, and one part he gave to the assistant, one he kept himself, and the rest he handed to Dr. Truman, the public analyst.

By Mr. Stanger: It was his intention that both the tablets and saccharin which he bought should be analysed.

Dr. Truman, public analyst to the borough of Nottingham, stated that on December 20 last, he received from the last witness a packet of saccharin tablets, numbered 105. He analysed them, and on December 26 he handed in the results of his analysis. He found that the tablets contained 75 per cent. of milk sugar, the other ingredients being saccharin and a little carbonate of soda, which was added to make it more soluble. The addition of milk sugar would have the effect upon a diabetic patient of increasing the glucose in the urine. That would increase the disease. He believed that the value of saccharin was about 4*s.* an ounce.

Cross-examined by Mr. Stanger: He had had several samples of saccharin tablets sent to him, each box being numbered. There were seven in all, and he was not aware from whom they came unless he was informed. Samples of saccharine had also been submitted, and the sample marked 106, which he had since found was from Boot's, was pure. The tablets had not even a little carbonate of soda. Pure saccharin was not easily soluble. Saccharin entirely by it self was soluble with difficulty in water. Saccharin was very powerful, and its sweetening properties were much greater than ordinary sugar. If one of those pellets was made simply with saccharin it would not be quite so convenient to carry about. Half a grain of saccharin was the usual dose, and he should consider it a proper dose. In the tablets produced there was as nearly as possible half a grain of saccharin in each. Milk sugar and ordinary sugar had the same effect upon the urine, but there was a difference upon the patient. The skimmed milk treatment was exclusively recommended by one man for diabetes, but he did not think it was generally recommended. About 350 grains of milk sugar could be taken in a pint of skimmed milk. In each one of those pellets there was about a grain of milk sugar. The very sweetest taste he did not think could take more than four of these tablets in tea, coffee, or chocolate. Sugar of milk did not ferment so readily in yeast as ordinary sugar. He had heard of a gentleman of the name of McNaughton Jones, who had taken a great interest in saccharin, and he believed in the theory mentioned by him in the *Lancet*. It was invariably the case that the tablets manufactured by the chief makers should contain half a grain of saccharin and a grain or a grain and a half of other matter.

Cross-examined by Mr. Harris: Saccharin taken by a patient was perfectly harmless; there would be no injury at all to the patient.

Dr. Boobbyer, medical officer of health to the borough of Nottingham, said that on the 20th of December he handed the following prescription produced to the witness, Willbond:—"Pulv. saccharine, 1 dr., ½ to 2 grs. to be taken with food. Tabloid saccharine, xii. One p. r. n." He had since seen the certificate of the public analyst. In his opinion milk sugar would increase the amount of glucose in the urine. He did not think it was necessary that 75 per cent. of other matter should be used to make a tablet. Those tablets could be made with gum without any sugar of milk being added to it.

By Mr. Stanger: He was not a practitioner, and never had been in practice. He had been a house-surgeon at King's College. There was a wide difference in the fermenting qualities of milk sugar and ordinary sugar. It was worse to give a patient ordinary sugar than milk sugar. Milk sugar was much less sweet than ordinary sugar. They were taught as students to avoid giving any sugary compound to a diabetic patient, but milk was given because it was found that its nutritious properties more than compensated for the amount of sugar in it.

This was the case for the prosecution.

Mr. Stanger, in defence, said it was a case which, as it was quite obvious, was of the very last importance to his client. Once they impeached the reputation of a person as to the purity of the drugs which he sold, they practically destroyed his business. The public would never go to a person who dispensed drugs which were not pure, and that was the reason why it was necessary the case should be threshed out to the utmost. He was not there to raise any technical point of law, but he came fortified by the evidence of medical authorities to satisfy the Bench that the firm had done nothing contrary to law, and that they had in no way sold a drug which was injurious to health. The Bench would understand from his cross examination the line which he was about to take, and the case would largely depend on the weight which the Bench attached to the opinion of the medical gentlemen whom he was instructed to call. For that reason his preliminary remarks would not be lengthy. Before, however, he called any witnesses for the defence, he thought that in order to clear the ground it would be convenient to consider the charge which was brought against the defendants, and here he was glad to find that he was in accordance with Mr. Harris as to the law. He accepted what Mr. Harris said that in order to make out his case he must show one of two things—either that this article was of less value from a commercial point of view in consequence of the mixture of foreign ingredients, and in that sense a fraud was committed on the public; or, supposing it was not of less value in a commercial point of view, and supposing in that sense there was no fraud, yet it was injurious to the health of a certain class of the public—diabetic patients. It had been laid down that the prejudice of the purchaser must mean that the article was inferior. In regard to the first point, he thought he could clear the way in a moment. The tablets were sold by number, and not by weight. It was clear now, without his calling any evidence at all, that the common practice of all manufacturers—whether the articles were called tabloids, tablets, or discs—was to put half a grain of saccharin, and half a grain only, in each of them. They found that was not only a common practice, but a judicious one, because the sweetening properties of saccharin were so great, that if more than ½ grain were put in the article would be made too sweet for a good many people, whereas if they were not sweet enough a man could use three or four. Starting from that point what did they find? It was a common practice in the trade to give ½ grain. When a person asked for a tablet he did not expect that it would be made of pure saccharin. There was always a foreign ingredient introduced, sometimes consisting of 1, sometimes of 2 grains. He had a box which was sold by an extremely respectable chemist in the town, where the tablets came to as much as 5 grains each. In that case again there was only ½ grain of saccharin, and they had therefore an admixture of a foreign substance to the extent of 4½ grains. It would be inconvenient to have tablets merely half a grain in weight, but because a foreign ingredient was added they did not thereby lessen the commercial value of the articles. It was not sold to the purchaser as 2 grains of saccharin. The trader said, "It is a saccharin tablet, and I guarantee it shall contain as much saccharin as is needed." The question as to whether the ingredient was injurious was entirely different. When they compared the prices of these articles with the prices of other tablets in the trade they found they were the same. They had the same preparation, and the only question left was whether the ingredients were injurious. It seemed so trifling a case, so far as the commercial value was concerned, that he hardly expected the magistrates would want him to address them at any length upon that part of it. The tablets were sold by number, and not by weight, and every single tablet contained the ordinary dose. Let him give an illustration. A person went to a chemist's shop and asked for an opium pill. He expected that the principal or active ingredient would be opium, and he would get what would be a proper dose of opium in a pill. If in addition to the opium there was some harmless substance introduced which made the pill more portable or sightly, how was the person injured thereby? It would be an entirely different matter if in this case it could be shown that the tablets were sold as of pure saccharin. His friend Mr. Harris had shown quite the reverse of that. When pure saccharin was asked for it was found to be pure. Saccharin and saccharin tablets were bought for the purposes of analysis. The saccharin bought as saccharin was found to be perfectly pure. The other point raised in the case was that on which Mr. Boot felt very strongly. If the prosecution were successfully maintained, he had been selling to the public an article recommended for diabetic persons as a substitute for sugar, with which was mixed something peculiarly unsuitable for such persons. He believed that the Bench would agree, after hearing the evidence, that if Mr. Boot had done such a thing he had acted in absolute ignorance. He had mixed this sugar of milk in accordance with medical advice supplied to him, supported by men of great eminence. It was partly a chemical question and partly a question of the general practice of medicine. He should call a very eminent chemist to give evidence. Mr. Boot himself and the duly qualified chemists he employed would also be called, together with a number of gentlemen who were perfectly well known to the magistrates as practitioners of large experience in the town. In their opinion this sugar of milk was widely different from ordinary sugar, and might be administered without injury to diabetic patients. They went further, and said that the amount was so trifling in this case that it was absolutely insignificant and inappreciable. He asked the Bench to say that the sugar of milk made the tablets more convenient, and helped solubility. If so, it was harmless, and if that opinion was correct, there was an end of the case. Mr. Stanger referred to a number of the *Lancet*, in which sugar of milk was mentioned, and also alluded to the fact that Dr. NcNaughton Jones had absolutely recommended sugar of milk as being useful for tablets. In view of those facts, supported by the gentlemen whom he should call, it would be a strong measure indeed to say that Mr. Boot had been defrauding the public by selling injurious drugs for the sake of his own pocket, thereby rendering himself liable under the section of the Act.

Dr. Otto Hehner, F.C.S., hon. secretary of the Society of Public Analysts, public analyst for Notts, South Derbyshire, West Sussex, the Isle of Wight, Derby and Ryde, lecturer on practical chemistry at the Westminster Hospital, London, etc., was called by Mr. Stanger, and deposed that he had an extensive knowledge of saccharin tablets as now manufactured by the trade. Saccharin was with difficulty soluble in water, and it was therefore very desirable that some substance should be added to make it more easily soluble. It had become the universal practice to add bicarbonate of soda. The sweetening properties of saccharin were intense. It was desirable that some harmless substance should be added in order to make it more portable. It would be a very small tablet which weighed only a quarter of a grain. It was the universal practice to deal with drugs in such a way that they could be conveniently handled. The tablets and pellets which he had examined varied in weight from one to five grains, and they all contained half a grain of saccharin, which was the usual and proper dose. Half a grain of saccharin was equal to 150 grains of ordinary sugar, and 150 grains was the average quantity put in a cup of coffee or tea, hence, half a grain was used in these tablets. Sugar of milk was very much less fermentable than ordinary sugar. A tablespoonfull of milk would contain very much more sugar of milk than these tablets.

Mr. Stanger: Assuming that these tablets were sold by number and not by weight, would the mixture of half a grain of sugar of milk be an adulterant?—The purchaser, in my opinion, gets the ordinary dose of saccharin, and this ordinary dose is in no way interfered with by the addition of another material.

The properties of the saccharin are not rendered in any degree less effective?—No.

The witness, continuing, said that at present saccharin was not in the British Pharmacopœia. There were no standard pellets. It was generally acknowledged that the pellets that were made did not consist of the pure drug. They were generally made up of something.

Cross-examined by Mr. Harris: Witness said he had examined the tablets made by a number of manufacturers. He had not met with any tablets that were sold which were perfectly pure. No pure saccharin was sold in pellets. An addition was always made in order to make them more soluble.

Mr. Harris: Is the condition anything approaching to the amount in the case, 75 per cent.?—No, it is not.

Do not you think 75 per cent. to be a large addition?—No; I take it it is intended to give half a grain of saccharin. It makes no difference how mixed if the proper drug is given.

If a man buys twelve tablets, and the addition is 75 per cent., you say he will not be prejudiced?—If he gets the right amount of saccharin he is not prejudiced. It makes no difference whether the doctor prescribes the medicine to be given in a 1-ounce or a 12-ounce bottle, supposing the medicine is there.

Mr. Harris: The general condition is from a third to a half-grain in the case of the great makers?—Yes. Witness added pellets were often sold of very much smaller size than in this case.

Replying to Mr. Harris, who asked as to fermentation of sugar of milk, whether it was not a fact that it depended a great deal upon the stomach of the patient, witness said that he would rather reply to strictly chemical questions. Sugar of milk was less subject to fermentation generally.

Mr. Harris: Is it not a fact that if any animal decomposition was going on in the stomach it would affect a man injuriously?—It is hardly a question of injurious effect, seeing that all our food undergoes fermentation in the stomach. The fermentation of a few grains of sugar of milk would make very little difference. Witness added that 75 per cent. seemed a very large amount, but it meant only a few grains; at the outside 10 or 15 grains.

Mr. Stanger intimated that he had six medical gentlemen in Court whom he could call as witnesses.

Dr. Brookhouse, who was then examined, said he should describe sugar of milk as an article of food or a remedial agent. It differed from ordinary milk, and was less liable to fermentation. In the case of a diabetic patient, where ordinary sugar was prohibited, sugar of milk might be given to the extent of ½ ounce without any injurious effect. There were 24 grains of sugar of milk in 1 ounce of milk, or about 5 per cent. There were 480 grains in all in 1 pint of milk. It might be given to the extent of 30 grains a day without the least injury. The tablets could not do any injury, even in the case of diabetic patients. He had had experience of the treatment of diabetes by the skim milk method. In a number of cases it answered very well. He thought Dr. Boobbyer hit the nail on the head when he said that a person suffering from diabetes needed to be treated according to their own circumstances and condition. There were some with whom the milk treatment did not answer. There were others with whom it answered extremely well. A person was not worthy of the name of diabetic who passed 50 grains of sugar in 24 hours. He did not see how they could make 50 grains out of 15.

Cross-examined by Mr. Harris: The question whether if sugar given to a diabetic patient increased materially upon the amount at first administered was a very difficult one to answer. It was a question of vital chemistry upon which he was not prepared to give an opinion, neither was anybody else. They might take every particle of food which was supposed not to form sugar. They might keep a patient upon a strictly animal diet, but they would be able to take sugar from his urine, though where that sugar came from no chemist or physician could answer. It was a question of chemistry. Were they to give an ounce of sugar to a patient and kept him alive for a week, very likely he would pass more sugar during twenty-four hours than he took into the system. He had been associated with Dr. Pavey in experiments upon lower animals. That doctor held certain opinions then which he might have since changed. He should unhesitatingly say that the quantity of milk sugar found in those tablets to the extent of 5 grains to 15 grains would not injure a diabetic patient.

Dr. H. R. Hatherley, medical practitioner of Nottingham, said he agreed with Dr. Brookhouse's opinion. He did not think the amount of sugar f milk contained in each tablet would injure a diabetic patient. He should look upon so small a quantity as quite unimportant. Ordinary sugar was more injurious to a diabetic patient than milk sugar.

Mr. Stanger: Unless a patient took of these tablets by the bucketful they would not do him any harm?—No one would like to take so much as that.

Cross-examined by Mr. Harris: In his opinion, to take the amount of 75 per cent. of milk sugar would be in no way injurious. He would not measure sugar by the grain, but by the ounce, with regard to its injurious effects. He believed that the tablets in question were harmless.

Mr. Stanger said he had a number of other medical gentlemen present who were prepared to give evidence of a similar character to that of the witnesses he had already called. He did not know whether their worships would like to hear them.

Mr. Evans said that the magistrates were satisfied with the evidence they had before them, and had determined to dismiss the case.

Drs. Chas. Vernon Taylor, F. Howitt and Whyatt were in court to give evidence for the defence.

Reviews.

THE FUNDAMENTAL PRINCIPLES OF CHEMISTRY PRACTICALLY TAUGHT BY A NEW METHOD. By ROBERT GALLOWAY, M.R.I.A., F.C.S.*

Mr. Galloway is already favourably known as the author of the 'First Step in Chemistry,' which appeared in 1861. That was an attempt to teach chemistry by what was then a new method. Mr. Galloway had recognized the important fact that if chemistry is to be taught as a branch of general education it must be used as a means of training the mind to think and reason exactly and not for the purpose of enabling the student to prepare and crystallize metallic salts or to test complex mixtures. It is to Mr. Galloway's credit that he saw what the large majority of teachers had not seen, that the plan usually adopted in teaching the science must fail to produce educational results of any value. The most it can do is to strengthen the memory; it cannot develop those inquisitive tendencies which, if properly trained, may be developed into a mental habit of the utmost value, and capable of bringing success in every walk of life. 'The First Step in Chemistry' was an attempt to adapt chemistry to the needs of mental education. Instead of containing the usual account of the modes of preparation and properties of the elements from hydrogen and oxygen onwards, the pupil was first led to make easy experiments to illustrate the simplest facts, such as the difference between elements and compounds, the conditions necessary for chemical combination, etc. The publication of the 'First Step' did not, however, do much to modify the current methods of teaching the subject. It is still the general custom, as it was then, to make an account of the properties of the elements, together with qualitative analysis, pass muster as science teaching. One reason for this is to be found in the rapid development of the system of competitive examinations. It is undeniably easier to determine whether a student can test a simple salt or a mixture of salts than it is to ascertain whether he has received such a training as will enable him to experiment and reason with exactitude. Another excuse for the retention of these imperfect methods of teaching is the absence of an entirely satisfactory text-book written on the proper lines. And this brings us back to the 'First Step,' which attempted more than it succeeded in achieving. Instead of being restricted to the consideration of a few of the simpler chemical phenomena it brought under notice some of the most complicated facts with which chemistry has to deal. Its most conspicuous deficiency was due to the failure to recognize the vast importance of introducing quantitative experiments at an early stage so that the student may learn how our knowledge of the composition of important compounds has been arrived at. Nevertheless, despite these cardinal defects it must be acknowledged that many teachers and students have derived valuable assistance from this book.

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* 1888. London: Longmans. Pp. 1–364.

The present volume may be looked upon as a new and shortened edition of the 'First Step.' The method of the two books is precisely the same. As in the 'First Step' many of the experiments are not sufficiently simple for beginners, and the details given are not full enough to enable them to be performed by the pupils themselves, neither do the majority of the exercises serve to illustrate the really fundamental facts of the science. In order that the method which Mr. Galloway rightly recognizes to be the correct one shall be successful, simple quantitative experiments are requisite, carefully designed to illustrate the manner in which that body of knowledge which we call the science of chemistry has been, and is being, acquired. Very few such experiments are met with in this volume, whilst a great many trivial and quite unimportant details are dealt with at considerable length. It appears to be a mistake to put before the beginner in the first chapter many of the highest generalizations of physics and chemistry, involving conceptions which even the advanced student finds it hard enough to master. Here Mr. Galloway shows how much he is still trammelled by conventional superstitions about the teaching of the subject. He needs must put into his first chapter the so-called "elementary" definitions of matter, force, the law of gravitation, etc., together with explanations about the meaning of the words particle, molecule, atom, and the like. Having thus fettered himself at the outset the author struggles through many pages in his attempt to make clear to the beginner these ideas, which were acquired comparatively late in the history of physics, and are therefore the most difficult for the beginner to grasp, not hesitating to quote freely from larger works, and frequently to draw his illustrations from them. In this respect the book fails to carry into effect the inductive method, which the author emphasizes as the "new method" that he has introduced. Some of the statements to be met with have an antiquated air. On page 33 we are told "the two prevailing opinions with regard to the nature of heat are the theory of emission and the theory of undulation." Joule's work, nearly fifty years ago, dealt the last blow to the emission theory, and no physicist of repute now looks upon it as anything more than a historical curiosity. On page 67 the metric system is stated to be "founded upon the metre, which is the $\frac{1}{10000000}$ part of a quadrant of the meridian; this constitutes the unit of the system." The truth is, however, that later measurements have shown that the metre is not the ten-millionth part of the quadrant. The unit of the system, the metre, is in reality a length of platinum kept in Paris, and is no more an "absolute" standard than is our "yard." On page 84 we are startled to read that "substances liable to ferment and putrefy may be kept *in vacuo* for a long time without undergoing any change, owing to the oxygen of the air, which causes them to change, being removed." A more inaccurate statement could not well have been written in the year 1888. Has the author never heard of Pasteur's researches?

The definitions of fundamental terms are often loose and misleading. On p. 212 "chemical affinity" is stated to be "a molecular force," and on the same page we meet with the remarkable assertion, in italics, that the "properties of a compound cannot be predicted either from a knowledge of the properties of its constituents, or from any other source." On p. 233 we are informed that "although we do not know why substances always unite together in unvarying proportions by weight, a beautiful theory was invented by the late Dr. Dalton to account for the fact; it is known as Dalton's Atomic Theory, and although purely speculative, has exerted an important influence in aiding the progress of chemical science." This is hardly consistent with a true appreciation of the difference between a scientific theory and a pure speculation. Nevertheless, the volume contains a quantity of useful information likely to be of interest to the student of chemistry.

MANUAL OF PRACTICAL PHARMACEUTICAL CHEMISTRY. By GEORGE ROBERTSON, F.C.S.[*]

The wants of students preparing for examination give rise to the publication of a very large number of small books, intended to cover the syllabus of some particular examination. These are usually mere collections of the most essential facts and theories, arranged as briefly as possible, so as to be crammed up and remembered for a few weeks for the purposes of the examination, after which they are again forgotten as quickly as they were learnt. This little manual of pharmaceutical chemistry, however, although compiled expressly for medical students preparing for the degree of M.B., and embracing only the subjects included in the syllabus of that examination, is by no means of this superficial description, as although the range of subjects is limited, the treatment of each is thorough, more so, in fact, than in most larger works on the subject. Having so few substances to deal with the author is enabled to treat more fully of each individual process, and thoroughly explain, step by step, the object of each operation, and the action of each test.

The directions for the preparation of the various salts, alkaloids, etc., are those of the British Pharmacopœia, in cases where such methods are given in that work, and they are supplemented by notes explanatory of the reasons for each step in the process. These explanatory notes form one of the most valuable features in the book, as in reading the official process for assaying a drug or testing a salt it is often difficult for a student to see the reasons for many of the directions or the objects of many of the tests, nor would he find them explained in the ordinary text-books. The official process for estimating the morphine in opium is a typical case; very few students see the rationale of this process until it is explained to them, and here the drying of the opium, the action of the lime, the taking a fractional part of the liquid, the use of the ether, and the action of the chloride of ammonium are all commented on, and an intelligent appreciation of the process thus conveyed.

In adapting the official directions for the preparation of salts and extraction of alkaloids for educational purposes, the quantities are reduced to a suitable scale for experiment, the wording being otherwise unaltered; this sometimes produces a rather exaggerated effect, as in the extraction of morphine, where the crude extractive from an ounce of opium is directed to be enveloped in a double fold of strong calico and subjected to powerful pressure.

In the arrangement of the experiments no particular order or system seems to have been attempted, most of the organic substances being taken first, though iodoform and chloral hydrate occur later, in the middle of the inorganic salts; this want of arrangement is, however, largely compensated by a complete index. Besides the special preparations for making and testing which directions are given, general remarks on tinctures, extracts, decoctions, infusions, etc., are included, as well as a table of poisons and their antidotes, and directions for the detection of poisons in vomits. These last are somewhat crude, and adapted only for a rough and ready preliminary testing; for example, a yellowish white precipitate, on adding ammonia and sulphydrate of ammonium to a portion of the vomit in which sulphuretted hydrogen has given no precipitate, is taken to indicate zinc, whereas a precipitate would most probably be obtained on the addition of those reagents, whether zinc were present or not. In looking for morphine and strychnine, too, ether is used as the solvent for the alkaloids (morphine is practically insoluble in ether), and an ethereal extract of the original vomit made alkaline is directly tested.

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[*] London: S. F. Hodsoll. 8vo. Pp. 58, interleaved. 1s. 6d.

The remainder of the book is thoroughly reliable, the only oversight being the statement recently proved to be incorrect, that the iodine-liberating impurity in ether consists of aldehyde. The book is interleaved with blank pages for notes.

COLOURED ANALYTICAL TABLES. By H. WILSON HAKE, Ph.D., F.C.S., Lecturer on Practical Chemistry and Assistant Lecturer on Chemistry at the Westminster Hospital Medical School.*

These tables consist of the usual tests for the common metals and a few acid radicles and organic substances, apparently intended for use in an elementary stage of the study of practical analysis. A novel feature however is introduced in the shape of an attempt to illustrate the reactions by reproducing on paper the colours and appearances of the various precipitates, oxides, borax beads, etc. This attempt can scarcely be considered a very successful one, as the characteristic appearances of the precipitates, apart from their colour, are not in this way rendered evident. Thus there is no apparent difference between the chlorides of silver and lead, or between arsenious and stannic sulphides, which are easily distinguished in actual experiments by differences of appearance. In our opinion it would be far better to leave the student to examine the results of his tests with an unbiassed mind, merely giving sufficient verbal information as to colour, etc., to prevent mistakes. He certainly will not gain a more correct idea of the appearance of ferrous sulphide by looking at a black spot on a piece of paper than could easily be conveyed in words, and he might possibly be tempted to omit the actual performance of the tests on known substances and rely only on the coloured drawings.

Obituary.

Notice has been received of the death of the following:—

On the 30th of December, Mr. Robert Bingham, Chemist and Druggist, Market Place, Kirton-in-Lindsey, Lincolnshire. Aged 48 years. Mr. Bingham was an Associate in Business of the Pharmaceutical Society.

On the 3rd of January, Mr. James Lockhead, Chemist and Druggist, Elderslie Street, Glasgow. Aged 81.

On the 6th of January, Mr. George Pasco, Chemist and Druggist, Hackney Road, London. Aged 51 years.

On the 7th of January, Mr. Samuel Dunsford, Chemist and Druggist, Market Place, Wigan. Aged 47.

On the 7th of January, Mr. John Edmund Hugo, Pharmaceutical Chemist, Addle Street, London. Aged 55 years. Mr. Hugo had been a Member of the Pharmaceutical Society since 1870.

On the 9th of January, Mr. Frederic Walker Haydon, Pharmaceutical Chemist, Fordinbridge, Hants. Aged 66 years. Mr. Haydon had been a Member of the Pharmaceutical Society since 1847.

On the 11th of January, Mr. William Williams, Chemist and Druggist, High Street, Tenby. Aged 57 years. Mr. Williams had been a Member of the Pharmaceutical Society since 1871.

On the 12th of January, Mr. Walter. Spratling, Chemist and Druggist, Barton Street, Gloucester. Aged 29 years.

On the 14th of January, Mr. George Geddes, Chemist and Druggist, Main Street, Aberchirder. Aged 44.

BOOKS RECEIVED.

THE PRACTICE OF PHARMACY. By JOSEPH P. REMINGTON, Ph.M., F.C.S., etc. Second edition. Philadelphia: Lippincott and Co. 1889. From the Publishers.

THE LATIN GRAMMAR OF PHARMACY for the Use of Medical and Pharmaceutical Students. By JOSEPH INCE, F.C.S., F.L.S., F.G.S., etc. London: Baillière, Tindall and Cox. 1890.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ACIDUM SULPHURICUM AROMATICUM.

Sir,—I can confirm the observations of Mr. R. A. Cripps in reference to the specific gravity and acidity of this preparation. On reference to our laboratory journal I find the specific gravity of successive batches ranges from ·925 to ·926 at 15·5° C.

Probably through an oversight Mr. Cripps gives ·864 as the specific gravity of tinct. zingib. fort. Standards prepared by myself have a specific gravity of ·858 only, and this is identical with the results recorded by Stoddart and Tucker (*Pharm. Journ.*, [3], iii., 216).

London, N. F. W. FLETCHER.

Sir,—I can fully confirm the observations of Mr. R. A. Cripps upon the errors which occur in the B.P. description of aromatic sulphuric acid. I have repeatedly taken the sp. gr. and acidity of different batches and have invariably found the sp. gr. to be between ·922 and ·925 and the acidity about 13·7 per cent. of real sulphuric acid. This sp. gr. is slightly lower than the average of Mr. Cripps, which is no doubt due to the high sp. gr. of his strong tincture of ginger.

Mr. Cripps gives ·864 as the sp. gr. of this tincture, and if he has used no water to displace the spirit, has certainly produced a very strong tincture. Fletcher gives the sp. gr. of strong tincture of ginger as ·858, and even this, in my experience, is rather high, for successive batches, prepared strictly B.P., have only varied from ·847 to ·850.

It is curious that Stillé and Maisch, in the last issue of the 'National Dispensatory,' give, under Acidum Sulphuricum Aromaticum, the sp. gr. of the B.P. preparation as ·927 and the acidity as 13·4 per cent., whilst in the text they perpetuate the erroneous pharmacopœial description.

40, Charlotte Street, E.C. E. J. MILLARD.

Blondeau et Cie.—The reply to "Argentum" did not mention your firm: it had reference to "soap" in the ordinary acceptation of that term, and not to the diacid salts of the acetic series to which you call attention. The two things are quite distinct, and your communication does not at all affect or alter the opinion we have expressed.

School of Pharmacy Students' Association.—The next meeting will be held on Thursday, January 23, when Mr. E. B. Sherlock will read a paper on "Alkali Manufacture," and Mr. L. W. Hawkins will give a report on "Inorganic Chemistry."

Medicus.—There will be a precipitate due to reaction between the bichloride and bicarbonate.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Davenport, Redfern, Wilson, Tubby, Nemo, Apprentice.

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* London: G. Philip and Son. Large 8vo., 12 pp. and 9 pls.

RECENT DONATIONS TO THE MUSEUM.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

OIL OF ROSEMARY.

During the present month two samples of essential oils, obtained from plants grown in Sussex, have been presented to the Museum. One is the oil of rosemary and the other that of lavender, both distilled at Brighton, from the plants grown there by Mr. Sawer (see vol. xv., p. 125). With those specimens some information is contributed concerning the details of the preparation of the oil of rosemary, which seems sufficiently interesting for publication.

Mr. Sawer states that he first experimented with plants raised from seeds which had been collected probably in the south of France, but these yielded a rank oil. He then obtained cuttings from old gardens in England, and found that if planted in August they strike rapidly, especially if pulled off with a "heel" or woody portion, and shaded from the sun. It was found that light loam answers best, and that the cuttings succeed best in wooden boxes. Mr. Sawer recognizes two distinct forms of rosemary, the one having a larger leaf, which is more hoary underneath than the other; both however seem equally fragrant, and he mixes them in equal proportions for distillation. Rosemary is by no means easy to grow everywhere, requiring a warm, sheltered and somewhat dry situation. In a damp atmosphere, or where shaded by trees, or in a rich soil, it is apt to grow rapidly and form long herbaceous shoots, and the plant is then liable to be killed by the frost. In order to harden the plants and prevent their too rapid growth the young plants are placed in rows at least four feet apart, with 18 inches or two feet between each plant, on a dry calcareous sloping ground. The chalk on which they grow holds sufficient moisture in summer and yet provides good drainage in winter. At the beginning of September the young shoots are carefully and evenly cut, with a strong pair of sheep shears, right down to the wood, and the plants soon form a compact stunted hedge about 18 inches high. The old leaves remain on the plant a considerable time, not shrivelling off as do those of lavender. The only manure he gives is cinder ash in abundance, and the spent leaves from the still. The plants are fully exposed to sea air at a considerable elevation about two or three miles from the sea. This Mr. Sawer considers beneficial to their growth, the name Rosemary (*Ros marinus*) almost implying that their native habitat is near the sea.

For purposes of distillation the young shoots are cut at the end of August or beginning of September, and separated from the wood, *i.e.*, the ends of the main branches, as much as possible. The twigs are then packed tightly into a perforated copper vessel, which is covered with a perforated copper lid, and the whole is lifted into the still by pulley tackle. If the wood is not removed much space is wasted and the oil acquires a turpentiny rankness. If the rosemary is not distilled soon after being gathered it is liable to heat, and if spread out till the next day Mr. Sawer believes it would lose much fragrance. Cold water is let into the still until it rises nearly to the level or within an inch of the lid, the head of the still is then luted on and clamped, and the mass left to become saturated with water until the next morning. The fire is then lit and when the water begins to boil the oil distils over. That which comes over during the first twenty-five or thirty minutes is the finest; that which comes over afterwards is small in quantity, inferior in quality, and apt to spoil the rest if allowed to distil into it. A worm of tin pipe in a galvanized iron cylinder is used as a condenser. The place chosen, on the dry chalky South Downs, in proximity to the sea, is perhaps the very best that could be selected in this country for a plant whose native home is on the sunny shores of the Mediterranean.

There appears to be no reason why English oil of rosemary should not be obtained of the greatest purity and of the finest flavour under such favourable conditions, when skill and care are also applied to its production. Mr. Sawer promises details concerning the distillation of lavender at a future date.

POISONS AND POISONERS.—1.

BY FREDERICK SPURR.

The word "poison," although, in the words of Macaulay,—

> ". . . . . . . a very ugly word,
> One which should make us shudder
> Whenever it is heard,"

is nevertheless used very lightly in these days and conveys little, if any, idea to our minds of the dread which it inspired in past ages, when ignorance, superstition and credulity rendered wholesale poisoning a comparatively safe proceeding; and when, in consequence, poison played a more important part than it now does in the arrangement o domestic difficulties and the furtherance of political objects.

Then it was regarded, in its nature and action, as the very embodiment of *mystery*, and was associated with ideas of supernatural and almost omnipotent power. It baffled the most celebrated physicians, and resisted all the talismans of witchcraft and all the antidotes of alchemy. It was believed that certain poisons existed which possessed the most extraordinary properties; a subtlety so extreme as to defeat the most skilful caution, and a virulence so manageable as to be capable of the most accurate graduation. Under the influence of ignorance, terror, and imposture these absurd and extravagant ideas were disseminated and perpetuated, so that at a later period the secret poisoner flourished, and secret poisoning became a fine art.

Under such circumstances, and in such an age of myths, legends, and superstition we need not wonder that poison was regarded with a dread unknown to us who live in a more enlightened age, when microscopical and chemical science are in such an advanced state of perfection that it is almost impossible for the poisoner to escape detection after the death of his victim, even if the presence of poison has been doubtful before.

The first poison, probably, with which man became acquainted was the venom of the snake, and in the earliest times of which we have any record, this was used as a poison for the points of arrows, and other weapons of warfare; being gradually superseded by other poisonous substances more easy of access, such as the juices of plants, and putrid animal matter. We are thus able to understand the significance of the word "*Toxicology*," as applied to the scientific knowledge of poisons. It is derived from an ancient Greek root, *toxikon* or *toxos*, signifying an *arrow*, or other similar weapon, and has indirect reference, therefore, to the poison in which they were steeped.

Arsenic, aconite, hellebore, opium and henbane appear to have been well-known amongst the ancients for their poisonous properties, and various facts also tend to the supposition that prussic acid, or some allied substance, was at a very early period known to the Egyptians, and through them to the Greeks and Romans. The acid was probably extracted in a dilute state from certain plants, among the chief of which was certainly the peach. There is, according to M. Duteil, in a papyrus preserved at the Louvre, the sentence, "Pronounce not the name of I. A. O., *under penalty of the peach*," from which it is gathered that those who revealed the religious mysteries of the priests were put to death by means of peach-water.

Amongst the Romans the crime of poisoning was of common occurrence, and strange to relate, women seem to have been the most frequent offenders. The first notable instance of poisoning in Rome occurred during the consulship of M. Claudius Marcellus, and C. Valerius, about the year 331 B.C., when the city was visited by an alarming pestilence. Many of the leading men of the state had died of the same disease, and many others were manifesting every symptom which characterized it, when information was given by a slave girl that the disease was due to poison prepared and administered by the Roman matrons. Acting on this information the *curule ædiles* surprised about twenty matrons in the act of preparing certain drugs over a fire, and being compelled to drink them in the forum, since they asserted they were not poisonous, they perished by their own wickedness. Further investigations led to the discovery of a conspiracy amongst the women to destroy their husbands, and over a hundred and seventy matrons were ultimately condemned.

We next read of poisoning on an extensive scale in connection with the worship of Bacchus. The festivals in honour of this god were held several times a year, and were called by the Romans Bacchanalia, Orgies and Canephoria. On their first introduction to the Romans these feasts were celebrated with great solemnity, but afterwards they were characterized by the most unrestrained debauchery. Dr. Leonhard Schmitz, of Bonn, thus describes them:—"The initiated did not only indulge in feasting and drinking at their meetings, but when their minds were heated with wine they indulged in the coarsest excesses and the most unnatural vices. Young girls and youths were seduced, and all modesty was set aside; every kind of vice found here its full satisfaction. But the crimes did not remain confined to these meetings; their consequences were manifest in all directions; for false wills, forgeries and denunciations proceeded from this focus of crime."

Wholesale poisoning and assassination followed, for it was found necessary to silence those who had been fraudulently drawn into these orgies, lest they should bear witness against the shameless practices there indulged in. In the year B.C. 184 Quintus Nœvius Matho was commanded by the Senate to investigate such cases. He spent four months in the accomplishment of his task, and according to a contemporary writer he condemned no less than two thousand persons.

The first legal enactment specially directed against poisoning was passed by the dictator Sulla, about the year 84 B.C., and with one or two slight alterations it continued in force until the fall of the Roman empire. It was known as the *Lex Cornelia de Sicariis et Veneficis*, and contained provisions against all who made, bought, sold or possessed poison for illegal purposes. At this period poison was frequently given as a "love potion," or in order to gain undue influence over a person, and no doubt many were in this way unintentionally killed. The punishment was death, but clear evidence of malicious intent was necessary for conviction, and under palliating circumstances the court had power to mitigate the sentence.

Much more might be written about the use of poisons previous to the Christian era. The deaths of Hannibal and Demosthenes show that the ancients were acquainted with some very rapid and powerful poisons, while the writings of Plutarch, Tacitus, Theophrastus, Quintillian and others abound with instances of occult and slow poisoning. Plutarch informs us that a slow poison "which occasioned heat, cough, spitting of blood, a lingering consumption of the body and a weakness of intellect" was administered to Aratus of Sicyon. The same poison is alluded to by Quintillian in his 'Declamations.' Tacitus informs us that Sejanus caused a *secret* poison to be administered by an eunuch to Drusus, who, in consequence, gradually declined, and at length died. Theophrastus speaks of a poison prepared from plants, which could be so modified as to occasion death within a certain period, such as two, three or six months, a year or even sometimes two years. This is, of course, absurd, though no doubt regarded by Theophrastus and his contemporaries as matter of fact.

Owing to the ambiguity of description, loss of records and other circumstances it is impossible to identify many of the poisons mentioned by ancient writers with those known in the present day, though in some cases there appears to be tolerable certainty in the matter. Thus, a preparation of poppies, similar to, if not identical with *opium*, appears to have been celebrated for its medicinal, as well as for its poisonous properties, and was probably the very preparation which Helen mixed with wine and gave to the guests of Menelaus.

Hemlock and hellebore are also supposed to have been known at this time, and by some it is said that the former, the *conium* of to-day, was the poison used in the Athenian executions, and the one by which Socrates met his death.

It is not until after the commencement of the Christian era that we read of any notorious professional poisoner, but so early as the year A.D. 26 poisoning was so much in vogue as a political agent that Agrippina refused to eat of some apples offered to her by her father-in-law Tiberius. Her caution availed her little, however, for very shortly afterwards she was exiled to the island of Pandataria, and there starved to death by order of the emperor. Her husband, Germanicus, whose popularity had aroused the jealousy and the fears of Tiberius, had been secretly poisoned some years previously, near

Antioch, by Plancina, the wife of Piso, and no doubt at the instigation of the emperor himself. Being afterwards accused of the murder, and of other similar crimes, Piso destroyed himself, A.D. 20, as the only means of escaping the judicial punishment of his wickedness. Plancina, being befriended by the Empress Livia, was acquitted, but afterwards, at the desire of her patroness, she was guilty of the greatest crimes, and ultimately perished, like her husband, by her own hand.

About this time, too, the infamous Locusta flourished. She obtained favour with Nero on account of her knowledge of poisonous herbs; having supplied the poison to the Empress Agrippina Julia by which she destroyed her husband Claudius, in order to make Nero, her son, succeed to the throne. She was also the principal agent in the preparation of the poison that was administered by order of Nero to his brother Brittanicus, whose death was attributed to a fit. Probably there were suspicions at the time that poison was the real cause, but of course this could not be proved, as in the present day. At that period great importance was attached to mere external marks and discolorations; indeed, the people had to depend entirely upon them, and upon the mode of death, for evidence of poisoning.* Thus, we read, that if in addition to sudden death there was lividity and rapid putrefaction of the corpse, the signs were regarded as absolutely conclusive; and we are told, "that when Brittanicus died, an extraordinary lividity spread over the face of the corpse, which they attempted to conceal by painting the face." This explains why he was hastily buried by night, and with great secrecy. It is said also, that "a shower of rain washed away the white paint, which the murderer had put over his face, so that it appeared quite black and revealed the effects of the poison."

Tiberius and Nero unfortunately did not end the race of Royal poisoners, for both in ancient and modern times kings and rulers have been guilty of the crime of poisoning, while a goodly list could be compiled of monarchs who are said to have fallen victims to this form of assassination. It is very probable, however, that many of these cases, as recorded by the old historians, had no foundation in fact, but were the outcome of popular superstition.

For instance, John, King of Castile, as Tissot relates, was poisoned by a pair of boots prepared by a Turk; Henry IV., by gloves; while Louis XIV., fearing a project to poison Philip V., prohibited him opening letters, or putting on gloves. Pope Clement II. is said to have been poisoned by the fumes of a taper; and a priest is reported to have offered to destroy Queen Elizabeth by poisoning her saddle.

One of the most reckless and notorious poisoners of the Middle Ages was an occupant of the Papal chair under the name of Alexander VI. The original name of this pontiff was Roderic Borgia, and he entered the church early in life, being appointed Cardinal in 1455.

On the death of Innocent VIII. in 1492 he contrived by means of dissimulation and intrigues to get himself elected, though he had been living in utter disregard of the canons of his church, and had at that time four sons and a daughter by a Roman lady. His daughter, Lucrezia Borgia, had a very romantic career, and has been made the subject of an opera by Donizetti. The story of her life, as pourtrayed in this opera, is briefly quoted here:—

"Lucrezia Borgia, daughter of Pope Alexander VI., was thrice married, her last husband being Alfonso, duke of Ferrara. Before her marriage with the duke she had a natural son named Gennaro, who was sent to be brought up by a Neapolitan fisherman. When arrived at man's estate he received a letter, informing him that he was nobly born, and offering him a commission in the army. In the battle of Rimini he saved the life of Orsini, and they became sworn friends. In Venice he is introduced to the young nobles who tell him of the ill-deeds of Lucrezia Borgia. Gennaro, in his indignation, mutilates the duke's escutcheon with his dagger, knocking off the 'B' of his name, and so changing Borgia into Orgia (*orgies*). Lucrezia, not knowing who has offered the insult, requests the duke that the perpetrator may be put to death, but when she discovers it to be her son gives him an antidote for the poison he has drunk, and releases him from confinement." By some authorities this story of profligacy is discredited, on the ground that Lucrezia is praised by several eminent historians for her virtues. Her father and her brother Cæsar attempted in 1503 to poison a rich cardinal for his wealth, but by the mistake of a servant they themselves drank of the wine prepared for their intended victim. The pope died almost directly, but Cæsar recovered and was killed four or five years later.

Until the end of the sixteenth century our information as to the nature of the poisons principally used is very vague and uncertain, but the probability is that vegetable poisons were most in vogue. About the beginning of the seventeenth century, however, a change took place, and *arsenic* became the favourite weapon of poisoners, a notorious company of whom arose in Italy about this time. Chief among them was a woman named Toffania, or Tofana, who claimed for herself the power of bringing about the death of any person at a specified time. For the accomplishment of her evil purposes she used arsenic in solutions of varying strength. These solutions, however, were not prepared in the ordinary manner adopted in the present day. One of the methods employed was to dose an animal with a large quantity of arsenic, suspend him by his hind legs and carefully collect the liquid coming from the mouth and nostrils during the death struggles and subsequent putrefaction. By this means the solution would contain a peculiar *ptomaine*, which would add greatly to its virulence, and which Selmi has shown quite recently to be formed when animal matter decomposes in contact with arsenical solutions. Her preparation was widely known throughout Italy as Acquetta di Napoli, or Aqua Tofana, and it is believed that with it more than *six hundred* persons were poisoned. Hieronyma Sparta was another notorious poisoner, who is supposed to have been a pupil of Tofana. She formed an association of young married women who were desirous of destroying their husbands, and provided them with the means of accomplishing their object.

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* The same belief in the significance of various external *post-mortem* appearances, prevailed up to the middle of the seventeenth century, and lingers still among the uneducated at the present day.

In France the professional poisoners were represented by a number of infamous characters, who carried on their work by methods similar to those employed by the Italian School.

The crimes of St. Croix, Madame de Brinvilliers, the priest Le Sage, and many others are all related in Voltaire's history of the reign of Louis XIV. As in the cases of many others whose lives have been spent in crime, so both St. Croix and Madame de Brinvilliers both met with terrible deaths; the former being suffocated by the fumes of his own chemicals, while the latter, having escaped to a convent, was betrayed by a detective disguised as an amorous Abbe, and beheaded, her body being afterwards publicly burnt near Notre Dame.

Since the days of Brinvilliers and St. Croix the world has entered upon a new era; an era characterized by unprecedented educational advancement, and by many brilliant discoveries in medicine, surgery, pathology, chemistry and microscopy. A spirit of inquiry and investigation has superseded the former credulity; enlightenment has supplanted superstition; and truth has conquered, and is still combating falsehood in its many varied forms. Secret poisoning and professional poisoners are no longer to be dreaded as formerly. Criminals have learnt that poison in these days leads to almost certain detection; and that their evil purposes can be more safely effected by means of revolvers, knives or dynamite. Thus, cases of criminal poisoning are becoming less common every year, though, unfortunately, our newspapers still contain frequent reports of cases of accidental poisoning. Many deaths are also caused annually by the careless administration of soothing medicines to young children. This very common practice cannot be too strongly condemned, for it is a well established fact that children are exceedingly susceptible to the action of such medicines, which ought never to be given except by a medical man.

In succeeding papers I propose to speak of the subject of poisons collectively and generally; then of some individual poisons, selected as representing the class to which they belong, or as possessing special interest and importance; and lastly of the methods of treatment in cases of poisoning, and of the present state of toxicological knowledge.

THE MANUFACTURE OF "COMPRESSED YEAST" AND ITS DETRIMENTAL GERM IMPURITIES.[*]

BY ALFRED J. M. LASCHÉ.

The object of this investigation, as the subject title implies, is to give a description of the process of manufacture of the so-called *compressed yeast*, together with an examination of the detrimental germ impurities which the latter may contain.

In order to render all the different steps and manipulations of the process clear and intelligible, a few introductory remarks of a biological character would seem necessary. In the first place it may be stated that the term "*compressed yeast*" implies not only a definite species but a particular form of yeast, as distinguished from the *liquid* and *brewer's yeast*, which, as formerly, are still used to some extent by the baker and brewer respectively.

Compressed yeast may, therefore, be defined as a product obtained by the expression of water from the liquid holding the yeast plant in suspension, thereby rendering it readily transportable, better suited for domestic purposes, and relatively purer. As previously mentioned, the term compressed yeast refers to a definite species, and this is known technically as *Saccharomyces cerevisiæ*. It received the name *Saccharomyces* on account of its capability of converting sugar into alcohol and carbon dioxide, while *cerevisia* literally means beer.

The *Saccharomycetes* are a very interesting order of *fungi*; the differences in the products of decomposition of the various species being of great practical importance to the manufacturer of alcoholic beverages. All of them have their individual characteristics, but a microscopic examination of them is not in itself sufficient for the determination of the species. We must also resort to macroscopic aids, and, still further, to the chemical analysis of their individual products of decomposition.

It is of course an easy matter to distinguish between such forms as *Oidium lactis* and *Saccharomyces cerevisiæ* by means of the microscope, but when the latter alone is resorted to for the purpose of discriminating between *Saccharomyces cerevisiæ*, *Sacch. ellipsoideus*, *Sacch. membranaefaciens*, or *Oidium albicans* there remain microscopic characters still to be discovered, for their variations under different conditions are so great as to render such a means of discrimination impossible.

A fairly good method has been devised by Hansen,[*] who determines the limits of temperature between which ascospore formation takes place, and the time which elapses before it commences, at different temperatures. The following table, abstracted from the paper referred to in the footnote, will render this method comprehensible.

Species.	Limit of temperature for ascospore formation. °F.	Lapse of time before ascospore formation took place at 52° F.
Saccharomyces cerevisiæ	49–72	10 days.
Saccharomyces pastorianus (a) *var.* I.	45–67	89 hours.
Saccharomyces pastorianus (b) *var.* II.	43–64	77 hours.
Saccharomyces pastorianus (c) *var.* III.	45–64	7 days.
Saccharomyces ellipsoideus . . .	45–67	4½–5½ days.

Sacch. pastorianus var. I. is a sedimentary ferment.
" " " II. is a medium ferment.
" " " III. is a surface ferment.

This, as stated, is a fairly good method, but considering that the effects produced at different temperatures are not uniform in yeasts, it cannot afford perfect satisfaction or undoubted accuracy and precision. Furthermore, as Mr. Martinand has intimated,[†] it is exceedingly difficult to observe the exact time when ascospore formation begins, and there can be no doubt but that the method is inferior to the one suggested by him, which is as follows: A definite amount of maltose is subjected to fermentation, at a definite temperature, with a certain amount of the yeast in question, and, after fermentation has ceased, the amount of maltose remaining is determined. The differences shown by this method between the different yeasts is so marked as to render it a very accurate one, so far at least as the determination of the species is concerned. The comparative results obtained by Martinand with those yeasts which are of particular importance to the brewer may here be appended as an example of the practicability of his method.

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[*] A Thesis presented to the School of Pharmacy of the niversity of Wisconsin, from the *Pharmaceutische ndschau*, January.

[*] Yeast, its morphology and culture, by A. G. Salomon, in *Pharm. Journal*, February, 1888, p. 718.

[†] Etude sur l'analyse des levures de brasserie. *Journ. de Pharm. et de Chim.*, 1889, p. 33.

	No.	Hours.	Amount of maltose remaining from 100 parts.
Saccharomyces pastorianus var. I.	1	27	0·97
	2	35	0·81
Saccharomgces apiculatus . . .	1	35	10·80
	2	35	10·70
	3	35	10·26
	4	35	10·35
	5	35	10·50
Saccharomyces cerevisiæ	1	30	0·75
	2	40	0·64
	3	29	0·77
	4	29½	0·70
	5	28	0·73
	6	47	0·74
	7	38	0·70
	8	40	0·67
	9	42	0·75
	10	48	0·70
Saccharomyces cerevisiæ	1	21	0·80
	2	23	0·85
	3	22	0·925
	4	18	0·84
	5	23	0·95
	6	18	0·862
	7	38	0·772
Saccharomyces ellipsoideus . . .	1	17	2·54
	2	30	2·47
	3	19	2·22
	4	20	1·86
	5	33	2·34
	6	26	1·95
	7	15	2·07
	8	15	2·27
	9	15	2·20
	10	21	2·45

I will pass for the present the details relating to the different yeast forms, and give the principal characteristics of the pure culture of *Saccharomyces cerevisiæ*, which forms the basis of the compressed yeast. *Saccharomyces cerevisiæ* (Syn. *Cryptococcus cerevisiæ* or *Torula cerevisiæ*) belongs to the achlorophyllaceous *thallophytes*, Order of *Saccharomycetes*. It is a one-celled plant, 7–9 *m* long, 4–5 *m* in diameter; the individual cells are cylindrical or oval, occurring in short chains of 2's, 3's or 4's, or singly. They multiply principally by gemmination (budding) at ordinary temperatures (21–22° C.), though at some temperatures (10–21° C.) they develop 3–4 ascospores in each mother-cell.

I had the opportunity to closely watch the formation of a bud at 1500 diameters, and it may be of interest to describe the observation here. When a cell is ready to become a "mother-cell," a slight thickening of the membrane takes place at a certain point, and most microsomes (food particles contained in the cell) seem to gather near this point. In eight cases that I had under observation this occurred in about four minutes (in nutrient solution). In two minutes later this thickened part of the cell membrane gradually took the form of a minute process. After the latter had grown very prominent, the cell membrane gradually became constricted at the point from which the process extended, and eventually closed up, leaving it in the form of a small bud, still connected with its mother-cell, but indirectly communicating with it. The entire process of bud formation required, on an average, eighteen minutes in those specimens which were under my observation.

Saccharomyces cerevisiæ, cultivated on a gelatin plate at 21° C., forms in forty-eight to fifty hours small circular colonies, occasionally stoloniferous, at first colourless, and in twenty-four hours more acquiring a yellowish tinge. When magnified 114 diameters they have a tesselated appearance, the individual cells being easily recognizable. As the colony becomes older it grows to the surface of the gelatin to obtain free access of oxygen, and forms small white spots or dots. Cultivated on potato at 38° C., it produces a nearly clear white perfectly homogeneous film of "yeast" around the points of inoculation, and finally spreading and covering the entire surface of the potato, at the same time developing a yeasty odour.

In a tube with gelatin (the so-called *stab culture*) the development of the individual colonies seems to increase as they approach the surface of the gelatin. On reaching the surface they develop rapidly, and do not liquefy the gelatin.

Mr. A. G. Salomon has shown* that by the chemical analysis of yeast the following bodies may be detected within the cell, namely: invertin, leucin, glucose, glycerin, succinic acid, cholesterin, guanine, xanthine, sarcine, inosite and alcohol. The ferment invertin is produced by all *Saccharomycetes*, and serves to invert cane sugar, and to convert nitrogenous matter into a form suitable for plasmolysis.

PROCESS OF MANUFACTURE OF "COMPRESSED YEAST."

A. *Preparation of the Mash.*—3130 lbs. of ground corn (*Ger.* mais) are mixed with 4500 gallons of water. This mixture is heated to 190° F. (to swell the starch and thereby facilitate its inversion) and subsequently cooled to 154° F.,† then 1920 lbs. of ground rye (*Ger.* roggen) and 550 lbs. of ground malt (*Ger.* gerste) are added (malt is specially employed for the amount of diastase it contains and is indispensable in the converting process). This mixture is then allowed to stand one hour, and is finally cooled to 80° F. The proportions of the different grains are of course largely a matter of opinion, and the various yeast manufacturers have different working formulas.

B. When this mash has cooled to 80° F. it is drawn off into another tub, and 1 gallon of concentrated sulphuric acid is added, in order to dissolve all remaining starch, dextrin, and glutinous matter, and to convert them into grape sugar. Finally, a quantity of compressed yeast is added, to start the fermentation. This yeast settles to the bottom of the tub, but as soon as fermentation has started (usually in half an hour), and carbonic acid is being generated, the current of the latter gradually carries the yeast to the top of the liquid. It remains there, covered by a layer of the chaffy parts of the grain, until the yeast has accumulated in a sufficiently large quantity, and the current of carbonic acid has become strong enough, when it eventually breaks this film of chaffy particles, and collects on the top of it in the form of foam. This goes on until all of the nutritive matter has been assimilated. The foam, containing all the yeast, rises about 2 feet above the top of the liquid, dependent on the size of the tub, and when no more effervescence is noticeable, fermentation is complete.

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* *Pharm. Journ.*, Feb. 1888, p. 719. See also the *London Analyst*, 1888, p. 86.

† Mr. A. G. Salomon, *loc. cit.*, states that at 143° F. the maximum amount of maltose is obtained by inversion. It would, therefore, be advisable for some manufacturer to try this temperature, and to compare the results with regard to the quantity of yeast obtained.

C. Immediately after fermentation has ceased the foam is drawn off by means of troughs, and run, together with a fresh supply of water, into a revolving six-sided, and declining cylinder, lined with a sufficiently fine strainer. During this step of the process most all the chaffy remnants of the grain are separated, and the liquid, containing the yeast plant in suspension, is allowed to flow into a basin, whence, by means of a trough, it finally flows into a large tub.

D. The product in this tub is prevented from further fermentation by the addition of a sufficient quantity of ice. The yeast is now allowed to settle, the supernatant liquid drawn off, and the residue repeatedly washed to free it from all mechanical impurities.

E. When sufficiently cleansed it is run into a press by means of a steam pump. The press is constructed of a column of iron frames, either side of each frame being covered with a very fine straining cloth, and all the parts fitting tightly into each other. The yeast having been pumped into such a press, the water is separated from it by means of the strainer, and carried off through a waste pipe.

The yeast, now compressed, is taken out in the form of large cakes, and in this condition it is brought into commerce.

During my visits to the various yeast manufactories of Milwaukee, Chicago, St. Louis, and Detroit, quantities of spoiled yeast were often met with, and as this difficulty could not be accounted for by the manufacturers, an investigation was planned to discover the cause of the trouble. For this purpose duplicate inoculations were made into gelatin tubes of the products of all the different steps of the process, from each of the different manufacturers. These tubes were labelled Sets I. and II., and the following is a list of them :—

Set I. Two inoculations were made from the contents of the tub, after the mash had cooled to 80° F. = A′.

Two inoculations were made from the mash, after the sulphuric acid and yeast were added, and after fermentation had begun = B′.

Two inoculations were made from the foam, after fermentation had ceased = C′.

Two inoculations were made after the yeast was in ice for one hour = D′.

Two inoculations were made from spoiled yeast in the shop = E′.

Set II. was prepared in the same manner from the products of a different manufacturer, and labelled respectively A″, B″, C″, etc. All necessary precautions were taken to prevent the access of foreign bodies to these inoculations.

After these inoculations were forty-eight hours old, all but four showed signs of liquefaction. A cover glass preparation was made, and under a power of 600 diameters it showed numerous motile bacilli. In three days all but these four were almost completely liquefied. On opening one of these liquefied tubes a very disagreeable odour was given off, similar to that of the spoiled yeast in the factories, and which may be compared with the odour of rotten cheese. When the contents of these tubes were completely liquefied they developed a white, flocculent "swarmer,"* as a sediment, and a thin film over the surface of the liquid. The liquefied portion grew turbid, and acquired a reddish tinge. When these tubes were two weeks old the physical appearance had not changed materially, but the odour became somewhat more disagreeable. The four tubes which did not liquefy produced no disagreeable odour. They were the inoculations made from the mash after this had cooled to 80° F. Their physical appearances were alike, and they contained the same thing, as was subsequently verified.

Work was now begun for the isolation of the bacteria of the liquefied tubes. From each of these of Set I., *i.e.*, B′, C′, D′, and E′, an attenuation into gelatin tubes was made, and these poured on to plates. In twenty-four hours all of them began to develope, and in another day the plates were completely liquefied and unfit for further use. Another set was immediately started, and this time I inoculated into sterilized water contained in a tube. From these blanks, attenuations into gelatin tubes were made, and the latter subsequently spread on to plates. These plates proved sufficiently attenuated, and were used for further work. The plates prepared from C′ and E′ may be described as follows: In the first place colonies of *Saccharomyces cerevisiæ* were plentiful, and besides these there were two distinctly different colonies of bacteria, one a liquefier and the other a non-liquefier. Plates prepared from B′ and D′ were entirely devoid of yeast colonies, but otherwise presented apparently the same kinds of colonies as those prepared from C′ and E′. Of the bacteria found to be present on the plates prepared from the originals, pure cultures were afterwards made on agar-agar, a sub-stratum which is not liquefied by bacteria, and therefore well suited for stock cultures.

Gelatin tube A′ was the next to be subjected to investigation, and plates prepared from attenuations obtained from it apparently contained but one kind of colony. Gelatin tubes were inoculated from individual colonies of this plate to obtain pure cultures.

Having isolated all of the bacteria found to be present in Set I., their individualities were next studied. Starting with the non-liquefiers the pure cultures of all of these seemed so nearly alike that I was first led to ascertain their differences, if any. Plates were made from attenuations of the pure cultures, and in thirty hours they developed small, circular, light brown colonies. All of the plates showed them to be perfectly homogeneous in structure, and nothing characteristic could be seen. All of the non-liquefying colonies are therefore to be regarded as the same thing, from this point on. The colonies above referred to as having developed in thirty hours, showed after an additional period of eighteen hours what may be designated at the second stage. The centre of the individual colonies became considerably darker, and a lighter zone separated the centre from the periphery. The colonies seemed to grow very rapidly in size, and in ten hours more the same colony presented still further differentiations. When another day older its appearance under the microscope was a very fine one, showing a dark nucleus surrounded by numerous concentric rings.

When these colonies were a week old they reached the top of the gelatin, and formed small, white, opaque, knob-like masses.

Another colony were now taken under observation, and this time showed the differentiation more plainly, especially in the fourth stage. No other bacterium, to my knowledge, which has as yet been described, shows these characters so definitely and uniformly, and I have therefore provisionally designated it as the concentric ring colony.

When inoculated into gelatin in a tube ("stab culture"), this bacterium developed a whitish zooglœa, also showing a differentiation of concentric rings. In this case the formation might have been due to the drying up of the gelatin, for the same character was noticed in four tubes, and all of these showed signs of desiccation. Along the path of the inoculating needles the colonies developed irregularly, and most abundantly near the surface of the gelatin.

A potato culture of this concentric ring colony presented the appearance of a few, not specially characteristic slimy dots on the surface, which were at first of a grayish-white colour, and later on acquired a dirty yellow tinge. It developed very slowly at 21° C., more rapidly at 30° C., but its optimum temperature for development seemed to be 38° C.

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* This term implies that the whole liquefied contents of the colony is in a streaming motion.

On agar-agar it developed a white, but not characterestic zoogloea. In the gelatin culture a peculiar, not disagreeable odour was developed, but the potato and agar-agar cultures were entirely odourless. It coagulated milk in four days at a temperature of 38° C., and the casein did not become redissolved on standing, but a sour odour was developed. From this milk culture a plate culture was made in order to ascertain whether the souring of the milk could be attributed to this concentric ring colony. No impurities were found on the resulting plate, nor could any reaction for acetic acid be obtained with the soured milk.

When cultivated in beef broth it produced a cheese-like odour in two days, forming a thin "swarmer" on the top of the liquid, and causing it to become slightly turbid. On plating back from this culture no impurity could be observed. When cultivated in beef broth with 1 per cent. of grape sugar it produced a slight alcoholic odour in two days, forming a very delicate membranous "swarmer" on the top of the liquid.

An experiment to prove that the zoogloea as it grows on the top of the gelatin in a tube invariably develops in the form of concentric rings was now made. For this purpose a sterilized dish was half filled with a gelatin medium, and into this several inoculations were made. The dish was then well-sealed to prevent evaporation from the gelatin, and kept at a temperature of 21° C. The zoogloea, as they devoloped, did not assume the form of distinct concentric rings, although showing a tendency to do so, but this somewhat abnormal behaviour was considered to be due to the larger amount of water continued in the culture medium, as it contained less than 10 per cent. of gelatin. As this culture became older a distinct garlic-like odour was developed, and on examining the other cultures, with the exception of that of the potato, the same odour was observed.

When cultivated on bread, nothing characteristic was presented. It seemed to develop most luxuriantly in simple beef broth.

I prepared a stained specimen of these colonies, and found them to consist of short, thick bacilli, 0·65 *m* to 1·3 *m* long and 0·45 *m* to 0·55 *m* in diameter and occurring singly or in short chains of two's or three's.

A pure culture of *Saccharomyces cerevisiæ* was now inoculated with this bacillus, to see whether the decomposition of the yeast was caused by it, but no physical change could be noticed, and no disagreeable odour was developed. A pigeon inoculated with it also seemed to suffer no inconvenience. I therefore concluded that this bacillus was not the cause of the putrefaction of yeast which often takes place in factories, but that it was a harmless air form.

All the bacteriological literature at hand was consulted for a description of this bacterium, but nothing could be found to correspond with it in the characters above noted. On further examination it may prove, however, to be an already known form, and I shall, therefore, simply refer to it as the concentric ring bacillus.

Work on the liquefying colony was now begun.

Several attenuations were made from the pure cultures, and these plated out. In twenty-four hours very small, circular colonies, of a light brown colour were found to be developed. When magnified 114 diameters they appeared to be ⅜" in diameter, smooth on the periphery, and darker in the central portion. When three days old a second stage could be distinguished. This stage shows a dark nucleus, and a liquefied portion surrounding it. The nucleus is seen to become ruptured, and the fragments to dissolve in the liquefied portion. When magnified 114 diameters a slow "Brownian movement" was observable. A culture prepared in a gelatin tube from this liquefying colony showed the first traces of development twenty-four hours after inoculation. At this time there appeared along the path of the inoculating needle numerous small and colourless colonies, liquefying the gelatin near its surface. Twenty-four hours later the liquefied portion was funnel-shaped, and distributed all through it was a dense white "swarmer." Twenty-four hours after this had been noticed the liquefied portion occupied the entire surface of the tube.

The liquefied portion of the contents of the tube was turbid, and a "swarmer" in the form of a thin film on the surface of the liquid, and coherent to the sides of the tube, had developed. When this tube was two weeks old, and by this time the contents completely liquefied, the liquid had acquired a bright orange tinge, and possessed an extremely disagreeable odour.

On agar-agar, a medium which is not liquefied by this bacterium, develops a white zoogloea, which spreads rapidly, especially in a streak culture. The zoogloea is of a sticky nature, and not very easily soluble in water.

Several cultures of this liquefier were made on potatoes, and placed in the incubator at 38° C. In two days only slight development was noticeable in the form of dirty, yellowish-brown spots surrounding the points of inoculation. The potatoes were then taken out of the incubator, and kept for three days at the ordinary temperature of the room, *i.e.*, 20—21° C. They seemed to develop much more rapidly at this temperature, the colour of the zoogloea becoming of a lighter yellow, and spreading over the entire surface of the potato. When these potatoes were seven days old the zoogloea was of a dirty orange colour, and emitted a peculiar, indescribable odour.

This liquefying colony, cultivated in beef broth, gave rise to a disagreeable cheese-like odour, and caused the medium to become turbid. No "swarmer" of any kind was formed. When cultivated in beef broth containing 1 per cent. of grape sugar, an alcoholic odour was developed in four days, no characteristic development was perceived when cultivated on bread. Milk was coagulated in one day, and a yellowish ring, "swarmer," was found around the sides of the test-tube on the surface of the milk. The odour developed in this medium was a peculiar sour one. After a few days the casein separated completely, and was not perceptibly peptonized.

A cover-glass preparation showed this liquefying colony to consist of motile bacilli 0·65 *m* to 1·3 *m* long and 0·33 *m* in diameter. Their ends are knobbed, and they occur singly or in short chains of two's or three's. Such a preparation of this bacillus from an agar-agar culture a week old, and kept at 20° C., was stained with alkaline methyl-blue solution, when it was observed that one or two spores could be plainly recognized in each cell. No spore formation could be observed in any stained preparation obtained from fresh cultures. Among the stains which they will absorb, I found "dahlia" to be the best.

A number of yeast samples were now obtained from different manufacturers, and three of them placed in an incubator at 30° C., the remaining three being kept at 21° C.

In three days numerous small white dots were developed on their surface. From these I prepared several tube, plate and potato cultures, and as a result found them to be the above described bacillus. Only one of these six samples did not show these white dots, and in this case *Penicillium glaucum* was found to be the impurity.

All necessary precautions were taken to prevent the accidental contamination of the compressed yeast with the above described bacillus. In order to prove its presence as an original impurity, I broke open a few samples of a certain manufacture, and from a freshly broken surface inoculations into gelatin were made. As a result the presence of both the previously described bacilli was discovered, namely, the *concentric ring colony* and the *liquefier*.

After the five samples, on which these white dots had developed, were four days old, the odour of putrid yeast was abundantly given off. From the experiments made with the concentric ring colony upon pure cultures of yeast it was found that this disagreeable odour was not produced by them, and suspicion was therefore directed to the liquefying bacterium.

Pure cultures* of *Saccharomyces cerevisiæ* were therefore inoculated with this liquefier. They were kept at 21° C., and in two days the disagreeable odour previously referred to was developed. As these cultures grew older the odour increased in intensity, and resembled in every respect that observed in yeast factories. These experiments therefore confirmed the suspicion with regard to this liquefying bacterium, that is, that it is the principal cause of the so-called yeast rot, which is often met with in compressed yeast factories.

All the bacteriological literature available was consulted to find a description of this bacillus, but without success. It has not yet been sufficiently studied, however, to assign to it a specific name, and I will, therefore, designate it for the present as the *liquefying bacillus*. With regard to the sample of compressed yeast on which *Penicillium glaucum* was found, it may be further stated that *Oidium lactis* was also present. The latter, however, was found to be only an occasional or accidental impurity, and no importance is, therefore, to be attached to its presence. *Penicillium glaucum* was found to be present in a greater number of cases, but both of these last-mentioned impurities are probably brought into the yeast accidentally, and could be avoided by not allowing the product to remain exposed to the air for any length of time, and by packing it a little more securely than is generally the case.

In an analysis by Mr. Rowland Williams† of ten samples of yeast prepared in Europe only two contained notable quantities of starch, namely, 21·2 and 12·3 per cent. respectively, one sample contained but a trace, and the others were free from this substance. In this connection it may be stated that the yeast of this country, with few exceptions, contains considerable quantities of starch, which, as I have been informed by some of the manufacturers, is purposely added as a diluent.

It is not probable that the moderate addition of starch will materially influence the value of the compressed yeast when used for domestic purposes, but it may sometimes be the medium by which other germs, such as moulds, the so-called wild yeasts, etc., are introduced.

In connection with this investigation a question which is of much practical importance to the manufacturer naturally arises, and that is how the compressed yeast can be prevented from undergoing putrefaction. In answer to this, the following observations may be of some value, although no method is known by which destructive germs can be eliminated when once present. Before the yeast is compressed it should be thoroughly washed with clean water to separate as completely as possible the glucose and starch, as well as inorganic salts, which are certain to be present. The fermenting tubs should furthermore be well washed with boiling water after each operation, and a higher degree of cleanliness should be observed than is usually the case in the factories. The yeast should finally be kept in a cool place, at a temperature of 48—58° F. The method devised by Hansen,* and now adopted in some of the large breweries of continental Europe, of growing the yeast crop from a single pure yeast cell, might also be suggested as worthy of a trial by the manufacturers of compressed yeast.

The culture media employed in this investigation were prepared according to the following formulas:—

Gelatin.

One pound of lean meat was exhausted with water, and the liquid strained. To this liquid 10 grams of dried peptone and 5 grams of sodium chloride were added. After these had completely dissolved, 100 grams of gelatin were added, and the liquid heated to boiling for 10 minutes. Enough water was now added to make the whole measure 1000 cubic centimetres, and this finally neutralized with sodium carbonate. The solution was then filtered through paper, and finally sterilized sufficiently. In order to clarify the product it is advantageous to add the white of an egg before filtering, and then heat to boiling in order to coagulate the albumen, after which the liquid is filtered.

Agar-Agar.

This was prepared according to the foregoing method, with the simple difference of substituting 20 grams of agar-agar in place of 100 grams of gelatin.

Beef Broth or Bouillon.

This was prepared by extracting 1 pound of lean meat with 1000 cubic centimetres of water, straining, and then adding 10 grams of dry peptone and 5 grams of sodium chloride, filtering and sterilizing. Beef broth with grape sugar was prepared by simply adding the required amount of grape sugar to the former, before sterilization.

ESTIMATION OF MORPHINE IN OPIUM.†

Professor F. A. Flückiger estimates morphine in the following manner: 8 gm. of powdered opium are placed in a plaited filter 12 cm. in diameter, the funnel being slightly tapped in order to bring the powder to the bottom, and the whole dried at 100° C. After half an hour, a mixture of 10 c.c. chloroform and 10 c.c. ether is poured on the powder, the funnel being covered and tapped a number of times; then 10 c.c. chloroform additional are poured on. After the liquid has drained off, the filter is spread out and the powder dried at a slightly elevated temperature. The powder is then shaken with 80 gm. water to which has been added 0·2 gm. ammonium oxalate to separate the calcium present, and filtered after two hours. 42·5 gm. of the filtrate are treated in a small tared flask with 7·5 c.c alcohol (sp. gr., 0·83), 15 c.c. ether and 1 c.c. ammonia (sp. gr. 0·96). After six hours, having shaken often, the contents of the flask are poured on two plaited filters, one inside of the other, and 10 cm. in diameter, the flask being rinsed with 10 c.c. water or an aqueous solution of morphine (1:5000) and poured on the filters. These are dried at slightly elevated temperatures and at last at 100° C. The morphine is then transferred to the flask which has been dried at 100° C., and the whole heated to this temperature until constant. The morphine obtained represents one-half the quantity of the opium.

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* These cultures were on agar-agar, and as this liquefying bacterium produced no odour when cultivated in this medium, reliable results could be obtained.

† *London Analyst*, May, 1889, p. 87.

* See *Pharm. Journ.* Feb. 1888, p. 719.

† From *Archiv. d. Pharm.*, 1889. Reprinted from the *American Journal of Pharmacy*, January.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE RESPONSIBILITY OF DISPENSERS.

Two cases of prosecution under the Food and Drugs Act that are reported in this week's Journal call for notice, since they are of interest in several respects. In one case a chemist and druggist was proceeded against for omitting to use chloroform water in dispensing a prescription, and the defence offered for this disregard of the directions given by the prescriber was that the offence was only of a technical nature. In the other case it would appear from the report we have received that in dispensing a prescription bicarbonate of potash was substituted for the iodide of potassium that was ordered. This discrepancy was admitted and the only explanation offered was that there were several customers in the shop at the time, and that the person for whom the medicine was prepared disconcerted the attention of the dispenser by laughing and talking while it was being made up. Naturally, in both instances, the defence offered was not received by the magistrates as satisfactory, and penalties were inflicted upon both the defendants. In the last mentioned case the person for whom the medicine was prepared happened to be obtaining it for the purposes of the Food and Drugs Act, and when the case was heard it led to the expression of opinion by the magistrate that as the public must be protected against that sort of thing, a substantial penalty would have to be inflicted. It can scarcely be contended that either of these cases are illustrations of the oppressive operation of the Food and Drugs Act upon chemists which is frequently complained of. They were simply perverse infractions of the rule which all dispensing chemists profess to regard as inviolable and that ought to be most scrupulously observed. We are disposed to believe that these cases are exceptions to the general practice, but we do not for one moment suggest that they are on that account less deserving of the penalty which the law imposes. They are indeed to be regarded rather as offences of twofold gravity, since they are not only breaches of trust as regards the public, but also offences against the pharmaceutical body calculated to throw discredit upon it and create suspicion of those who do not merit it.

There is another point of view from which one of the cases above mentioned is curious at the present moment when the question is pending as to who is to be regarded as the seller of a poison. The defendant in that case was an assistant, a duly qualified man, who is apparently carrying on a chemist's business for the widow of its late proprietor. This seems at first sight to be inconsistent with the probably prevailing impression that in the case of infringement of the Food and Drugs Act the proprietor of a business would be proceeded against. However, on referring to the words of the Act it appears that its provisions are throughout personal, it being repeatedly stated that no person shall commit any of the offences defined by the Act. The only part of the Act where reference is made to the "seller or his agent" is that relating to the taking of separate samples for the purpose of analysis, and though the terms of those sections show that an agent may throw responsibility upon his employer in respect to that proceeding, they do not indicate that an agent may not be himself held responsible for the act of sale if the main provisions of the Act be infringed by him personally. The case now referred to shows that such a view of the Act has been taken by a magistrate, and the circumstance is at least suggestive of the tendency of public opinion.

Viewing these cases purely as matters affecting the internal interests of the craft, it may well be asked how is the body to be protected against the damage caused by the acts of its own members? This is indeed a grave question, and one that takes a more definite form than many of the complaints upon which arguments in favour of the need for protection of the trade interests of chemists are sometimes based. If the chemist is to command any preference over grocers and general dealers in the estimation of the public it must be by securing confidence in the faithful performance of his duties. Without that basis it cannot be expected that his claim for remuneration upon a higher scale than a mere trader will be considered, and he will have no pretence to be regarded as a professional man.

The publication of the Calendar for 1890 of the Pharmaceutical Society of Great Britain furnishes an opportunity for referring to a useful little volume that might with advantage take its place on the chemist and druggist's book-shelf more often than it does. Although its object is primarily to deal with the business of the Society the information that it contains covers a much wider ground. Besides the lists of members, associates and apprentices, the regulations of the Boards of Examiners, the written examination papers of the previous twelve months, the syllabus of the School of Pharmacy, and similar matters, one hundred and twenty pages are devoted to Acts of Parliament and official regulations having a special bearing upon the business of the chemist and druggist, this information being brought well up to date. For instance, we notice an excerpt from the new Weights and

Measures Act, and a description of the model regulations for inspectors drawn up by the Board of Trade under its authority; a section from the Revenue Act, 1889, enacting for an attempt to defraud the excise by the use of false weights or measures a penalty of one hundred pounds; as well as the latest regulations issued by the Board of Inland Revenue and the Registrar of Trade Marks, and the Revised Medical Scales for Shipping. In addition there is a full list of subscribers and donors to the Benevolent Fund.

* * *

A sensational letter appeared last week in the *Globe*, with the signature "Hard Lines," complaining of the difficulty experienced in obtaining medicine from a chemist at half-past nine on Sunday morning. The writer speaks of having to go from Regent Street to Moorgate Street without succeeding in getting what was required and then back again before obtaining it at eleven o'clock. It is also stated that "very few chemists will serve medicine at night." This is not the case, for there are probably few parts of London where it is not the practice with chemists who dispense prescriptions to have a notice on their doors stating how medicines may be obtained at any hour in case of emergency. In replying to this letter "Chemicus" suggests that "Hard Lines" may have been in the habit of dealing at establishments which are open only between the hours of nine a.m. and seven p.m., and that it is unnecessary to go to a chemist's except when they are closed. If there be any ground for this belief it would entirely dispose of the grievance that "Hard Lines" complains of. But in reality we think that if the writer of that letter would make himself better informed as to the provision made by chemists for satisfying the requirements of the public in the supply of medicines at all hours he would find that his complaint has been premature.

* * *

The London County Council has had under consideration the new Act relating to weights, measures and weighing-machines, and a report has been presented by the Sanitary and Special Purposes Committee containing various recommendations as to the administration of the Act in London. This will involve considerable additions to the work hitherto carried out, as the duties imposed upon the County Council by the new Act are very important. It is considered that the existing offices for the verification and stamping of weights and measures are quite inadequate, inasmuch as they are not generally equipped in a proper manner and are in some cases unsuitably located. One of the first requisites will be to provide properly appointed offices for the purpose of examining and verifying weighing-machines, as well as the work to be done under the provisions of the old Act. It is suggested that the county should be divided into fourteen districts, arranged as far as possible on the basis of population, and with an inspector for each district. It was further recommended that the present inspectors taken over from Middlesex, Surrey and Kent, as well as those who would come under the control of the Council from Westminster, Marylebone and St. Pancras, should be appointed for a period of six months, with a view to their passing the necessary examinations and obtaining certificates of qualification during that time.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

ADDRESS TO STUDENTS.

The following address to the students of the Liverpool School of Pharmacy was delivered on the occasion of opening new premises by the President, Charles Symes, Ph.D., on Thursday evening, the 16th inst.:—

We have met this evening as you are aware under special circumstances and to mark an important occasion. Mr. Ward has been so successful a teacher that he has found it necessary to provide new and increased accommodation for the Liverpool School of Pharmacy, and at this, the formal opening, he has invited me as President of the Liverpool Chemists' Association to address to you a few words suited to the occasion. In complying with this request I do so rather as a fellow-student further on the road. Almost daily I acquire some item of knowledge which I did not previously possess, and am impressed with the fact that we have yet much to learn in connection with our calling, and if my remarks tend to give you a deeper interest in and make you more closely attached to the business of your life we shall not have spent the time in vain. Perhaps as this school occupies a position and has an existence (so far as I am aware) unique, it may be well to say something concerning its history. The Liverpool Chemists' Association had for many years a school of pharmacy; it was never in my recollection a very successful affair, the students usually numbered about a dozen to twenty, mostly the smaller number. There were some good chemical lectures for very moderate fees, and botany and materia medica were taught for reasonable sums, but the various efforts made to sustain it had practically failed, and it had fallen to a very low ebb when Mr. Ward started the Liverpool School of Pharmacy. The success of the undertaking was at first by no means assured, and it required ability, expenditure of capital, courage, patience and perseverance to bring about the present result. The Council of the Association relinquished its school in favour of this, and an arrangement was entered into whereby, although not having any pecuniary interest in it as a property, the Council exercised a certain control over its conduct.

The syllabus is submitted for revision and approval, and members of the Council can at any reasonable time visit the premises and satisfy themselves that it is complied with, and that sound teaching is the principle which governs all instruction given. So far the arrangement has worked satisfactorily, and if carried out both in spirit and letter, it may form the basis on which may be built a solid educational structure to meet the wants of this city and neighbourhood, and may be a model on which other provincial schools of pharmacy may be founded. I have not yet given up the hope that these will some day exist in all important centres. It would be inopportune in the presence of the Principal to eulogize this school, but it is only just to say that if students come here with a fair amount of previous training and study, if they do not gain all the additional knowledge they require for passing (not merely getting through) the examinations, and establishing an intellectual appreciation of the duties which subsequently devolve upon them, the fault will rest chiefly, if not entirely, with themselves. I say "with a fair amount of previous training and study," and here I touch on a weak point with students in pharmacy. The average youth leaves school, passes the Preliminary examination or else equivalent, and becomes an apprentice. Feeling that he has now done with school and schoolmasters, attracted by his new occupation, and having but little leisure, he loses the habit of study. Study is a habit which, when acquired, is easy of practice to those who follow it, but to those who neglect it the little they do is laborious and irksome. This habit, once lost, the youth trusts to the information he will gain in the pharmacy, and a few months tuition at a future date to meet the ordeal which he dreads. Consequently men come to schools like this, aye, and to that at Bloomsbury Square also, quite unprepared to digest and assimilate the mental food that is prepared for them; with minds often almost incapable of comprehending the important principles on which their instruction must proceed, and it is these men who constitute the majority and swell the percentage of unsuccessful candidates at the examinations. I would like to see more junior students here, youths who have served part of their apprenticeship; taking one or two subjects each session to help and direct their private study, previous to coming for their final instruction, which then need only be short and would most assuredly be satisfactory and would serve them a useful purpose through life. The object of a compulsory curriculum is to promote this kind of training, and, as originally proposed, I think it would with careful and considerate administration have accomplished this object. There were conditions originally surrounding it which if not formally withdrawn have been practically abandoned, and others which I consider of an impracticable nature have been suggested which it seems to me renders revision absolutely necessary. It is unnecessary, however, to go further into detail on this subject, as most of you present will, no doubt, have passed your examinations long before any compulsory curriculum can come into operation. What more deeply concerns us, perhaps, is whether at present a proper relation exists between pharmaceutical education and pharmaceutical examination. Professor Attfield has devoted considerable time and attention to the consideration of this subject, and has written a pamphlet thereon which reached a second edition. He holds that until examiners know more of the lines on which students have been taught, or teachers know more of the lines on which they are to be examined —notwithstanding solid training, passing the examination will be very much a matter of chance, which ought not to be the case. This certainly looks like sound reasoning, especially in so wide a subject as chemistry. The scope of the examinations is defined by the Council and Examiners, and we are bound to assume that it is just and right; in fact I do not remember hearing a complaint that it is otherwise. But the examiners have a difficult task to perform in varying the questions so as not to make the examination a mere matter of memory (one student communicating the questions asked) and yet to keep within the lines as at present defined. A more complete syllabus would no doubt help both teachers and examiners, and when this is formulated it ought to be published for comment and criticism before it is finally adopted, as by such means it would be rendered far more perfect and acceptable than it otherwise would be.

The examiners tell us, or rather the President tells us on their behalf, that they would be materially assisted in their judgment as to the fitness of candidates if they were empowered to demand certificates of attendance at *bonâ fide* schools of pharmacy. Now assuming this to be the case, although they cannot at present demand, there is nothing, so far as I am aware, to prevent them from receiving such certificates if voluntarily offered, and they would soon learn to attach such value to them as they really deserved. I am aware that in the London University examinations, which are the highest in the kingdom, no such certificate is required or received; but the tendency is in this direction. A case recently came under my notice in which a friend who was a successful candidate for his M.D. was asked by the last examiner at what school of medicine he had studied. And nothing more. I am told that candidates at Bloomsbury Square are sometimes asked this question, and that all do not care to give a definite reply to this question. Let us hope that the occasion may never arise that a candidate shall be ashamed to own that he has been educated at the Liverpool School of Pharmacy. One word more about these examinations. If possible do not stop at the Minor. It is, I know, the qualifying examination, but it is the gate of the field where all who would qualify must enter, hence that field is very crowded. The Major is the entrance to the fold where there is much more room, and where you are more likely to reap both intellectual and pecuniary reward. You are no doubt aware that there has been some discussion as to the desirability of having one qualification and of putting all on one dead level; there is not much fear of that being accomplished, as although it is very desirable to give the man who passes the qualifying examination more than at present, I believe there will always be a Major or honours examination. And now you are fairly entitled to ask me, when you have accomplished all this what is to be your reward?

Well, gentlemen, I trust you have not chosen pharmacy for your vocation because you thought there was a rapid fortune to be made out of it, for such a result would be contrary to common experience, but rather because you thought it a calling in which you could make a reasonable livelihood, and be occupied in a manner genial to your tendencies and wishes. If such is the case there seems to me no reasons why your hopes may not be realized. It is a business which requires a less capital to start with than many others, and one in which you can always find food for thought whilst you are earning that for the body, and in which you can make a fair income, notwithstanding the miserable competition to which it is subject.

This more especially if you really love your business, and strive to be in the front ranks where, as I have said, there is most room. The social position is certainly not great, but it is tending upwards, and you can assist the body to which you belong.

Sheffield has for some years been making strenuous efforts to render its school of pharmacy the first in the provinces, and I have been much pleased with the success attendant on its endeavours and my earnest wish is that its career of prosperity may long continue. But surely Liverpool will not be satisfied even with a second place, as a friendly rivalry amongst schools of pharmacy in a dozen centres would certainly be productive of good. If such a number existed in a healthy condition we should be able to make almost any demands from Bloomsbury Square with good hope that they would be granted. You will remember that with the support of my friend, Mr. Schacht, I once endeavoured to move the Council to grant that the Pereira Medal and other Council prizes may be competed for at various centres throughout the country. The refusal was not a very emphatic one, but it was a refusal. More recently Mr. Marshall Leigh has made a proposal of a similar although not identical nature and with similar results. Now if we can strengthen our position and show that we are doing good work, we shall certainly not ask next time in vain. And now I have only to wish you well and perseverance with your studies, success in your examinations and subsequent prosperity. To the school of pharmacy in its new domicile a long and useful existence.

At the close of the address, which was well received, a vote of thanks, proposed by Mr. Harold Wyatt, junr., seconded by Mr. Cave and supported by Messrs. Newton, Kerr and Ward, was heartily accorded to Dr. Symes for his presence and address.

Mr. Ward in supporting the vote of thanks said Dr. Symes had touched upon some very important points in his address. He referred especially (1) to the advisability of issuing a new syllabus, and said that upon this point there could be no doubt, the present syllabus being no real guide to the examination. (2) The acceptance by the examiners of certificates of attendance, etc., from teachers, and he considered the proposal a very good one, and one which if properly carried out would considerably aid the examiners in judging the ability of candidates, and would also prove beneficial to students. Mr. Ward also contended that the examination should as far as possible be conducted in writing, and at various centres. This would make the examination an equal one to all, whereas at present much depends upon the examiner the candidate gets.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The usual monthly meeting was held in the Society's rooms on January 7. The President, Mr. A. Russell Fox, occupied the chair.

The minutes of the last meeting having been read and confirmed, the President called upon the author to read the following paper on—

THE METRIC SYSTEM OF WEIGHTS AND MEASURES.

BY J. H. BRADWALL.

The French Government appears to have first awakened to the great inconvenience arising from the different systems of weights and measures in use, and the avenues thereby opened to inaccuracies, if not to actual fraud, and a commission, composed of gentlemen noted for their ability in the fields of science and philosophy, was consequently appointed to consider the whole question, and if possible devise, or suggest a method which would obviate these evils.

The commission appears to have well grappled with the difficulties, and after several years propounded a system, which not being based on anything peculiar to their own country would be suitable for universal adoption. Two standards to this end were selected,—the length of a pendulum vibrating seconds, and a fraction of the earth's circumference, the latter being eventually decided upon. One forty-millionth part was the fraction chosen, and this length was called a metre.

It may be called an arbitrary standard and a purely imaginary one, yet although it belongs to the region of abstract thought nothing can be more exact. It is the length of a bar of platinum, carefully preserved in Paris, and from which copies have been taken from time to time for actual use. Two standard metres of platinum are also preserved by the Royal Society in this country.

The standard metre is described as a rectangular platinum bar, bearing no mark or inscription. Its breadth is ·984 inch, and depth ·138 inch, so that it may roughly be described as one inch broad and one-eighth of an inch in depth or thickness.

The length of a pendulum vibrating seconds, so near as it can be ascertained, is not much different to that of the metre—it is about three-sixteenths of an inch shorter. For all practical purposes, therefore, the one measure would have been as convenient as the other, and especially as both belong in reality purely to the region of thought, and a standard bar would become the fundamental measure for practical purposes in either case.

The metre, the starting point and base of the whole metric system, is 39·371 English inches. It is divided into tenths, hundredths and thousandths, called respectively decimetres, centimetres and millimetres. The multiples of the metre are named by corresponding terms derived from the Greek. Superficial measures are obtained by squares, and those of solidity and capacity by cubes of the metre or its divisions or multiples. The weight in vacuum of a cubic centimetre of distilled water at its maximum density, or a temperature of 4° centigrade, has furnished a fundamental weight, and a satisfactory and reasonable connection between the measures and weights of the system. In France the coinage is linked to the system of weights and measures in like manner.

Distilled water was selected as the best material in nature for thus determining the unit of weight, from its being obtainable everywhere, its being perfectly homogeneous, and its density being invariable at any given temperature. It was required to first accurately ascertain the weight of this volume of water, and then to construct a metallic standard of equivalent weight. There were two modes of proceeding for determining the volume of water to be weighed, one by measuring the internal capacity of a vessel to contain this volume of water, the other by measuring externally a solid or hollow body in order to ascertain the weight of the volume of water displaced by it; the latter method was preferred, it being considered that the accurate external measurement of the metallic body was much less difficult than that of the internal capacity of a vessel, and it was determined that the best form of this body was a cylinder of a height equal to the diameter of the base, this form being capable of being made and measured with the greatest precision.

Doubtless there would at the time be very great and somewhat natural reluctance in France on the part of the people to change their old customs. All these have, however, been changed. Difficulties which might possibly cause a little friction at first would gradually disappear, and the metric system is now thoroughly established.

Most of the difficulties which presented themselves to the French nation in the very infancy of the metric system, would probably present themselves to us in the inauguration of a comparatively new method of weighing and measuring, and it is a probably much exaggerated glimpse of these difficulties which has led to attempts from time to time to mend and patch up our present system, or rather non-system, in preference to the adoption of a new one.

We should, however, be under the very great advantage of the knowledge that we were not entering on an untried path, and I venture to affirm it is now pretty much a matter of overcoming our natural and national hesitation to emphatic changes.

That no great advantage can be gained from further attempts to ameliorate by repairs the present state of things is furnished from the fact that for more than a century commission after commission has been appointed to this end, but with how small success, we need scarcely stay to inquire.

Several schoolmasters with whom I have spoken earnestly deplore the present state of affairs, but confess themselves powerless to interfere with it. Now that the Education Act is well to the fore, and the question of over-pressure in schools is being ventilated, it may not be uninteresting to say that I believe I am only expressing a common experience of our connection with suffering humanity as family chemists in saying that instances of this over-pressure in schools are very frequently noticed by us, some of them very melancholy instances indeed.

A personal strong impression that the most laborious part of the school-work of our young people is experienced by them to be arithmetic is confirmed by the analyses of the results of our Preliminary examination, where this branch of the examination has so often been found to be the stumbling block, through miscalculations, even by a fairly well-up candidate.

As a commentary on the above facts I have no hesitation in expressing a firm belief that fully one half the time spent in the teaching of arithmetic would be saved if the decimal system of weights and measures, and one or two slight alterations in the coinage, were adopted.

Moreover, from this point of view the subject has an important bearing, not only on the rate of education, but on the education rate.

Some opposition has been made to the metric system by those who prefer to substitute a system of arithmetic with the figure 8 for its basis, and there are others who have been and are in favour of a duodecimal system, and much may be said for both these ideas, especially for the one having twelve for its basis.

It is much easier to make a division into eights than into tenths, as everyone knows who has had to graduate an 8 oz. and a 10 oz. bottle, and the fact that 12 is divisible by 2, 3, 4 and 6 is a great advantage. This number is also very much used in common life. Articles are continually bought and sold by the dozen, and there can be little doubt that this convenient number was either fixed upon to assimilate to some extent with our coinage, or that the penny was not accidentally decided upon as the twelfth of a shilling, but was the result of the popularity of the convenient dozen.

Then again there is the fact that the radius of a circle is equal to the chord of one-sixth of its circumference, so that the 3rd, 6th, or 12th part of the circumference of a circle can be easily taken, while it is a much more difficult matter to ascertain the 10th part.

From these and other considerations it has been held by competent arithmeticians that a duodecimal, instead of a decimal system should be adopted, and that the numbers as they stand, instead of being 1, 10, 100, 1000, etc., should be 1, 12, 144, 1728, etc. These arguments would be important were the idea to commence from its very foundation a complete system of arithmetic; such is however *not* the case, and any attempt now to overturn the decimal system of calculations is undesirable and would be useless.

The superiority of the decimal system to an octagonal or duodecimal one is apparent, its multiplications and divisions being accomplished largely by the movement of a dot, so that I shall not need to refer further to the above arguments. My idea is simply to say a few words on behalf of a system of weights and measures which has been found to be free from those objectionable features which have characterized our own system; this and much more may be fairly stated on behalf of the metric system.

Suppose we were to-day for the first time coming behind the pharmacy counter, what a remarkable thing it would seem to us that side by side on the counter we have two sets of weights that we buy and sell by one system, as a rule, and dispense, as a rule, by the other, but that to both rules there are exceptions.

What is known to a Yorkshireman as a Jack is in London called a Jill, and *vice versâ*.

Only the other day I happened to read of a chemist's errand boy whose weight was casually stated as 200 lbs. I thought at the moment it would have been a far more striking way of putting the matter to have said 16 stones, but I forgot at the instant that a stone means anything from 8 lbs. to 16 lbs., and that consequently in a newspaper it means nothing, and the weight must be given in pounds to be calculated by the reader according to the custom of his particular district.

The *Times* in a leading article some years ago says: "Whatever inconvenience to individuals in the shape of decapitation, confiscation of property, and so forth, the great French Revolution may have drawn with it, it is undeniable that the French nation derived from it considerable benefit in the reform of their weights and measures. It is granted on all sides that uniformity of weights and measures would be a desirable arrangement were we called upon to settle the matter for the first time. This, however, is not the case, we have to deal with a network of prejudice and a dead-weight of habit, which can scarcely be appreciated by any who are not in the habit of dealing with our small farmers and the humbler but more numerous members of the agricultural class." And the article concludes as follows: "Nothing can be better adapted to check the freedom of transactions than a system by which a bushel at one end of the country means one thing and another at another. The farmer in Suffolk, conversant only with coombs, writes to his correspondent in Northumberland to inform himself of the price of grain. An answer comes that it is so much per boll, and if he will but give himself the pains of looking at the Flintshire papers he will find that on a certain day prices ranged so much per hobbet. By the help of these advices he will no doubt be able to guide himself in his transactions at Mark Lane, where he can only sell by the quarter."

A Government commission appointed on the subject of standards of weights and measures some years ago made an exhaustive and valuable report, from which the following is abstracted:—

"In examining into the actual uses of these several denominations (*i.e.*, the avoirdupois and troy weights which were under consideration) we see at once that it is impossible to abrogate the avoirdupois pound and ounce which are used so extensively by every class that they must be considered as being emphatically the British weights. The avoirdupois drachm, however, does not appear to be used at all. The troy pound appears to be wholly useless; it is not used in contracts for gold and silver or in medical prescriptions, and we are not aware of any obstacle to its entire abolition. We think it desirable that measures be taken for the removal of the troy scale, and remarking the convenience of a decimal scale of subdivision of the avoirdupois pound we propose that the Government should use its influence for the introduction of such decimal scale."

I have been unable, however, to trace any very decided or practical outcome of the report of the commission.

The arguments in favour of the adoption of the metric weights and measures in place of those at present in use in English pharmacy are very numerous and weighty, and I believe there is now a very general feeling in this direction. That there are, however, considerable difficulties to be met with in detail cannot be denied, and that such a decided alteration would have to be brought about by very careful and guarded means is apparent to every pharmacist. The weighing and measuring of active medicaments is too serious a matter to be subjected to any sweeping and violent changes, and any alteration in this respect which may be brought about would necessarily involve the practice of such new conditions and surroundings by men who have long become accustomed to the weights and measures in present use.

Very decided advances towards the adoption of the metric system may be, however, made without the occasion of material interference with the convenience of the routine of pharmaceutical operations in the matter of weighing and measuring, as now conducted.

One such very suggestive advance is the introduction into the Pharmacopœia of parts by weight and fluid parts, the idea being that by the use of these and like terms which occur throughout the 1885 Pharmacopœia the operator is at liberty to use whatever weights and measures he may choose and with which he may happen to be the more conversant. And this, leaving out of the question the greater convenience for adaption to any quantities with which the individual may require to deal.

A more emphatic move still in this direction, and one which would have brought the book more in touch with modern continental Pharmacopœias, would have been to abolish altogether the mention of any specific weight or measure and in every instance give only the proportional parts, *e. g.*, tinctura laricis: larch bark, 1; rectified spirit, 8. Of course this could not have been carried out in convenient numbers throughout the entire work without slightly altering in certain cases the quantities, and consequently the proportions; but such alterations would only have been slight, and allowed these modifications, no serious or practical difficulty presents itself.

As an instance of the kind of allowable, but very important, alteration to which I refer, I may mention liq. morphiæ and other pharmacopœial solutions of the same strength, which, formerly 4 grains in the ounce, are now 1 per cent. solutions, and at the same time one may almost read between the lines the words, "the metric system of pharmacy."

By the adoption of such formulæ throughout the Pharmacopœia the employment of a great many useless words would have been dispensed with; the pharmaceutical student as well as the compounder would have found ready to his hand what he now often works out in the margin. To the advocates of the metric system the book would have recommended itself, and without entailing interference with established usage it would have been abreast with modern scientific literature, and which, excellent work though it is, it can scarcely be said to be so long as the terms pound, pint, and gallon occur in it.

It has been proposed as an acceptable addition to our present system to standardize the popular tea- and tablespoonful, making the former about 85 minims and the latter about 5 drachms, to leave out the term "ful," and speak of teaspoon and tablespoon simply, and adopt these measures for common use at the dispensing counter as well as the invalid's table. The idea is an ingenious one, and considering the present very unsatisfactory variation in size of these largely used domestic medicine-measures, and the dilemma thereby frequently caused to prescriber and dispenser, the project would, if fairly set on foot, probably become very popular.

I have no hesitation, however, in expressing my firm belief that the adoption of the metric system of weights and measures in its entirety in British pharmacy is only a question of time, and that it behoves us to very jealously guard against any additions to the already promiscuous list of British weights and measures, with the exception only of such additions as have a direct leading towards the metric system, such, for instance, as the use of a 7 and a 70-grain weight, being the 100th and 1000th part respectively of the avoirdupois pound, or that of a 48 minim measure being the 10th part of the fluid ounce.

I would suggest that we endeavour to further by all discreet means the adoption by physicians of the plan of prescribing an imperial ½-pint bottle of mixture, dose one-tenth part, which prescriber and dispenser alike would find very convenient for the calculation of quantities of active ingredients, would furnish a suitable number of accurate doses for the patient, and whilst safer for the public would, from the druggist's point of view, be preferable to the 6-ounce bottle, dose one tablespoonful in as much water, or the 1 or 2-ounce mixture, as now frequently ordered.

We shall, I think, be agreed that the time has not arrived for the adoption in pharmacy (and more particularly in the dispensing department) of the metric system, the Pharmacopœia Committee having only, as it were, partially opened the doors to the system, and physicians' prescriptions continuing to be written, almost without exception, as heretofore.

I would express the opinion that the time has fully arrived for a very wholesome discontent with our present usages; that it behoves especially our younger members to make themselves thoroughly at home with a system of weights and measures which is rapidly being embraced in chemistry and allied sciences; and that in pharmacy there is a decided advance, whether we choose to aid it or not, in this direction. The tide already flows towards the pharmacy from the chemical laboratory. When its impulse is also felt from the examining boards of the medical profession the time will have come for the change, and this having become inevitable will then be easiest accomplished by a complete adoption of the metric system, a system of weights and measures which, founded on a thoroughly scientific basis, uniting in itself its system of weights and its measures of length and capacity with each other, linked by its decimal principles with our national system of arithmetical notation, and utterly devoid of anything local or ambiguous, commands and secures at once our unqualified approbation.

After the reading of the paper a short discussion took place.

A vote of thanks to Mr. Bradwall brought the meeting to a close.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second half of the session opened on Thursday evening, January 16. There was a large attendance. The President, Mr. John Forsyth, in the chair. After the minutes of the previous meeting had been read and confirmed, the Chairman called on the Secretary, Mr. T. C. Henderson, to read a communication from Mr. Peter MacEwan, F.C.S., London, entitled "How to prepare for the Minor."

In this paper the author referred to the conditions for study which exist in Dundee, giving it as his opinion that the educational facilities provided by the University College, and other local institutions, were such that Dundee Chemists' Assistants could say that they were as well off in this respect as those of any other town in the kingdom. He then proceeded, after a few words of advice to those who had not passed the Preliminary, to give a sketch of a plan which he had followed with advantage in Dundee for utilizing spare time for the purpose of private study. This plan being specially devised to suit the circumstances of local students need not be referred to at length. In the next section of the communication Mr. MacEwan spoke of the system of reading which should be adopted, and he thought that reading should not be confined solely to books relating to the pharmaceutic sciences, but that at least two clear days per week should be devoted to sound general literature, or that otherwise the student should have a rest from his studies. A selection of books for private study was given, and an abstract of Professor Attfield's scheme for the profitable study of the British Pharmacopœia formed an interesting part of the communication. In addition to these matters the author gave some hints on testing, with particulars of the apparatus and reagents which were required. The object of the communication was, he stated, to induce home study to be kept up in a continuous fashion from the time an apprentice or assistant passed the Preliminary until entering for the Minor. He thought that such study extending over one, two or three years, along with attendance at local science classes, was as good an education as can be obtained by the provincial student, and he claimed that it did away with the necessity for a short period of hasty coaching immediately before the examination. He did not, however, advise the student to rely entirely on self-tuition, but to devote some time to revisal under a competent teacher.

At the conclusion of the paper, which was attentively listened to and frequently applauded, several of the members spoke on the merits of the communication and of the value it would prove to the Association's members generally.

On the motion of Mr. Skinner, Vice-President, the Secretary was instructed to write and thank Mr. MacEwan on behalf of the members for his valuable contribution.

The Secretary was also instructed to write and thank the Council of the Pharmaceutical Society for the gift of the Journal.

This was all the business, and a vote of thanks to the Chairman concluded the meeting.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the Chemists' Assistants' Association was held on Thursday, the 16th inst., the President, Mr. T. A. Ellwood, in the chair. The following papers were read:—

The Influenza Epidemic—the Favourite Remedies.

BY F. A. ROGERS.

It having been suggested to me that a statement of the most approved remedies for the epidemic still with us might interest some of the members of this Association, more especially those of us who have not yet fallen victims to it, I have glanced over a very considerable number of prescriptions written, as I have good reason to believe, for genuine cases of influenza, with the following results.

Quinine appears to head the list; it has generally been given in 2 to 3 grain doses, and the most approved form of administration has been the ammoniated tincture, the dose usually to be repeated two or three times a day.

Salicin is well entitled to the second place; it has usually been given in 20 grain doses to be taken in a wineglass of water, every hour for the first six hours, or even longer, and then every two or three hours. This treatment appears to have been as rapidly successful as any, and will probably suit many who cannot take quinine.

Antifebrin and antipyrin have been much used in doses of 5 to 10 grains, but usually in combination with some other remedy, and only in the feverish stage of the disease.

Tincture of aconite in doses of 2 or 3 minims, usually together with acetate or citrate of ammonia, concludes the list of most approved internal remedies.

Inhalations have been largely used simultaneously with the administration of the above remedies, the most popular being carbolic acid, oil of eucalyptus and menthol, a saturated spirituous solution of the latter being used, and if used alone a few drops were ordered to be sprinkled on the handkerchief for each inhalation, or a smelling bottle to be filled with sponge soaked in the solution. These inhalants have, however, been more frequently used combined than singly. A very good mixture was made up of equal parts of—liq. ammon. fort., tinct. iodi, carbolic acid, oil of eucalyptus, and a saturated spirituous solution of menthol. To be inhaled from sponge.

I trust that these notes, limited to a notice of the most approved remedies only, from personal observation, may elicit valuable information from other members of this Association.

The Chairman said his own remarks upon the paper must necessarily be of minor importance, as from the nature of things he had fewer facilities for observing the treatment of the malady than was the case with those who were brought into more immediate contact with it. He gathered however from the variety of remedies that had been suggested, that the medical man had been taken somewhat off his guard in combating his new foe, and that the disease was more or less rare in England seemed to be admitted on all sides. English practitioners who had served in India seemed to regard it as a type of disease which was common enough in many low-lying or swampy districts of India and the East, and such an epidemic was in those countries often regarded as a precursor of cholera. Whether this prophecy would prove true or not time only would tell. Apparently the use of salicin in the low and intermittent fever stage was attended with good results, and the greatest benefit was derived from the administration of quinine during the period of convalescence. He had been told that the ordinary treatment for a genuine cold was unsuccessful. He remarked that Dr. Macnaughton Jones advocated the liberal use of menthol for inhalation, and it had been strongly recommended by other medical men. He thought its action might be due rather to its antiseptic efficacy than to any other remedial virtue.

Mr. Charles W. Secoombe felt a little disappointed at the brevity of Mr. Rogers' paper, but remarked that in choosing his subject the author had hit the very keynote of their experience during the past fortnight. He had brought before them a theme interesting from a private as well as a public point of view, for although the chemist was unfortunately subject to the same maladies as ordinary mortals, he was expected to rise superior to them, to be the last to complain, and the last to leave his post. As dispensers of the numerous prescriptions that had crowded in upon them, they were in a measure competent to speak of the remedies which had been found most effectual in the neighbourhoods they represented. The epidemic had been no respecter of persons. In the West End it was quite the exception to meet a person who had not been more or less its victim, and for some, what the real thing had not done fancy had created. Of the remedies most approved in that locality quinine stood first and foremost, the tr. quininæ ammon. B.P. having been generally prescribed. Quinine pills (best made with tragacanth not exceeding 5 per cent. and massed with simple syrup) had an enormous sale. Quinine hydrobromate had also been largely prescribed, the tincture of nux vomica forming a favourite and useful addition. The orthodox prescription of ipecac, squills and camphor had been much in vogue, but all were agreed that quinine and its preparations—not, indeed, in Mr. Labouchere's famous doses, but in doses of about 2 or 3 grains for the sulphate—have produced the best results. Antipyrin, tincture of nux vomica, carbonate and acetate of ammonium had all been largely prescribed. Taking the averages of two hundred consecutive prescriptions entered in one book, the first week in January, quinine and its preparations showed 23 per cent., tr. nucis vom. 14 per cent., carbonate of ammonium 12 per cent., acetate of ammonium 11 per cent., and antipyrin 6 per cent. Salicin and antifebrin had rarely been given. Mr. Seccombe also referred to sal volatile, cascara sagrada, ext. glycyrrhizæ, cinchona tincture, aniseed water and menthol inhalation, as amongst the favourite remedies of West End prescribers.

Mr. G. W. Phillips said it looked as though the medical men were treating the symptoms rather than the disease. From personal experience of the complaint he testified to the benefit he had derived from drachm doses of Easton's syrup.

Mr. Stark confirmed the statement that quinine was the favourite remedy, and Mr. Blackham said the same remedy according to his experience occupied the first and only position.

Mr. E. Richards drew attention to a microscopical slide prepared by Martin J. Cole of the bacillus of Russian influenza from the expectoration taken on the sixteenth day. It was dried on a cover and stained in methyl aniline violet and mounted in Canada balsam. It is also interesting to note that this agrees identically with the results of Dr. Lennox Browne, as published in the *Medical Press*, Jan. 8, 1890, of the nasal secretion of a patient suffering from the epidemic.

The next paper was by Mr. Ince entitled—

MACERATION.

[NYCHTHEMERUM PROCESS.]

BY JOSEPH INCE.

Very many pharmacopœial percolates are prepared by previous maceration, the object being to present the drug in the most favourable condition for the complete extraction of its medicinal properties.

With regard to other processes, maceration has fallen into neglect, but it is suggested that its use might be advantageously extended and revived.

Forty years ago the Nychthemerum process was in vogue as an adjunct to distillation. By nychthemerum is meant maceration for a night and a day (*νὺξ ἡμέρα*), in other words, for twenty-four hours.

The following formula is a representative instance:

Spiritus Angelicæ Compositus.
℞ Radicis Angelicæ libram unam.
Valerianæ minoris.
Baccarum Juniperi.
Singularum uncias tres.

Concisis, contusis et in versicam destillatoriam immissis adde

Spiritus Vini rectificati libras sex.
Aquæ communis quantum satis.

Post macerationem per nychthemerum destillent libræ sex, in quibus solve.

Camphoræ unciam unam cum dimidiâ et filtra.

Sit limpidus, coloris expers.

Berlin, 1846.

Even in distillations from a single ingredient the same plan was frequently employed.

Spiritus Juniperi.
℞ Baccarum Juniperi contusarum
libram unam.
Spiritus Vini rectificati
libras quatuor.
Aquæ communis quantum satis.

Post macerationem per nychthemerum destillent libræ quatuor.

Sit limpidus, coloris expers.

Spiritus Lavandulæ

Paretur è Floribus Lavandulæ uti spiritus Juniperi.

That is, let the Lavender flowers be macerated, per nychthemerum, for twenty-four hours previous to distillation. Two centuries ago, date 1689, Aqua Rosæ, Aqua Sambuci, Aqua Menthæ Piperitæ, and Aquæ Menthæ Sativæ, were distilled by the Nychthemerum process, and starting with Aqua Destillata were drawn over in the order named.

Note, and it will be found no digression, the sequence here mentioned. When distilling on a fairly large scale, say, 30, 90, or 120 gallons, the still must be thoroughly well cleansed before laying in a stock of Aqua Destillata. The distillation of Aqua Rosæ may then be commenced without further precaution. It will be sufficient to pass steam once through the worm before Aqua Sambuci is drawn over; no steaming is then necessary for the subsequent distillation of Aqua Menthæ Piperitæ, owing to its powerful odour; while the penetrating odour of Aqua Menthæ Sativæ renders more than a single passage of steam unnecessary.

Note also the curious but undoubted fact, that immediately after these distillations are completed, it is difficult even for an expert to distinguish one from the other: the aroma characteristic of each seems to be latent. It will remain latent for months if they are kept in hermetically closed vessels. I have preserved a dated distilled Spirit of Lavender in an absolutely air-tight bottle for twelve months, at the end of which time scarcely a trace of the Lavender odour could be detected. These waters should be stored in loosely closed vessels carefully protected from the intrusion of foreign matter, and specially from dust.

Read in confirmation the following passage from Dumas' Codex:—"Les eaux distilleés ne possèdent pas toutes leurs qualités au moment où elles viennent d'être préparées; ce n'est q'au bout d'un certain temps qu'elles ont acquis leur plus grande suavité: aussi convient-il de ne les employer qu'un mois ou deux après leur préparation."

[Distilled waters do not possess all their qualities at the moment when they have just been prepared. It is only after the lapse of a certain time that they acquire their greatest fragrance. Consequently it is advisable not to use them earlier than one or two months after their preparation.]

This statement points to the conclusion that to put an aromatic substance in a still and inconsequently draw it over, is neither wise nor scientific, since neither before nor after is there immediate transfusion of aroma; and on broad, general grounds the Nychthemerum process may be recommended.

In mediæval practice a still longer previous maceration was deemed necessary. We find a whole series of Odoriferous or Sweet Waters in a work contained in our library, called "The Secretes of Alexis," date 1562. There are two copies, both defective and without value in a collection. The formulæ would occupy needless space and may be omitted, but a few instances will give the general idea of the directions; I modernize the spelling.

[Book Second, p. 44.] Various aromatics having been mentioned the writer continues: "And of all this make a composition the which you shall put into a vessel of glass well stopped, leaving it so by the space of fifteen days; afterwards let it be distilled in Balneo Marie the manner of which is described in the first book and the water which shall issue out of it put in a vial well stopped, in the sun, for the space of fifteen days and then shall you have a water of great excellence."

Again—"But you must stamp well the herbs and bray the spices well; then put all together in an earthen pot leaded; and after it hath stood in the sun by the space of two days distil it in Balneo Marie. And to the water that issueth out put a scruple of fine musk, letting it stand afterwards in a vial of glass well stopped, by the space of twenty or thirty days. Then shall you have a notable water."

We have other illustrations in which maceration for ten, four, six or certain days is required.

While we regard mediæval chemistry as inexact and in many instances not free from the charge of being foolish, a good deal of old pharmacy is entitled to respect.

We accept as convenient preparations many Spiritus of the British Pharmacopœia, which, in the recognised sense of the term are not Spirits but simple solutions in alcohol. The physician has it thus within his power to exhibit the oils of cajuput, cinnamon, juniper, peppermint, and others in a ready and effective manner. We object that Aqua Menthæ Piperitæ and Aqua Menthæ Viridis should be made by throwing their respective oils into water and without the delay of an instant being drawn over as distillates. Once more we are confirmed in appreciating the wisdom of the adage which bids us hasten slowly.

Some pharmacists regret that in the Spiritus Armoraciæ compositùs, which is a true distillate, the

Nychthemerum process of maceration has not been deemed worthy of adoption. It is familiar that in this preparation the volatile oil of horse-radish (sulphocyanate of butyl or tetryl) is the chief active ingredient. Water in addition to proof spirit is introduced to determine its extraction.

It is in no captious spirit that some pharmacists object to the instructions given to bruise certain fruits before submitting them to distillation—such as Fructus Anethi, Anisi, Carui and Fœniculi. The bruising of an aromatic substance should be resorted to only from necessity. This necessity is avoided by the old Nychthemerum process of previous maceration. The result is good—being the distillate of a cold infusion with the full aromatic properties intact.

A short communication, such as the one now presented, could not include a general comparison between British and continental pharmacy; still I wish to show what opinion was held respecting the point under discussion by very advanced and characteristically modern pharmacists in France; and I purposely quote a few sentences written by or under the immediate sanction of Jean Baptiste Dumas and a Commission of Publication consisting of men of exceptional reputation.

Alcoolats. [Spiritus.] On emploie à la préparation des alcoolats, tantôt des matières fraiches, tantôt des matières sèches. Les unes et les autres doivent être préalablement divisées, pour que l'alcool les pénètre plus aisément; on les laisse d'ailleurs macérer pendant quelque temps pour favoriser la dissolution des principes aromatiques, qui passent ensuite plus facilement à la distillation. In the preparation of distilled spirits, sometimes fresh, at other times dry substances are employed. Both should be previously disintegrated so that the alcohol may the more readily penetrate. Moreover, they are allowed to macerate for a certain time to favour the solution of the aromatic principles which thus pass over with greater facility in distillation.

So we get—faites macérer pendant deux jours, pendant quatre jours, pendant six jours—as the case may be—et distillez au bain-marie de manière à retirer toute la partie spiritueuse. Again—

Eaux Distillées [Aquæ Destillatæ].

Certaines substances exigent une macération plus ou moins prolongée avant d'être soumises à la distillation. Certain substances require maceration more or less prolonged before being submitted to distillation.

What sort of substances are here intended? The official instances are—

Aqua Cinnamomi.
Aqua Anisi.
Aqua Valerianæ.

Concassez—laissez macérer pendant douze heures dans l'eau et distillez. Bruise—macerate twelve hours in water and distil.

Which demonstrates that men who were the least likely to be guided by sentiment or tradition retained the courage of their convictions, and that a working London pharmacist is not to be blamed if, supported by his own experience and hereditary practice, he ventures to imitate their example.

Aroma is a medicine—describe it scientifically as a property due to an essential oil; to an acid, such as benzoic or cinnamic; to a volatile product of distillation, or to an odorous glandular secretion; describe it popularly as a scent, an odour or a perfume; it is of distinct value as a remedial agent. To consider it simply as an agreeable adjunct, and on a level with the adjectives grateful and comforting attached to the cocoa of epic fame, is an error of judgment, if not something else. Time, unquestionably in a pharmaceutical point of view, is one element in its development; the action of the atmosphere, another.

The larger question of the chemistry of the subject may be safely left to our own excellent investigators. Turning for a moment from distillation, I would submit to the judgment of experienced pharmacists whether maceration as the sole process might not be adopted with success in the preparation of two well-known tinctures—Tinctura Cardamomi Composita and Tinctura Sennæ? Here we have two admirable though complex formulæ both containing raisins freed from seeds, a substance not friendly to percolation.

There is a tendency in both these instances for the menstruum to be supernatant and to be content with that elevated position, and thereby to complicate the result. Personally I would place Tinctura Rhei in the same category and revert to the time-honoured plan of subjecting the Rhubarb root to Nychthemerum maceration.

It was then withdrawn from the menstruum, well bruised in a capacious stone mortar, and afterwards returned. The remaining ingredients being added, the tincture was finished according to the usual method of maceration. The result was eminently satisfactory and suggested no desirability of change in the method used.

I would guard against any inference drawn from the above remarks that a comparison was meant to be instituted between maceration and percolation to the disparagement of the latter.

Such is not my intention because such is not my thought.

It was asked some time ago at an evening meeting, whilst advocating distillation in a particular instance, whether I considered that there was some special charm in distillation. There is no charm in any process other than its right application. Percolation has proved effective in numberless cases, and it has advanced the progress of pharmacy. The method is beautiful in itself; with skilled manipulation, admirable. It is not adapted to every conceivable formula where partial solution is desired.

For educational purposes it is best to make certain official preparations in more than one way: first, implicitly and absolutely in accordance with Pharmacopœial instructions; afterwards in accordance with methods old and new, suggested from time to time by eminent pharmacists and chemists. This is the student's position. He should make Spiritus Ætheris Nitrosi strictly by the authorized formula of 1885; then by direct contact of Rectified Spirit and Nitric Acid, with subsequent redistillation over Bicarbonate of Potassium for comparison; again by the method proposed by Messrs. Dunstan and Dymond for adoption.

I claim the same right of experimental manipulation for sundry other preparations: to night with chief reference to distillation. My belief is that the distillation of drugs of an aromatic character, and all compound galenical distillations, are advantageously effected by previous maceration, Nychthemerum or more prolonged. Further, that in the case of certain tinctures, a return to the old process of maceration may be defended.

It has fallen somewhat into disrepute as an easy process, requiring attention rather than much skill, and conducted sometimes in a careless manner.

Were we to judge of any process by imbecile manipulation there would not be one left in Pharmacy to merit our adoption, nor can imperfect work be accepted as an argument against the legitimate and conscientious use of Maceration.

The Chairman said the raising of the question of the Nychthemerum process offered a new topic for discussion, which was particularly apropos at the present time, because of the invitation recently addressed to pharmacists by the General Medical Council. It was one of those subjects whose reintroduction into the Pharmacopœia had much to recommend it. Whilst laying down certain processes for the preparation of medicinal compounds the Pharmacopœia did not insist upon those processes being exclusively adopted, as might be seen on referring to the preface of that volume; the only essential was that the compounds should satisfy certain stated requirements, and if by some modification the pharmacist was able to produce a superior preparation, there was nothing to prevent him leaving the beaten track. Referring to the instances Mr. Ince had selected, he rather favoured the adoption of an alternating maceration and percolation process for tincture of rhubarb, and advocated the preparation of the tinctures of cardamoms and senna by maceration only. As the spirit of horseradish derived its virtue from the development of the active principle which ensued when the root was brought into contact with water, he said it was advisable to allow the root to macerate with the water for a few hours before adding the spirit and other ingredients. He concluded his remarks by saying that processes rather than products called for discussion.

Mr. A. C. Stark did not quite agree with the proposal to abolish percolation in certain instances; in making large quantities of tinctures he said it was practically impossible to entirely exhaust the drug and recover the spirit by simple maceration. He was surprised to find that the use of comminuted drugs had been viewed in an unfavourable light. He thought the introduction of the sieves and corresponding powders into the Pharmacopœia had been one of its most useful innovations. He said that tinctures of a totally different character could be obtained by using cinnamon bark in "small pieces" and in fine powder.

Mr. W. L. Williams said he had experienced the value of allowing barks or fruits to stand in the still for a few hours before commencing to draw off a distillate; cinnamon water was a notable instance. He did not agree with the indiscriminate bruising of materials which were used for distillation, caraway fruit did not require it. Tincture of senna was a difficult preparation to manipulate, if the leaves were brought into too fine a state of division; when "broken small," however, it proved less obstinate.

Mr. C. W. Seccombe was sure Mr. Ince's paper could not but be interesting to all who were engaged in practical pharmacy, and their thanks were due to him for so clearly laying his suggestions before them. He thought that for aromatics the Nychthemerum process might be adopted with advantage, but felt that he would be more competent to pass an opinion upon it after he had tried it for himself. He had found the Pharmacopœia method to yield fairly uniform results, as indicated by taking the specific gravities. The tinctures were made in large quantities and they stood the prescribed time, being regularly agitated morning and evening, such tinctures as were ordered to be percolated being percolated in cylindrical percolators, as being more advantageous and economical than the conical ones.

Mr. W. A. Salter said the reason why some umbelliferous fruits required to be bruised depended upon the position of the vittae; in caraway they were near the surface, and hence that fruit did not require to be bruised, whilst coriander did require this preliminary treatment.

Mr. Ince in reply thanked the members for the kind way in which they had received his short paper, which had given rise to an interesting and practical discussion. In introducing the subject he had no intention to question the advantage or disadvantage of any process for the preparation of tinctures; he was simply treating of the Nychthemerum process and its value, more particularly in the preparation of aromatic distillates. The value of the process might be tested by anyone who would take the trouble to make the comparison. He did not question the uniformity of the product as obtained by the Pharmacopœia process; it was uniform enough, but uniformly poor. He had been misunderstood respecting the comminution of drugs; it was infinitely better that cinnamon bark should be bruised for the tincture, it was not necessary to bruise it for the distilled water. His object was to awaken interest in an old process which had been somewhat passed over, but which was capable of furnishing results that could not be attained in any other manner.

The next paper was entitled—

A COUNTRY WALK.—DEC. 25, 1889.

BY W. A. SALTER.

An appeal from our secretary a few days ago left me no alternative but to produce a short paper of some description for our meeting this evening. An enjoyable walk taken on Christmas morning being fresh in my memory, it seemed to furnish a subject which might be of interest to some of our members, and might serve to prove that Nature, even in her winter dress, is by no means devoid of attraction.

The blue sky and sunshine of December 25 formed a pleasing contrast to the rain and gloom of the previous day, and if the pleasures of snow and ice are to be denied to us at the festive season the weather on the present occasion formed no bad substitute for it, and left no room for grumbling. The roads, too, were in better condition than might have been expected after the recent storms, and at any rate the country mud is not nearly so objectionable as that mysterious and defiling compound to which we are but too much accustomed in our walks in London.

After leaving the town our way first takes us through the avenue of tall lime trees which leads up to the park gate. In early summer when they are in blossom the air is scented with their fragrance, and bees in thousands come to collect the rich stores of honey from the flowers. The trees are bare enough now, however, except for the bright green moss with which their trunks are covered.

My companion is an ardent ornithologist, and at the bridge over the tiny river Cam, just above the place where it is artificially widened in front of the mansion of the lord of the manor, we pause to observe the assemblage of water-fowl, always to be seen from this point. A dabchick, or little grebe, is swimming not far off, and as we watch it it suddenly dives, and comes up again some distance nearer to the bank. Quite a number of coots, their light-coloured bills showing conspicuously against their black plumage, are on the water, and a red-billed water-hen scuttles along amongst the rushes by the bank. A large bird flies up from some distance up the stream and flaps slowly away with legs stiffly outstretched behind it. It is a heron which has been standing motionless on its stilt-like legs at the water's edge watching for an opportunity to pounce upon an unwary minnow or other small fish with its sharp beak. It is recorded by Yarrell that a heron once speared an eel in this way, the eel twined itself tightly round the heron's neck and strangled it, and bird and fish were found thus locked together in death. By the help of a small pocket telescope those four or five birds paddling about amongst the reeds in the distance are made out to be wild ducks of the common species, and we can clearly see the handsome plumage of the drakes. Altogether, looking up and down stream, we count fifty-three head of wild fowl, leaving out of the reckoning the pair of stately swans which are permanent residents here.

Half a dozen brown objects, looking at first like lumps of clay standing up in a stubble field, prove when viewed through the telescope to be partridges, and over at the other side of the field, near the fir plantation which runs along by the railway line, are two or three handsome pheasants, one of which flies back into the wood, allowing us to get a good view of it. During the remainder of the walk we put up several more coveys of partridges, varying in number from two to as many as nine. These are the survivors of the original family of fourteen or fifteen, whose ranks have been considerably decimated since the fatal first of September. They will remain in these small parties until the approach of the breeding season, when they will only be seen in pairs.

The country through which we are now walking is not of a very interesting nature; a white chalk quarry here and there shows against the outline of the fields, which are bare and brown for the most part, but in one a young crop of barley or wheat has already attained a height of five or six inches. By the roadside we find two or three survivals of the summer flowers, and one which may be found at almost any season of the year, the daisy. There is quite a small patch of these widely open and rejoicing in the sunshine, of which they get but little in the present month. Daisies and buttercups should go together, and here we have two or three rather washed-out looking specimens of one of the common species (*R. acris*). A tall piece of yarrow stands up from the hedge bank, and our other find is a speedwell (*Veronica Buxbaumii*), though its pale blue petals are not expanded. We never remember to have seen the bushes so crowded with small birds, and they fly on before us in flocks. Some of them have been feeding on the scarlet hips which still brighten the hedges, the bareness of which is otherwise only relieved by the great woolly masses formed by the tailed achenes of *Clematis vitalba*, which earn for the plant its common name of "old man's beard." The small birds seem mostly to be of four kinds, sparrows, chaffinches, yellowhammers and greenfinches. We several times stop to admire a cock chaffinch, with his barred wings and handsome pinkish breast, and the brightly-coloured plumage of the yellowhammer seems almost suggestive of some bird hailing from the tropics. Some large leaf-buds of the horse-chesnut, covered with their sticky varnish, recall the fact of an unfortunate little blue tit having been found with its feathers so glued together by this natural bird-lime as to be unable to fly. The whitish buds of the beam tree (*Pyrus Aria*) are also conspicuous. Some willow catkins which the farm lads will wear in their caps on Palm Sunday are now just pushing back the bud scales and showing white.

Further on we find a genuine spring flower in the shape of some pendent hazel catkins, and on examination find that they must have been open several days, for we can shake the pollen from them quite freely. This is decidedly an early record, as an average of the first dates throughout the country for eleven years (1878–89) is January 25, and as far south as Marlborough in Wiltshire the average is January 31. The same may be said for dog's mercury, which we had found in flower on the previous day (December 24); its general average is January 31, and at Marlborough, February 14. It does not at all follow that 1890 is going to be an exceptionally forward year for plants. That depends entirely on the weather of the next two or three months, for as long as the bitter east winds of spring continue vegetation seems to stand still almost entirely, and it is not till a spell of mild weather comes that things come on with a rush. This order of affairs, however, is much better than a delusive interval of warmth too early in the season, which causes the horse-chestnut and other trees to expand their leaves only to have them shrivelled and blackened by late frosts. This was the case in 1888, and the leaves in that year never reached their full size and beauty.

Passing through a small village we see no flowers in the cottage gardens, but a few late chrysanthemums and some Christmas roses, those pitfalls for the unwary at the botany tables at the winter examinations. Our way now leads us by a lane through a little copse of hazel bushes, and a bright scarlet object in the bank side turns out to be one of those beautiful fungi, the *Peziza coccinea* (Sow.), sometimes known as "fairy cups." This find leads to a thorough search of the bank in question, and it yields enough of the fungi to furnish, when arranged in a glass dish with some velvety green moss, one of the prettiest winter substitutes for a summer's bouquet which it is possible to have. Treated in this way and kept moist they will preserve their beauty for a week or more. I have always prized them rather highly, as they can be found in January and February when flowers are almost absent, and they are just sufficiently uncommon to stimulate the search for them and to cause a feeling of satisfaction on spying one half hidden away under last year's dead leaves. They grow on decaying sticks, and I have noticed them more commonly in hazel plantations than elsewhere. Damp, mild weather is most favourable to their growth as to that of most of their class, and frost destroys their delicate beauty, causing them to become dry and shrivelled. Upon the same warm bank we find arum leaves pushing up, but tightly rolled up as yet; and we notice a bullfinch in one of the hazel bushes and get a good view of his black head and bright pink breast.

Out in the open country again, a hare goes off across a field. It is remarked how scarce the hares are becoming, and a close time is certainly needed to protect them from further diminution in numbers and final extinction in England. Near a little church we find an official shrub, the spurge laurel (*Daphne laureola*) growing. It has large clusters of buds, and on examining them carefully we find a single floret wide open and showing the yellow anthers. This makes our third spring flower found at the close of 1889.

We now take to field roads. Three large birds which are foraging over the ground are easily made out by their slaty grey coloured bodies and black heads and wings to be hooded or Royston crows. We have just passed a finger post directing the way to Royston, so it is appropriate to meet with these birds. The name was probably conferred by the naturalists of 150 or 200 years ago, who knew little of the birds of the country except those met with in the home counties, and who first encountered this species on what were then the bare heaths in the neighbourhood of Royston. The bird is far commoner in the north of England than in the south, but it is chiefly a winter visitor to us, only a few pairs remaining to breed on the Yorkshire moors and elsewhere. It sometimes mates with the carrion crow, a half breed family being the result, and in the entrance hall of the Natural History Museum at South Kensington is a large case containing stuffed specimens which graduate almost imperceptibly in their characters from one species to the other. The term "crow" is commonly applied to any large black bird belonging to the family of the corvidæ, but the true crows, of which we have just named two species, differ much from the rook, with which they are so frequently confounded. The crows are larger birds, and their curved and powerful beaks indicate a mode of life different to that of the rook. Whilst the latter picks up a living on the fields in the shape of grubs and small insects, with seeds also it must be confessed, the former will feed upon eggs (hence the custodian of the pheasants and the grouse is his sworn enemy), or will pick the eyes from the carcase of the dead sheep on the hills, or may be seen upon the shore about the tide edge, searching for any edible flotsam or jetsam that may be thrown up by the waves. The habits of the two species too are very different; the rook is essentially social and gregarious in its manner of living, whilst the crow will seldom be seen in company with many of its fellows.

One more interesting bird is seen as we again cross the Cam by another bridge on our homeward way. It is a grey wagtail, and is somewhat curiously named, as its yellowish breast and yellow tail coverts are its most conspicuous features, as far as colour is concerned. These birds come south in the month of August and remain during the winter, retiring to their breeding haunts about the moorland "becks" of the north country in early spring.

In conclusion I may say that the distance covered in our walk was about ten miles, and the locality the north western corner of Essex, near the borders of Herts and Cambridgeshire.

Obituary.

Notice has been received of the death of the following:—

On the 29th of December, Mr. William Hutchinson, Chemist and Druggist, Harrop, High Town, Crewe. Aged 43 years. Mr. Hutchinson was an Associate in Business of the Pharmaceutical Society, and filled the office of Local Secretary for Crewe.

On the 3rd of January, Mr. John Miller, Chemist and Druggist, East Street, New Shoreham. Aged 80 years.

On the 3rd of January, Mr. Reuben Shepherdson, Chemist and Druggist, Londesborough Street, Hull. Aged 58 years.

On the 16th of January, Mr. John Dobson, Pharmaceutical Chemist, Side, Newcastle-on-Tyne. Aged 71 years. Mr. Dobson had been a Member of the Pharmaceutical Society since 1858.

On the 20th of January, Mr. George Wallis, Chemist and Druggist, St. James's Place, Plumstead. Aged 62 years.

Parliamentary and Law Proceedings.

PROSECUTIONS UNDER THE SALE OF FOOD AND DRUGS ACT FOR INCORRECT DISPENSING.

For selling a compounded drug, not composed of the ingredients demanded by the customer, on December 11, George Alfred Pickering, chemist's assistant, Mexborough, was, on Saturday, fined by the Doncaster magistrates £5, including costs.

The proceedings were instituted by Supt. Blake, who said he called at the shop of Mary Pepper, chemist, High Street, Mexborough—where the defendant was engaged—and presented a prescription for half an ounce of iodide of potassium, dissolved in 12ozs. of chloroform water. When he told the defendant he intended sending the mixture to the public analyst at Sheffield, he said he had made a mistake and wanted to correct it. The component part that was wrong was 219 grains of bicarbonate of potassium, and this the analyst certified.

The defendant said he was sorry the discrepancy had occurred. He had several customers in the shop at the time and the superintendent somewhat disconcerted his attention by laughing and talking. It was the rule for prescriptions like that to be left to be made up.

Lord Auckland said a substantial penalty must be imposed, for the public must be protected against that sort of thing. In the place of a very expensive drug the superintendent had been supplied with a very cheap one.—*Sheffield Independent.*

On Tuesday, at the County Police Court, Huddersfield, Ben Lockwood, chemist and druggist, Milnsbridge, was fined 20*s.* and the expenses for selling to Supt. Pickard an article which did not contain ingredients demanded by him. On December 13 the Superintendent presented a prescription which he desired to have made up at the defendant's shop. Defendant made it up, and charged 1*s.* for it. He was told it was for analysis, and offered a part, but he declined it. The medicine was submitted to the County Analyst, who certified that it contained 120 gr. of citrate of iron and quinine, which should have been dissolved in chloroform water, but ordinary water was used. This was not disputed, but it was contended that the offence was only of a technical description, as chloroform water was so seldom used on account of its volatile character, and the pecuniary advantage to the defendant was infinitesimal.—*Leeds Mercury.*

Correspondence.

ACIDUM SULPHURICUM AROMATICUM, B.P.

Sir,—The remarks regarding this preparation raise the question, Why has the specific gravity not been corrected by the editors? Other corrections have been made from time to time, and there is no reason why this error should not also have been rectified. They certainly cannot plead ignorance of its existence, for I pointed out in 1885, shortly after the Pharmacopœia was issued, that the specific gravity was much too low, and that 0 926 was nearer the mark, adding that "the former figure (0·911) is very nearly what is got by calculation if it be assumed that no condensation takes place; but the liquids condense at least 2 per cent. of their total volume."* Professor Attfield, in dealing with this criticism† says that the specific gravity was got not by calculation but, "wrongly or rightly by experiment." This, of course, no one would think of denying, but at the same time, doubt having been cast on the accuracy of the results of the "experiment," the editors ought surely to have satisfied themselves as to who was right and who was wrong. Had the "experiment" been repeated they would soon have ascertained where the error lay. The limits suggested by Mr. Cripps are, I think, unnecessarily wide, and the experience of Mr. Fletcher and Mr. Millard tends to strengthen that opinion. The specific gravity might fairly be given as from ·925 to ·926, but a wider variation is not desirable. T. M.

"DUBOISINE" AND "HYOSCINE."

Sir,—I wish to call attention to a misquotation which is liable to cause some confusion. The following paragraph occurs in the 'Year Book of Pharmacy,' 1888, p. 63, "*Duboisine.*—A. Ladenburg and F. Peterson (*Ber. der deutsch. chem. Ges.*, xx., 1661). The authors prove the identity of duboisine with hyoscyamine by showing that there is no difference between the aurochlorides of the two bases."

A similar statement, giving the same reference, appears in the *Journal of the Chemical Society*, 1887, p. 740.

The word *hyoscyamine* in each of the above should read *hyoscine*.

It is given correctly in the *Pharmaceutical Journal*, June, 1887, p. 1049.

As the whole question involved in the experiments hinged upon whether duboisine resembled hyoscyamine or hyoscine, the correct reading is important. P. W. SQUIRE.

WHAT IS LIN. SAPONIS CO.?

Sir,—Mr. Findlay in his Note on Synonyms suggests Lin. Saponis Co. as a synonym for Lin. Opii.

He evidently is not aware that many dispensing chemists hold the opinion that lin. saponis co. is lin. saponis, B.P. When an assistant I found that in different parts of the country practice varied. In Edinburgh, lin. opii was dispensed when lin saponis co. was ordered, while in England the soap liniment of the B.P. was given. It is much to be regretted that uniformity in practice does not prevail. The opinion of some of the older members of our craft might go far in settling the question—What is lin. saponis co.? LANARKSHIRE.

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* *Pharm. Journ.*, [3], xvi., p. 343. † *Ibid.*, p. 466.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Naylor, Bullen, Trotman, Independent, Chemicus.

"THE MONTH."

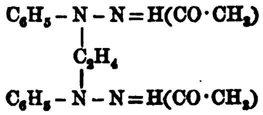
Hydrastinine. For some time past the fluid extract of *Hydrastis canadensis* has been used to a certain extent as a remedy in cases of internal hæmorrhage, the assumption being that any influence exerted depends upon the presence in it of two alkaloids, hydrastine and berberine, but hitherto this has not been confirmed by clinical experiments with the pure alkaloids. Dr. Falk, however, reports that with hydrastinine, the oxidation product obtained from hydrastine by Messrs. Freund and Will (*Pharm. Journ.*, [3], xviii., 427; xix., 277), he has obtained in experiments on animals as well as clinical experiments effects which show that, like ergotine, that base has the property of causing contraction of the vessels. He states that when injected into the circulation it acted very favourably in chronic metritis and uterine bleeding, the injections not being so painful as those of ergotine. Among other instances it gave favourable results in congestive dysmenorrhœa and profuse menstrual bleeding depending upon tissue change in the uterus. A 10 per cent. solution of the hydrochlorate was used, the dose being from one-half syringeful, or equal to 0·05 gram of the salt. Hydrastinine is obtained in oxidizing hydrastine by means of nitric acid, which causes it to break up into hydrastinine and opianic acid, according to the equation:—

$$\underset{\text{Hydrastine.}}{C_{21}H_{21}NO_6} + O + H_2O = \underset{\text{Opianic acid.}}{C_{10}H_{10}O_5} + \underset{\text{Hydrastinine.}}{C_{11}H_{13}NO_3}$$

The formula here given for the base includes one molecule of water so closely combined that it does not separate when crystallized from anhydrous solvents, but the salts contain no water. Hydrastinine, which when pure forms a perfectly white powder, is very readily soluble in alcohol, ether and chloroform, and difficultly soluble in warm water; with most acids it forms freely soluble salts. An aqueous solution of the hydrochlorate ($C_{11}H_{11}NO_2HCl$) shows a faint fluorescence, has a strong bitter taste, and is optically inactive.

"Belladonin" and Hyoscine. "Belladonin" is the name applied to the brown syrupy mother-liquor of the atropine manufacture after it ceases to yield crystallizable alkaloid. According to Herr Dürkopf it is a mixture containing belladonine (in a stricter sense), atropine, hyoscyamine and hyoscine, together with the decomposition products tropine, pseudotropine and tropic acid (*Berichte*, xxii., 3183). The presence of hyoscine was ascertained by digesting the crude "belladonin" in acid solution with ether and chloroform and heating the purified basic material with suitable agents to split up the atropine into tropine and tropic acid, when the hyoscine (18 to 20 per cent.) went into solution, leaving the belladonine unaltered. The hyoscine was easily recovered from the solution as a gold salt.

New Antipyretics. Some particulars have been published concerning two more new compounds alleged to possess antipyretic properties, which have been prepared by Professor Michaelis (*Pharm. Centralh.*, Jan. 16, p. 35). One of them is called acetylethylenephenylhydrazin, and is said to be obtained by acetylizing ethylenephenylhydrazin, which itself is formed by the action of ethylene bromide upon sodium-phenylhydrazin. It is described as occurring when crystallized from alcohol in colourless needles, melting at 220° C., and having the composition represented by the formula—



$$\begin{array}{l} C_6H_5-\overset{}{N}-N=H(CO\cdot CH_2) \\ \qquad\;\; | \\ \qquad C_2H_4 \\ \qquad\;\; | \\ C_6H_5-N-N=H(CO\cdot CH_2) \end{array}$$

The other compound is called ethylenephenylhydrazinsuccinic acid. It is said to be obtained by dissolving equal parts by weight of ethylenephenylhydrazin and succinic anhydride in alcohol and boiling; from the liquid, which is clear at first, the acid quickly separates under strong ebullition and in such abundance that the liquid solidifies to a paste. This acid is described as being soluble in hot water and difficultly soluble in alcohol, and as crystallizing in needles that melt at 203° C.

Sodium Cresotinate. As far back as 1876 sodium cresotinate was recommended as an antipyretic, but it appears to have fallen into discredit on account of uncertainty of action. As the compound used was probably a varying mixture of the sodium salts of the three isomeric acids derived from the corresponding cresol isomers, Professor Domme instituted some comparative therapeutic experiments with the separated compounds (*Pharm. Zeit.*, Jan. 29, p. 68). He reports that only the paracresotinic acid is of use in medicine, the ortho- and meta- compounds proving one inactive and the other dangerous. Professor Loesch found that sodium paracresotinate is well tolerated by adults in quantities reaching to 6 or 8 grams daily. A part of the compound appears to pass unaltered into the urine, which then gives a violet colour with ferric chloride. Administered to children it behaved as an active antipyretic in large doses, 1 gram having been given to a child twelve years old within three hours. It is further stated that good results have been obtained with the salt in the treatment of acute gastro-intestinal catarrh in children. Sodium paracresotinate is said to occur as a fine crystalline powder, with a distinctly bitter, but not disagreeable taste. It dissolves in 24 parts of warm water, from which it does not separate on cooling. The free acid crystallizes from aqueous solutions in long shining needles: it melts at 151° C. and sublimes undecomposed.

Aristol. In a communication recently published by Messrs. Messinger and Vortmann, upon a new series of compounds of iodine with phenol-like bodies, special reference was made to a thymol compound as a possible rival to iodoform under the name "annidalin" (*Pharm. Journ.*, Sept. 26, 1889, p. 241). It is probably a somewhat more definite form of this compound that has recently been reported upon by Dr. Eichhoff under the name "aristol" (*Apot.-Zeit.*, Jan. 25, p. 46). This compound is said to be formed, as a voluminous red-brown amorphous precipitate, when an aqueous solution of iodine in potassium iodide is treated with thymol in caustic soda solution. It is represented as being dithymoldiodide, in which the hydrogen of the two hydroxyls of dithymol is replaced by two equivalents of iodine; the compound is therefore calculated to contain 45·8 per cent. of readily removable iodine. Aristol is described as being insoluble in water and in glycerine, slightly soluble in alcohol, and freely in ether, but precipitated from the ethereal solution on the addition of alcohol. It is also soluble in fixed oils, but it is necessary to effect solution without heat to avoid decomposition, and for the same reason it must be kept sheltered from light. Upon distilling the compound with lime dithymol is obtained. Aristol is said to be non-poisonous, it not being absorbed by the organism. It is claimed that it shares with chrysarobin the property of being an active but harmless remedy in psoriasis, with the advantage that it does not cause the same intense coloration of the skin, or produce symptoms of conjunctivitis. Further it is said to act as favourably and quickly as the best remedies in mycoses and lupus, without being so irritating as some, and to be valuable as a dusting powder for wounds and burns.

Antipyrin and Chloral Hydrate.

A few months since (*Pharm. Journ.*, July 27, p. 61) M. Blainville reported that when antipyrin and chloral hydrate are dispensed together an oily liquid is formed, in which crystals are subsequently found possessing the taste of neither the one nor the other compound. This statement is confirmed by Herr Ludwig Reuter, who has made a closer investigation of the crystals as to their nature (*Apot.-Zeit.*, January 25, p. 45). They were found to be only slightly soluble in cold alcohol, ether or chloroform, a little more soluble in boiling alcohol and boiling water, and totally odourless and tasteless. When treated with cold caustic soda solution there was no separation of chloroform, while with ferric chloride there was only a slight yellow coloration, not at all the characteristic red of antipyrin. Upon heating the crystals with caustic soda solution decomposition took place, traces of chloroform being at first given off and then much isonitril, together with a separation of antipyrin and its decomposition products; the acidulated liquid then gave an intense red colour with ferric chloride. Nitrous acid had no effect upon the crystals in the cold, the characteristic blue-green of isonitrosoantipyrin not being produced. It would appear therefore that from antipyrin and chloral hydrate a rather stable compound is formed, described by Herr Reuter as "trichloraldehydphenyldimethylpyrazol," with which composition he considers the results of his analyses to have been in accord. He states that the same compound is also easily obtained upon heating together chloral hydrate and antipyrin to 115° C., and that it crystallizes from alcohol in dense scales. Upon rabbits the new compound failed to produce the effects characteristic of either of its constituents, and as far as the experiments went it appeared to be a therapeutically indifferent body.

Physiological Action of Selenious Acid.

The many striking analogies in chemical properties that exist between the compounds of sulphur and selenium suggested to Messrs. Chabrié and Lapicque a comparison of their physiological action. Some preliminary experiments have been made with selenious acid (*Compt. Rend.*, cx., 152) which showed that it is reduced by a solution of glucose containing beer yeast, but not by one from which beer yeast is absent. In order to test further the behaviour of the acid towards ferments beef bouillon was placed in test tubes, with varying quantities of selenious acid added, and exposed to the atmosphere at a temperature of about 25° C. It was found that a little more than 2 parts per 1000 of acid was required to prevent the fermentation of the bouillon under the influence of the ordinary atmospheric microbes, and that in the presence of a smaller proportion fermentation was set up, in which case the selenious acid underwent reduction. In other experiments it was ascertained that unlike the sulphites, which when injected into the blood are oxidized into sulphates and so rendered innocuous, selenious acid does not exercise a reducing power, but acts as an irritant poison. An aqueous solution of selenious acid, exactly neutralized with soda, was fatal to dogs when administered in doses of 3 milligrams per kilogram of body weight, the most remarkable symptom consisting in a very abundant bronchial secretion.

Lead Salts as Oxygen Carriers.

Whilst heating together lead oxide and carbonates of the alkaline earths, with access of air, Dr. Kassner observed that the carbonic acid was liberated at a much lower temperature than when the carbonates were heated alone, and further investigation led him to the conclusion that lead oxide when heated under such conditions takes up oxygen from the air and then acts as an acid (*Pharm. Zeit.*, Jan. 25, p. 60). In this way he prepared three compounds that he considers to be salts of orthoplumbic acid (H_4PbO_4), although he has not succeeded in obtaining such an acid in the free condition. The same compounds are said to be formed at even a lower temperature when the oxides or hydrates of the alkaline earths are used instead of the carbonates. Calcium plumbate is described as being yellowish-red or flesh-coloured, strontium plumbate as chocolate brown and barium plumbate as deep black. All three are insoluble in water, but after standing some time the water acquires an alkaline reaction and there is a superficial decomposition of the compound. They are all infusible and unaltered by heat. By most acids they are decomposed at once. Hydrochloric acid forms a clear green solution, which when slightly heated gives off chlorine, under a precipitation of lead chloride. Other acids break up the compounds into lead peroxide and the corresponding salt of the alkaline earth; even carbonic acid is capable of effecting this decomposition, especially when passed into a slightly warmed mixture of one of them with water. The compounds are also split up by solutions of carbonates under pressure, solution of caustic alkali being formed on the one hand and a mixture of lead peroxide and carbonate of the alkaline earth on the other. The decomposition is also effected by water at high temperature, the hydrate of the alkaline earth being then formed together with lead peroxide. From the foregoing it will be seen that lead peroxide is a constant product of the decomposition of the new compounds, and Dr. Kassner proposes to make practical application of this method of producing this oxidizing material for various technical operations. One purpose mentioned is the conversion of potassium ferrocyanide into ferricyanide, by treatment with calcium plumbate and carbonic acid, the potassium being first removed as oxide instead of chloride, as in the old process, and then immediately converted into carbonate, with a simultaneous formation of lead oxide and calcium carbonate.

The yellow coloration of a sample of distilled

Delicate Copper Reagent.

water answering to the ordinary tests when potassium iodide was dissolved in it was found by means of potassium ferrocyanide to be due to minute trace of a cupric salt, the reaction apparently consisting in reduction of the cupric salt and formation of cuprous iodide (*Pharm. Centralh.*, Jan. 16, p. 32). This reaction proved to be extremely delicate. A 1 in 10,000 aqueous solution of cupric sulphate gave with ammonia a scarcely perceptible blue tinge; treated with an equal quantity of 1 in 20 potassium ferrocyanide solution, after dilute acetic acid had been added, it gave a distinct brown colour; whilst with an equal quantity of 1 in 10 solution of potassium iodide it gave a distinct yellow colour. When the cupric solution was diluted to 1 in 10,000 ammonia produced no perceptible change, and potassium ferrocyanide a scarcely perceptible darkening, while potassium iodide still gave a distinct yellow colour. At 1 in 200,000 the reaction with potassium ferrocyanide was no longer perceptible, but potassium iodide produced a faint yellow that was changed to violet on the addition of a few drops of starch mucilage. At 1 in 500,000 the yellow colour could no longer be seen but there was still a distinct violet coloration when starch was added. The original contamination is attributed to the dropping of some particles of fat into the boiler, the volatile fatty acid from which is supposed to have passed over with the steam and attacked the copper condenser.

Action of Lead on Potable Waters.

It may be remembered that a recent report of the Medical Officer of the Local Government Board contained a suggestion from Mr. Power that the enormous "plumbo-solvency" sometimes exercised by soft moorland water might be related to the agency of low forms of organic life (*Pharm. Journ.*, [3], xix., 848). The suggestion has been followed up by Dr. G. Kirker, who states that he had already noticed that some waters, under certain conditions of storage, undergo change manifested not only by a great increase in the number of colonies recognized in bacteriological examination, but also by the appearance of a new substance or substances capable of modifying the reaction between ammonia and Nessler's solution (*Brit. Med. Journ.*, Jan. 11, p. 71). Into three samples of rain water that had originally been drawn from the same underground tank, but which had since been kept under different conditions, similar pieces of lead were placed, and the next day the water was tested. All the samples were found to contain dissolved lead, the quantity in each being in direct proportion to the relative deterioration it had undergone as manifested by the bacterial colonies that could be cultivated from it. Dr. Kirker also states that he has noticed that waters show increased organic deterioration in warm weather, and it was in the warmest part of the season that Dr. White found the Sheffield water to act most on lead. It is not thought probable that lead is attacked by micro-organisms directly, but probably the secretions that attend upon their multiplication have a solvent property.

Conditions of Steam Disinfection.

A series of experiments have been made by Dr. Budde in Copenhagen to determine the relative importance of tension, temperature and movement of the vapour used in a vapour disinfecting apparatus (*Deutsch. med. Wochensch.*, Jan. 16, p. 57). As a measure of the action the temperatures in the disinfection chamber and in the heart of the materials subjected to treatment were taken. For the purpose three maximum thermometers were used, one placed free in the chamber, another in the outer layer of three woollen coverlets rolled together and the third in the centre. Each experiment lasted fifteen minutes, during which the object was exposed to steam as a quiet atmosphere or in a continuous or an intermittent current, the steam coming from a boiler where it was under six atmospheres excess pressure, the excess pressure in the disinfecting chamber during the experiment varying between *nil* and one-tenth to three-quarters of an atmosphere. The highest temperature in the centre of the coverlets, 83° to 103° C., was produced by the current, whilst with the quiet atmosphere it did not reach beyond 60° C. The conclusions drawn from the results obtained are:—(1) that the higher the tension of the vapour the more rapidly the heat penetrates to the centre of the object to be disinfected; (2) that motion of the vapour also favours the penetration of the heat; (3) that the most favourable results are obtained by a current of high tension vapour.

Oil of Norwegian Caraways.

The yield and quality of oil obtainable from Norwegian caraways forms the subject of a communication from Dr. Nicolaysen (*Chem. Zeit.*, Dec. 23, p. 1704). He states that in distilling freshly powdered fruit from Christiania he obtained 6·1 per cent. of oil, whilst caraways from Tromsö, 10° further north, yielded 6·4 per cent. This is rather more than the quantity reported for Norwegian caraways in 'Pharmacographia,' 5·8 per cent., and as compared with the 4·8 per cent. attributed by Dr. Nicolaysen to Central European caraways, as a mean of twenty-five statements by different authors, is certainly a good yield. But it may be remarked that the authors of 'Pharmacographia,' on the authority of Messrs. Schimmel, give the yield of oil from German caraways as 7 per cent.; on the other hand in a statement published by Messrs. Schimmel themselves, the yield of oil from the fruit of cultivated German plants is given as 4 per cent., and from that of wild German plants as 6 to 7 per cent. (*Pharm. Journ.*, [3], xviii., 363). Different samples of oil obtained by Dr. Nicolaysen from Norwegian fruit had at 15° C. a specific gravity of 0·9064, 0·9048 and 0·9053, and upon being fractionally distilled yielded 48·9, 47·1 and 48·0 per cent. of carvol. The mean of ten statements respecting the specific gravity of Central European caraway oil is 0·921 at 15° C., and taking the sp. gr. of carvol as 0·965 and that of carvene as 0·849, the author calculates that this would represent 64·5 per cent. of carvol and 35·5 per cent. of carvene. It would therefore appear that although the yield of oil from Norwegian caraways is fairly high the product is relatively poor in the most important constituent, carvol.

Quebrachite and Pinite.

From quebracho bark (*Aspidosperma Quebracho*) M. Tanret announces that he has obtained two new sugars, one as a direct product and the other as a product of its decomposition (*Compt. Rend.*, cix., 908). The former, which he has named "quebrachite," was found to have a composition corresponding with the formula $C_7H_{14}O_6$. When it was heated with hydriodic acid there resulted a formation of iodide of methyl and of a sugar represented by the formula $C_6H_{12}O_6$ and having the constitution of an inosite. Quebrachite may therefore be considered a monomethylic ether of a variety of inosite; it does not ferment under the influence of beer yeast, does not reduce Fehling's liquor, melts at 186°-187°, and rotates a beam of polarized light to the left, as does also the inosite derived from it. A short time previously (*ibid.*, p. 812) M. Maquenne had announced the discovery, in pinite—a product that has appeared in commerce, derived from the juice of *Pinus Lambertiana*—of a sugar containing an aromatic nucleus, which he named "β-pinite." Acting upon the hint contained in M. Tanret's communication he succeeded in removing a methyl group from β-pinite also, and obtained as residue a variety of inosite, which corresponded in its chemical and physical properties with the inosite from quebrachite, except that it was dextrogyre. The probability that these two inosite sugars might stand in the same relation to each other as exists between right- and left-handed tartaric acid was thus suggested, and this was confirmed upon experiment, since from a mixture of solutions of the two active sugars there crystallized a substance differing from both in its physical properties and especially in being inactive towards polarized light (*Compt. Rend.*, cx., 86). This new compound has been named "racemo-inosite."

Alkaloids and Germination.

Although it has long been a subject of speculation as to what becomes of alkaloids and other nitrogenous active principles of seeds during germination, the question has not at present been answered. It seemed at least interesting to determine whether the alkaloids are useless waste products, serving only to protect the seeds from being eaten by animals, or whether, as fragments of albumenoid matter, they constitute nitrogenous nutritive reserves destined to be utilized directly by the young plant springing from the seed. To ascertain this some experiments have been made by M. Heckel, limited to caffeine in the uric group, and strychnine, brucine and daturine in the pyridic group (*Comptes Rend.*, cx., 88). For the caffeine experiments the seeds of *Sterculia acuminata* (kola nut) were used, the cotyledons, which would normally remain intact and adherent to the young plant till about three years after germination, being removed at different periods and analysed. The fresh seeds contained 2·37 per cent. of caffeine; after one year's germination there remained 1·072 per cent.; after two years 0·70 per cent., and after three years 0·21 per cent. During the same time there were formed in the seeds chlorophyll and potassium nitrate, which did not exist in them at first. In the case of the seeds of *Strychnos Nux-vomica* and *Datura Stramonium* it was found that within from two to five months after germination, according to the size of the seeds, all the alkaloids disappeared from the endosperm, being converted into more assimilable substances. But when seeds were deprived of their embryos, and plunged in moist earth, they preserved their alkaloids for a long time unaltered. In the case of *Physostigma venenosum* the eserine underwent transformation in the cotyledons, whether the seed were sown with or without the gemmule; the elements of the transformation of this alkaloid appear therefore to exist in the cotyledon tissue. After a time the seeds no longer gave any reaction for eserine or for the nitrogenous substances that must have resulted from its decomposition, all having apparently passed into the young plant.

Albumen Coagulation.

Considerable differences exist in the statements made by different observers as to the coagulation temperatures of albumen, and this has led Messrs. Haycraft and Duggan to investigate how far this phenomenon is affected by the conditions of experiment other than heat (*Brit. Med. Journ.*, Jan. 25, p. 167). The results obtained confirm previous statements that the rapidity with which coagulation is allowed to take place is a factor in determining the temperature required, egg albumen diluted with one volume of water coagulating at 64° C., when forty minutes were taken to raise the temperature to that point, but not lower than at 66°, when only one minute was so occupied. The coagulation point of albumen was found to be also affected by the degree of concentration, it being raised considerably by dilution, whilst a very dilute solution might not coagulate even on boiling. The effect of the presence of various salts has not at present been satisfactorily worked out, the same salt sometimes in one proportion raising the coagulation point and in another lowering it. In some cases a salt which alone would raise the coagulation point, when it is added to a mixture already containing another salt, will act as a depressant. The effect of acids has already been dealt with by Dr. Haliburton, who has shown that the coagulation point of albumen is progressively lowered by increased additions. He has also suggested a method of fractional coagulation based upon the observation that when albumen mixed with a definite proportion of acid is heated to coagulation, and the coagulum removed, upon raising the temperature still further another coagulum is formed. In this way serum albumen was made to yield three successive crops of coagula, and Dr. Halburton thought this indicated that serum albumen, instead of being homogeneous, might contain at least three different proteids. Messrs. Haycraft and Duggan, however, point out that the coagulation of part of the albumen would increase the dilution in which the remainder is left, necessitating for this a higher temperature for coagulation. Moreover, they have observed that the acidity of the liquid is partly neutralized in the coagulation, so that for this reason also the coagulation temperature of the residue would be higher than that of the original mixture. They therefore consider it more probable that the so-called fractional coagulations are not necessarily due to want of homogeneity, but to a progressive variation in the conditions of the experiment.

Paulo-wilhelmia speciosa.

Among the plants possessing medicinal interest brought to this country by Dr. J. F. Easmon from the Gold Coast, and presented to the Herbarium of the Pharmaceutical Society, was a specimen of a plant, named "Adubiri," used by the Aquapim tribe on the Gold Coast for poisoning fish. This has been identified by Mr. N. E. Brown at Kew as the *Paulo-wilhelmia speciosa*, of the natural order Acanthaceæ (*Gard. Chron.*, Dec. 28, p. 750 and fig. 106). The plant is an interesting one from a botanical point of view, since it is the only representative of the genus, the other two species referred to it in the 'Genera Plantarum' not being rightly placed in the genus, according to Mr. Brown. The plant appears to extend right across Africa, having been recorded from Abyssinia, Niam Niam in Central Africa (under the name of *Ruellia silerochiton*, Moore), and from the Cameroons and the Gold Coast. The specimens from the different districts differ slightly in minor details, such as the degree of toothing of the leaves and the pubescence on the inflorescence. The occurrence of a fish poison in the Acanthaceæ is noteworthy when taken in connection with the destructive effects on animal life manifested by another member of this natural order, viz., *Adhatoda vasica* (see *Pharm. Journ.*, [3], xviii., p. 841).

Insect Powder.

Mr. P. MacOwan, F.L.S., of the Cape Town Botanic Garden, makes some remarks on the plants yielding Persian insect powder (*Gard. Chron.*, January 11, p. 44), which seem to indicate that attention is being drawn to the cultivation of these plants in the colony. The flowers are at times so scarce and the powder frequently so adulterated that it may be hoped the market may be supplied in the future from so promising a district. Mr. MacOwan describes the plant called *P. Willemotii*, Duch., named after Mr. C. Willemot, who commenced in 1856 the cultivation of the "Caucasian" plants in France, as being identical with *P. cinerariæfolium*. Neither under the one name nor the other, however, is the plant mentioned in Boissier's 'Flora Orientalis' as a native of the Caucasus, although both *P. roseum* and *P. carneum* are therein enumerated. Mr. MacOwan points out that *P. cinerariæfolium* likes an open, dry soil, not too clayey, as both the seed and the plant are easily killed by excessive moisture. The seed is sown about half an inch below the surface, and germinates in about thirty days. As soon as the plants can be handled they are placed six inches apart, and in three months' time are placed one foot apart. The flowers are produced in the second year. In this country the plant appears to stand the winter in sandy loam in the south of England, but has not been observed by the writer to flower freely. There is, however, some difficulty in obtaining good seed, for the seed sent from Dalmatia has at times been found to have been carefully baked to prevent its germination.

Cinchonas in Bengal.

It appears from the annual report of the Government cinchona plantations and cinchona factory in Bengal for the year 1888-9 that the crop of cinchona bark for the year was the largest ever harvested, amounting to 373,100 lbs. of dried bark, of which 207,460 lbs. consisted of red, 128,770 lbs. of Ledgeriana, and 36,870 lbs. of other sorts. At the factory where nearly the whole of the bark was utilized, 8575 lbs. of alkaloids were prepared, of which 2191 lbs. were sulphate of quinine and 6384 lbs. cinchona febrifuge. In the previous year only 7250 lbs. were produced as against 8089 lbs. issued. During the year 1888-9 the amount issued decreased to 7689 lbs. of alkaloids.

Botanic Gardens.

A list of the botanic gardens of the United Kingdom and the British Colonies, together with the names of the directors, superintendents or managers, and of the Government botanists in connection with them, is given in the *Gardeners' Chronicle* (January 4, p. 13), and can hardly fail to be useful to those wishing to obtain botanical information concerning plants, medicinal or otherwise, in the respective countries named.

NOTE ON OLEITE.*

At the recent meeting of the American Pharmaceutical Association at San Francisco, Mr. Fred B. Kilmer read a paper on "Pharmacy as Applied to Preparations for the Skin," from which we take that portion which treats of oleite.

The substance named oleite is chemically a sulpho-ricinoleate of soda. It is prepared from castor oil by treating it with sulphuric acid at a low temperature, when a compound of sulphuric and ricinoleic acids is formed. The free sulphuric acid being removed by washing, and any unchanged oil by ether, the resulting sulpho-ricinoleic acid is then neutralized by sodium hydrate, the finished product being a transparent, jelly-like liquid, with little odour, acrid taste, soluble in water, alcohol, chloroform, and essential oils.

Substances similar in composition, known as "polysolve" and "solvine," are now upon the market, and a compound known as "Turkey-red oil" (Türkisch Rothöl) is in use as a mordant, but their resemblance, as far as utility for the purpose under consideration is concerned, is only in appearance, as far as the writer's experience goes.

Turkey-red oil contains a large amount of unchanged oil, water, and sometimes free acid. It has little or no action as a solvent for drugs.

Specimens of "solvine" or "polysolve" examined by the writer likewise contained unchanged oil, water, and were not neutral, some specimens being highly acid, others alkaline, and upon many drugs acted energetically and destructively. They had a decided odour of castor oil and a highly acrid taste, and a purging, cathartic action on the system.

Dr. Jacob has shown that the salts or compounds formed with sulpho-ricinoleic acid are of two series; the salts of the alkalies and the acid salts of alkaline earths being water-soluble, while those of the neutral metallic salts appear in the form of amorphous, lake-like precipitates, insoluble in water.

The behaviour of oleite towards drugs seems remarkable. When first experimenting with it, the writer was reminded of the dream of the alchemist in search of a solvent which would dissolve all substances. It is a solvent for at least a small percentage of almost any drug that it might be conceived would ever be wanted to be used with it. When the limit of its solvent power is reached, a very large amount is emulsified so as to be readily miscible with proper vehicles for use.

Oleite, being already a neutralized water-soluble substance, will, to a varying degree, form water-soluble compounds with drugs; but in compounds with an excess of heavy metallic salts, it suspends them in an amorphous form which I have termed emulsions, and produces different results than a simple union of the sulpho-ricinoleic acid or oleic acid with a base.

The behaviour of oleite towards drugs is so varied with each substance that the writer is not able to state at present what changes take place chemically. With some drugs it seems merely a solution; with others, as heretofore remarked, a union of the sulpho-ricinoleic acid and base is formed.

Its action with mineral and alkaline salts has been already spoken of; with iron, lead, zinc and mercury, percentages varying from two to ten are completely soluble. Nearly all of the alkalies are dissolved in quite large proportions. Gums and resins are somewhat soluble and, to a limited extent, made water-soluble. Solid extracts form clear solutions, miscible with diluents. Iodoform and iodine are completely dissolved. Owing, doubtless, to the neutralizing base used, iodine loses much of its colour, and its solution in oleite does not stain as much as an alcoholic solution. Iodine stains upon the hands, clothing, and utensils are readily removed by oleite. The same is true, in a less degree, with stains of chrysarobin.

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* From the *American Druggist*.

(Dr. Jacobs says that the decoloration of iodine and bromine by such a compound is due to the action of sulphuric acid, whereby two atoms of the halogens are absorbed by 1 molecule of the acid; that is (he says), simple addition takes place, with the formation of bromine and iodide substitution products of the fatty acid series.)

Oleite seems to differ from oleic acid, from the fact that the base, castor oil, contains no oleic acid, and castor oil yields no palmitic acid upon saponification, and by the process of manufacture no stearic or palmitic acid should be present. Oxidation does not seem to take place in oleite as in oleic acid. Oleite is water-soluble, while oleic acid is not. This gives it some advantages, as its compounds may be removed by cold water.

The experiments with this substance have not been exhaustive, and in but few cases have the percentage of solubility, or the chemical changes, been noted with sufficient accuracy to warrant definite statements, and its therapeutic application will only be spoken of.

The wide range of substances which may be dissolved or be brought into a condition to more readily penetrate the skin, certainly would claim for it a useful place in our materia medica. For if epidermic or dermic medication is of any use, it is reasonable that the more soluble the drug the more energetic will be its action. Therefore a much larger class of drugs can be applied in this way than has heretofore been possible.

Clear oleite applied to the skin in a very thin layer, while for a few seconds sticky, rapidly passes through the skin, leaving the skin dry, giving one the impression, if not clearly watching, that it has evaporated.

The action of oleite is largely due to its affinity for liquids, whereby the layer of air upon the surface of the skin is displaced, and a close contact established between the oleite and the glands and follicles, and absorption rapidly follows; also to the slight saponifying action of the oleite, whereby the fatty exudations of the skin (dirt and other matters) are emulsified, and their power to prevent absorption removed. (See Knapp's "Lehrbuch der Chem. Technologie" on action of saponifying agents upon the skin and fabrics.)

There is, doubtless, also a combined chemical and mechanical action between acids, fatty compounds, the liquids of glands and follicles, whereby their strong affinity causes them to rush together, so to speak. In experiments with sulpho-oleic acid, the writer has, under certain conditions, secured absorption so rapid that it was painful.

When alkaloids, or solid extracts containing alkaloids, are made into a solution with oleite, their action is greatly heightened, so much so that in experiments it has been necessary, in making preparations containing aconitine, atropine, veratrine, etc., to greatly reduce the strength. The same is true of iodoform and iodine. A very large amount of either of these can be employed in the ordinary way with moderate effect; but with solution in oleite, iodoform produces poisoning symptoms and iodine eruptions with what would be considered very weak solutions. Solutions in oleite of the metallic salts in large amounts are sticky, yet when applied to the surface and allowed to remain, are all absorbed within a prescribed limit. A noticeable feature of solutions in oleite is that they do not spread or run over adjoining surfaces.

Whether the use of oleite as a means of epidermic medication will ever come into extended use the writer is not able to judge. In experiments made by physicians in connection with the writer, they have demonstrated that drugs dissolved in oleite act very energetically, that the amount required to produce certain effects is nearly the same as if administered hypodermically. In these experiments, solutions of extract of belladonna produced characteristic action in very small amounts. Constitutional effects of mercury have been reported to the writer from the use of solutions in oleite. Very marked action was obtained from alkaloids. These experiments were not sufficiently accurate to detail here, and are only mentioned in a general way.

The statements as to the action of the ricinoleites upon tissue and blood corpuscles that have appeared from time to time were probably based upon the preparations "solvine" and "polysolve." Oleite has no such action. Careful experiments made by the writer, aided by physicians, show that the contrary is true. Upon cuts, burns, open wounds, aggravated skin troubles, highly inflamed surfaces, its effects are soothing, mild, and healing. It has been freely absorbed into the system, and taken internally without the slightest irritation. The only disadvantage that is known to the writer which would prevent its being applied as a solvent for drugs to be exhibited for epidermic medication, is that preparations made with oleite and a drug simply are very sticky, and in the case of metals with drying properties, mercury, zinc, lead, etc., unless oleite is in large excess, they harden by time. Many who have made a compound with a large percentage of such a drug as oxide of lead, then undertaken to apply a thick coating as they would of a cerate, ointment, or plaster, have found such a sticky compound that they were ready to condemn the use of such a preparation. Compounds of sulphoricinoleic acid were never intended to rub in, and compounds made clear with oleite cannot be applied by friction, as lard ointments or liniments. A thin coating is to be applied lightly. This will be readily absorbed, when another may follow. The minute glands and follicles have not the capacity and will not absorb like a sheep's-wool sponge. In the writer's practice, oleite has been used in varying proportions as an addition to any ointment in the Pharmacopœia, and many others, and found an improvement. Some preparations have acquired quite a local reputation.

In a brief report upon the use of oleite as an addition to the ordinary ointment bases, the writer suggested some formulas used by him in his own practice. They are certainly an improvement over ordinary fat bases. The formula suggested was to simply dissolve the drug in oleite, which was to be substituted for an amount equalling 25 to 33⅓ per cent. of the fatty base, then after solution or emulsion the fatty base to be gradually added. Even these do not fulfil the standard sought for in this paper.

CERTAIN SUBSTANCES FOUND IN THE URINE, WHICH REDUCE THE OXIDE OF COPPER UPON BOILING IN THE PRESENCE OF AN ALKALI.*

BY HERBERT H. ASHDOWN, M.D., F.R.S.E.

As the immediate result of the ingestion of certain chemical compounds, substances make their appearance in the urine which have long been known to possess the power of reducing the oxides of some metals when in solution, in the presence of an alkali, if that mixture be raised to the boiling point; but considerable confusion has resulted from the difficulty of finding a short and concise process whereby many of these substances may be readily recognized as not belonging to that comprehensive and at present ill-defined group of conditions generally styled as glycosuria. The importance of this group has been greatly enhanced of late years, however, by the attempts made to define and differentiate the individual members of which it consists, and to ascribe to each their relative significance, and these efforts have been crowned in some measure by a considerable degree of success.

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* Extract from a Report from the Physiological Laboratory of University College, London, and the Laboratory of the Royal College of Physicians of Edinburgh. From the *British Medical Journal*.

Musculus and Mering[*] were the first to point out, in 1875, that the substance which makes its appearance in the urine after the administration of chloral hydrate and croton chloral, is not glucose, as was formerly supposed to be the case. In 1878 Jaffé[†] after studying this substance, gave to it the name of urochloral acid; he also found that it was present after giving orthonitrotoluol by the mouth, and he recognized it as uronitrotoluol.

Wiedemann[‡] found the same substance present in the urine of dogs which had been previously fed upon camphor, and from such a urine Schmiedeberg and Meyer[§] were the first to obtain this substance pure, and analyse it accurately. They found it to be glycuronic acid, and ascertained its chemical constitution to be defined by the formula $C_6H_{10}O_7$. They were able to clearly show its identity with that substance, which had previously been described as urochloral acid and uronitrotoluol, both of which latter substances might accurately be designated as uroglycuronic acid.

Since that time others have described the appearance of glycuronic acid in the urine after feeding with different drugs, namely brombenzol,[‖] nitro-benzol,[¶] phenetol and some of the derivatives of quinine[**], as well as phenol, benzol, and indol.[††] Its presence has also been shown by Mering,[‡‡] to follow the administration of morphine and chloroform.

Chemical Properties.—This chemical compound when pure is not crystalline, but appears in white amorphous granules; but in its anhydride condition—$C_6H_8O_6$—it forms fine colourless acicular crystals. It is very readily soluble in water, not so readily in absolute alcohol, and scarcely at all in ether.

Solutions of this acid are very readily decomposed, although they are much more stable in an acid than in an alkaline medium, but at present little is known of its combinations. In the urine it appears in combination with urea, but it is difficult to say whether uroglycuronic acid, or glycuronate of urea best represents its relation to urea; probably, however, the former. It forms more stable compounds in combination with barium or lead, but in each case requires a considerable excess of the base to form the corresponding salt, which in the case of barium is the more stable of the two. It holds the oxide of copper in solution in the presence of an alkali, and reduces it, throwing down the suboxide upon boiling, either in Trommer's or Fehling's tests; and a similar reaction occurs with the oxides of bismuth, mercury and silver. It readily, when pure, rotates the ray of polarized light to the right 35°, or to half the extent of the deflection by glucose; but many of its combinations rotate the ray to the left. It does not ferment in the presence of yeast (torula cerevisiæ), and thus markedly differs from glucose in this respect.

Preparation.—The best method to obtain this acid from the urine is that recommended by Schmiedeberg and Mayer. A large quantity of urine is evaporated down to a syrup, and then digested with large quantities of damp barium hydrate, in the presence of gentle heat over a water-bath. It is then extracted by means of absolute alcohol, which leaves behind the acid, with many other urinary constituents, undissolved.

This residue is then mixed with a large quantity of water and filtered, and after again adding more baryta to the filtrate, it is again filtered and evaporated down over a water-bath. From the solution thus obtained an amorphous baric compound is thrown down of a spongy porous character. To obtain the acid pure from this porous substance it must be washed upon a filter with water and then decomposed by means of sulphuric acid, when it is again redissolved in water and again evaporated down, and dried *in vacuo* over sulphuric acid, when the crystals of the anhydride form will be obtained.

If the washing of the filter be further treated with more baryta a further quantity of the acid may be obtained, for the compound with barium, though stable in itself, requires an excess of baryta for its formation.

I have found that the process is greatly facilitated by the clarification of the urine by means of animal charcoal, as a preliminary stage before evaporation be attempted. This method, though sufficiently satisfactory for the extraction and preparation of the acid, is not sufficiently accurate in its results to allow of any really valuable quantitative results being gained, but nevertheless is by far the best. It is necessary, however, to have large quantities of urine at disposal, in order to conduct the process with any degree of security and satisfaction.

For the definite recognition of glycuronic acid the only reliable means possessed at present is to obtain it pure, but, as already remarked, the process is long and tedious.

The polariscope, unless used with pure solutions of this acid or solutions of known combination, is very apt to mislead, since some of its combinations rotate the ray of light to the left and others to the right: and if glucose be also present very erroneous conclusions may be arrived at. It must also be clearly stated that though the urine be clarified before using the polariscope with either lead or barium solutions, those commonly employed are not of sufficient strength to remove the glycuronic acid if present even in comparatively small quantity. It is therefore necessary to possess a pure solution before this test can with certainty be applied.

There is no doubt, however, that with comparatively small quantities of urine the differentiation of this substance from the glucose, which behaves similarly to chemical reagents, may be readily arrived at by applying the test of fermentation—a test of great delicacy if conducted properly and with due care, and one capable of demonstrating the presence of smaller quantities of glucose than Fehling's solution of Trommer's test can detect. The fermentation by means of yeast may be conducted over mercury with comparative ease. A long glass tube is filled with mercury, and inverted over a well containing mercury, and the column is sustained by the atmospheric pressure in the well, which should be so constructed as readily to allow of the introduction, by means of a pipette, of the urine, which is thus collected over the mercury. The best yeast to use is the dry German yeast, which should be rubbed down with a little distilled water, and a few drops mingled with the urine before it is introduced into the tube; in that manner all traces of air can readily be excluded.

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[*] Musculus and Mering, *Berichte d. deut. chem. Gesell.*, vol. viii., p. 622, 1875.

[†] Jaffé, *Zeitschrift. f. physiol. Chem.*, vol. ii., p. 47, 1878.

[‡] Wiedemann, *Arch. f. exp. Path.*, vol. vi., p. 230, 1877.

[§] Schmiedeberg and Meyer, *Zeitsch. f. phys. Chemie*, vol. iii., p. 422, 1879.

[‖] Baumann and Preusse, *Zeitsch. f. phys. Chemie*, vol. iii., p. 156, 1879, and vol. 5, p. 309, 1881; also Jaffé, *Ber. d. deut. chem. Gesell*, vol. xii., p. 806.

[¶] Mering, *Cent. f. med. Wissen.*, 1875, No. 75.

[**] Kossel, *Zeitsch. f. phys. Chemie.*, vol. iv., p. 296, 1880.

[††] Baumann, *Arch. f. Physiol.*, vol. xiii., p. 299, 1876; also *Zeitsch. f. phys. Chemie*, vol. i., p. 68, 1877.

[‡‡] Mering and Zweifel, *Berl. klin. Woch.*, 1874, p. 24; also *Zeitsch. f. phys. Chemie*, vol. viii., p. 70.

The whole apparatus should stand in a warm room for forty-eight hours, to allow of the possible disengagement of any gas from the urine, and then the subsequent introduction of a strong solution of caustic potash will readily indicate how much of the gas present is carbonic acid. This latter verification must at all times be conducted, as also must control observations, with the yeast solution and water on the one hand, and on the other with pure glucose solution.

Experiments.—I have now investigated a large number of specimens of urine obtained under different conditions, in order to trace as far as possible the presence of glycuronic acid, and to differentiate it from glucose. The fermentation test was always employed; and whenever the quantities of urine obtained were large enough, the chemical process was undertaken in its entirety for obtaining the acid pure. I now chronicle my results.

Morphine.—The urine secreted after the exhibition of this drug, either by the mouth or subcutaneously, contained a substance which, from its power to reduce Fehling's solution, has been generally regarded as a transient condition of glycosuria; but, after a close investigation, I find it to be due not to the presence of glucose, but of glycuronic acid.

Chloroform.—I have also satisfied myself that the reducing power of the urine, after the administration of this anæsthetic, is dependent entirely upon this acid, and not glucose. In this manner I have been able to confirm independently the observations of Mayer upon morphine and chloroform, already referred to, and of which at that time I was in entire ignorance. I can, however, add that with chloroform I have found some exceptional instances, in which no reducing substance appeared in the urine, but these exceptions over a large number of observations were undoubtedly rare.

Curare.—The glycosuria, so-called, of curare poisoning has long been known, having been first described by Claude Bernard[*] in 1835, but I have not succeeded, after an extended series of observations, in obtaining any fermentation by yeast of these urines, which appeared otherwise to be so markedly glycosuric. In these instances, however, it is most difficult to obtain large enough quantities of urine to complete the whole chemical process, since the curare itself interferes so decidedly with the secretion of the kidney, and consequently I have not been able to separate out the acid in this group of observations.[†]

Ether.—As the result of the administration of ether, I have never found the appearance of this acid nor any reducing substance present in the urine, and it is therefore a useful anæsthetic for observations upon the urinary secretion.

Analysis of Urine Secreted by Right and Left Kidneys: Renal Nerves Intact.—With a view of further investigating the significance of this substance, I placed cannulæ in the ureters, and collected for analysis the urine so secreted by the two kidneys separately. I found that, under ordinary conditions, the chemical constituents of the different secretions differed only to such an extent as would be readily accounted for by the difference in the size of the two organs; and I may here remark that the value of the observations of Max Herrman and Umstimowitsch has suffered very materially from the normal difference between the two organs in weight having been disregarded. I found, as the result of these experiments, that if the reducing substance was present in the urine of one side, it was invariably found also in that of the opposite side.

After a prolonged search over several hundred cases of men, both in disease and health, I have succeeded in finding one instance—this is the first, and only recorded, I believe—in which this reducing substance has been shown to be excreted in large quantity.

This individual is a man about twenty-four years of age, who apparently enjoys perfect health and a complete sense of well-being, and does not suffer from any of those symptoms which but too readily indicate the presence of glycosuria in youth. There is no wasting, no abnormal appetite, or thirst and dryness of the mucous or cutaneous surfaces. There are also no symptoms to point to the presence of cirrhosis of the kidney, and I specially desire to note this, since the presence of glycosuria in some cases of renal cirrhosis has long been recognised. He is, however, passing daily very large quantities of glycuronic acid in a urine which is not increased in quantity or density.

It must not, however, be concluded from these results that the presence of this substance is so extremely rare, for my observations were made upon individuals who were believed to be free from diabetes mellitus, and, since it causes no apparently inconvenient symptoms, its presence may be more frequent than one might be led to suppose. Further, by having shunned all cases of acknowledged diabetes, I may have unconsciously rejected instances of glycuronic acid in the urine as being supposed to be glucose. It is not unlikely, also, that some cases of true glycosuria glucose may have been present also in the urine with glycuronic acid, in which case they will mask each other.

The difficulties to be met with and overcome in order to demonstrate the presence of both substances in the same urine are extremely great; and I may also add here that the usual solutions of lead or baryta which are recommended to be added to urine for the purposes of classification before using the polariscope to estimate the quantity of sugar present are not sufficient to eliminate all chances of fallacy in the event of glycuronic acid being present as well as glucose.

THE CHEMICAL PROBLEMS OF TO-DAY.[*]

BY VICTOR MEYER.

When, a short time ago, I was called upon to speak before you, I gladly and zealously approached the work, which such an occasion seemed to call forth. It seemed to me that it would be an effort worthy of this assemblage of scientific men to recall the permanent additions that chemistry has made in our day to the treasury of human knowledge and to enumerate the problems which seem to lie nearest us in the future.

A science which, as such, is hardly older than the great European revolution, the centennial of which we witnessed a few months ago, which in that short time has caused changes in our spiritual and material life hardly less than those of the political revolution, such a science, I have thought, may, without temerity, boast of its achievements.

And yet the chemist approaches such a task with a certain hesitation, from which the astronomer, the physicist and the mathematician are free. Has it not been in our own day that the most prominent orator amongst German naturalists, one who astonishes us by the comprehensiveness of his knowledge, has adopted as his own Kant's judgment on chemistry, namely that "chemistry is a science, but not a science in the highest sense of the word, that is, a knowledge of nature reduced to mathematical mechanics." And this dictum is accepted, not as a blemish upon our science, but with the fullest and most perfect recognition of the immense achievements which modern chemistry has registered as its own.

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[*] Claude Bernard, *Leçons de Physiol.*, vol. i., p. 339, 35.

[†] Echard, *Beitrage z. Anat.*, vol. vi., p. 1, 1872.

[*] An address delivered at Heidelberg at the first general session of the sixty-second meeting of the Association of German Naturalists and Physicians. Translation from the Journal of the American Chemical Society.

But all of the marvellous successes of the atomic theory and of the doctrine of structure, the synthesis of the most complicated organic compounds, the blessings of an enlarged pharmacopœia, the potent revolution in technological processes, the new and systematic methods of production which have been characterized by an eminent technologist as "the gaining of gold from rubbish"—all this seems trifling to the mind that looks down from its standpoint of mathematical mechanics when compared with the work of a promised Newton of chemistry, who some day will represent chemical reactions in the thought and in the language of mathematical physics.

And if he who looks from a height is justified in the expression that to-day chemistry, in the recognition of ultimate causes, stands yet below astronomy of the time of Kepler and Copernicus, must not the chemist lose courage if he attempts, before an illustrious assemblage, to raise a song of praise to his science, to glorify what she has done and what in the future she seems chosen to do? If in spite of this the attempt be made, it must be with that resignation which rests upon the belief that "we should consider everything, but aim only at that which is possible."

Though we share, with full conviction, the expectations of a Newtonian period in chemistry, we hardly venture to hope that that period is near, and even the most enlightened representatives of the newer physical chemistry seem but precursors of that distant era.

Perhaps the chemist, immersed in the daily work of his science, fails to take the comprehensive view of one who from a distant height looks down upon the same. But those who are surrounded by the whirl of hourly renewed work recognize, all the more clearly, the immense amount that remains still to be achieved before those distant aims can be realized. This epoch, so rich in path finders in the department of physics, has rarely directed the highest order of research into the territory of our science and especially have the more complicated chemical phenomena been avoided.

If in a period that has witnessed the discoveries of Helmholtz, Robert Mayer, Joule, Clausius and van't Hoff, the revolutionizing progress of knowledge has been limited to physics, and if only modest applications of what was gained have been made in related studies, then the epoch seems not yet to be at hand in which chemical processes can be thought of as we think of the movements which we feel as sound, light or heat.

A humiliating statement! But, strange to say, the chemist of to-day has hardly time to complain of this resignation imposed upon him, and this for reasons easily understood:—

If—without question—it is the aim of all natural science to understand phenomena so fully that they may be described in a mathematical form and, so far as they are unknown, may be predicted, a science, which is so far distant from this aim as to look merely for the *path* that shall some day lead to it, must be considered as in its infancy. In the present stage our way of thinking and acting has this peculiarity. In every science phantasy must stand as another power alongside of knowledge and reasoning. But the influence of phantasy upon knowledge is all the greater the further this latter is distant from the mentioned ideal. And thus it happens, that in the chemistry of to-day, phantasy and intuition have a larger scope than in other sciences, and that occupation with the same, besides the pure scientific satisfaction that it yields, brings an enjoyment which, in a certain sense, reminds one of the activity of an artist. He, however, who only knows chemistry as a tradition of perfectly clear facts, or who thinks to see the real soul of chemical study in measuring the *physical* phenomena which accompany chemical transformations, feels no breath of this enjoyment.

The feeling is only disclosed to him who ventures into that ocean of the unknown that is spread out before us in the *organic chemistry* of the day; to him who is not appalled by a wilderness, populated with thousands of individuals of which every one shows a peculiar, fully unknown originality, and to him who attempts to become better acquainted with some of them, even if he is at a loss for a means of approaching them. To proceed with success in this direction is only granted to the genius—the method that leads onward cannot be learned, and it has only been practiced with success by a small number of chosen ones.

Indeed, in the experimental study of organic chemistry, the "presentiment" of happenings, the actuality of which is not indicated by any law to be expressed in words, has shown surprising results: here the thought is aided by a something, which we may meanwhile term "chemical feeling," a name which will disappear as soon as the progressive approach of chemistry to the mathematical physical basis shall have disclosed its meaning and shall have tabulated it amongst the methods which lead to the recognition of the new. The effect of this peculiar chemical method of study is not here to be dwelt upon in detail. Let it suffice to say, that without it the most brilliant discoveries in organic chemistry would not have been made, just as a Kekulé would, without it, have been unable, in contradiction of numerous data in chemical literature never before doubted, to affirm the non-existence of isomeric monochlorbenzol and of such bodies as were said to consist of a benzol ring and but *one* bivalent atom. Those significant hypotheses by means of which the knowledge of aromatic substances has been revealed to us, could not have been made solely upon the ground of exact observation, they required at the same time a pronounced chemical instinct. There was no logical reason in declaring the existence of a phenylene oxide as an impossibility, since the ethylene oxide did exist; he who nevertheless ventured to do so and at the same time ran directly in the face of experience, was surely led by a feeling which the present status of chemistry forbids us to replace by a process of thought.

But to return from the field of organic to that of general chemistry. Before we can arrive at a mathematical-physical treatment of chemical phenomena in general, the fundamental problems must be solved: an hypothesis which allows a control by experiment (even within the same limits which to this day are imposed upon physics in regard to the law of gravition)—must answer these questions: *What is Chemical Affinity?* and *What is Valency?*

By means of laborious detail-work chemistry tries to approach the solution of these enigmas, but he who pursues chemical methods, who stands in the midst of chemical work—which aims only, as at a far distant task, at the discovery of a sure *path*—still sees such obstacles to be cleared away, that he gives up the hope of living to see the new chemical era. He finds satisfaction in the consciousness of having exerted his best abilities in the elucidation of some minor and precursory principles.

If now we begin to consider—within the appointed limits—the most important achievements of chemistry, we cannot, at this place and at this hour of our meeting, be in doubt as to what is to be mentioned in the first place. The hospitable city that shelters us boasts of an advantage which is envied her by every other *Alma Mater*: here, chemistry for more than a human lifetime has been represented by Robert Bunsen, of glorious name, and the very days which find us here assembled, follow immediately the moment in which this hero of science has retired from his academical occupation. Who does not think, at such an hour, of the great teacher around whom ardent pupils from all parts of the globe were accustomed to congregate. But who, being called upon to-day to speak of the results of chemistry within the walls of Heidelberg, would not before all direct an eye upon that one discovery which has lifted chemistry beyond terrestrial research, which has enabled her, like astronomy, to search the universe and to dissect the starry heavens, chemically, by the subtle appliances of analysis. If "old Heidelberg" has become a pearl amongst German cities by its history, by its numerous traditions, by the incomparable beauty of its situation—if its university is the ideal of the German academical youth, we may well regard as an immortal leaf in its wreath of honour, along with these glorious titles, the union of those two great men who first met in this city in the most courageous enterprise of the penetrating mind; who have pursued with astonishing success the investigation which has made spectral analysis the most potent of scientific weapons, and has rendered their names a charm calling forth the admiration of the older minds and kindling in the minds of mere schoolboys the flame of enthusiasm in the study and exploration of nature. The immeasurable results of that discovery—the consequences of which extend every day over new territories—are known in the widest circles, and to mention them to-day in detail would be but carrying owls to Athens. It behoves us in this place to mention reverently the names of Bunsen and Kirchhoff, to think of them with gratitude, and to hope that men, their equals, may not be entirely wanting in the next generation! The younger one of them—whose scientific fertility was only equalled by his greatness of soul and the charming modesty of his heart—has been taken away from us before old age had naturally limited him. Bunsen we still rejoice to call ours, who now, allowing the tools of his work to drop from his hand, looks forth to the evening of his life in quiet, happy leisure. May he be permitted for a long time to look back upon a life filled with greatest scientific achievements; may his calm, friendly eye rest for many years upon the incomparable picture of his beloved Heidelberg.

We have mentioned spectral analysis, though it has been almost for an age the common property of science. Let us also cast a grateful retrospect upon a deeply furrowing revolution—of which chemistry also, for several decades, has boasted as a substantial possession—upon the development of the *doctrine of structure*, that solid theoretical foundation from which the proud edifice of modern organic chemistry rises. A generation has grown up around us which has received as a matter of fact this doctrine which still seems new to us older ones. But those far-seeing men, whose eyes recognized the immensely simple in the seemingly impenetrable complication of the carbon compounds, are still actively alive amongst us, and it is their happy lot to reap in their own activity what once they sowed in juvenile work. Here the eye is directed upon the master of chemical research—August Wilhelm von Hofmann; before all upon his researches upon the organic nitrogenous bases—researches which do not find their equal in organic chemistry and which, even more perfectly than Dumas' fundamental discovery of trichloracetic acid, allowed the fundamental conception of substitution to expand into the living consciousness of chemists, at first, curiously, by supporting the theory of types in organic compounds and then by promoting the transition to the structural or constitutional view, which at present embraces, with unparalleled perfection, the whole territory of organic compounds.

But the suggestion of this doctrine, which finds its crowning success in the recognition of the inner aggregation of the atoms, is associated for all time with the name of a man who, although a master of rare art in experimenting, knew how to surpass what he had achieved at the laboratory table by the convincing power of his speculative work. We cannot here dispute the part which other eminent chemists have taken in the development of the doctrine of structure—there are Butlerow, Cooper, Erlenmeyer, Frankland, Kolbe, Odling, Williamson—but the glorious guide in this great and victorious movement forward, he to whose eyes was disclosed not only the tetravalence of carbon, but also the solution of the problem of the constitution of organic compounds, in the recognition of the property of carbon atoms to be linked to *each other* by their valencies; he is the *philosopher* of organic chemistry—August Kekulé. The name of this discoverer, who also started upon his high and soaring flight from Heidelberg, is justly mentioned *alone* when we want to recall in a word the putting forth and the development of the leading chemical theories.

The researches in this direction are so numerous and so toilsome, and yet the result is so surprisingly simple! The carbon atom is endowed with four, the oxygen atom with two, the hydrogen atom with one point of attack for the chemical affinity. The cause of the aggregation of the atoms within the molecules lies in the mutual saturation of these units of affinity or valencies. It is the number of valencies which decides the possibility of the existence of a compound. Amongst the legion of imaginable combinations of these three elements only those are capable of existence in which every valency is saturated by that of another atom. Through this knowledge a new method of inquiry was opened, in particular for organic chemistry, the immense territory of which for many years seemed totally to absorb the working power of chemists. But then dawned the first signs of a further development. Hardly a decade had elapsed since the general admission of the doctrine of valency, when a fundamental deepening of the same was announced, which our science owes to two savants, working independently of each other—to Le Bel and van't Hoff. These chemists, considering those substances which turn the plane of polarization of light, arrived at views which soon led to a result, until then thought to be out of reach, a conception of the aggregation of the atoms within the molecules in space. Thus a field of study was created which van't Hoff called "*la chimie dans l'espace*" and which we now call *Stereo-chemistry*.

It was recognized that the carbon atom stretched out its four valencies in definite directions, and this in a symmetrical manner. The combination of a carbon atom with four other atoms, for example methane, CH_4, is representable by the picture of a tetrahedron, in the stereo-metric centre of which the carbon atom is situated, while the hydrogen atoms occupy its four corners.

Numerous cases of isomerism until then not understood, could be explained in this manner and were regarded as stereo-chemical ones. The cause of optical activity was found to consist in the presence of an asymmetric carbon atom, that is, one which is combined with four different groups.

Also the stereometric forms of a few simple molecules were considered; it was recognized, *e. g.*, that a compound of three carbon atoms linked together by one bond respectively, could not contain those atoms in a straight line, but that they must lie in the angles of a triangle the sides of which form an angle equal to that in which the directions of valency of the carbon atom intersect each other.

By the application of these considerations to more complicated molecules, which contain a chain of atoms closed within itself, Adolph von Baeyer has enlarged our theory in a manner full of consequence.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 1, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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DEATH BY POISONING IN SCOTLAND.

IN the article recently published on this subject the statistics given had reference only to England and Wales. Since then the report of the Registrar-General for Scotland has been issued for the year 1887, and it will be useful to supplement the information already given as to death from poison by quoting the figures now published in reference to Scotland. The population of Scotland is stated to have been estimated at something less than four millions, and the total number of deaths by poison are stated to have been seventy-six, or rather less than three per cent. of the entire number classed under the head of death by violence. Of the seventy-six deaths caused by poison twenty-six were cases of suicide and fifty were the result of accident or negligence. The cases of suicide by poison amounted to rather more than eleven per cent. of the total number of suicides and the cases of accidental poisoning amounted to rather more than two per cent. of the cases of accidental death from all causes. In both instances the proportion of deaths by poison to deaths from other causes is somewhat less than that recorded for England, though the difference is not considerable. In a general way, therefore, the statistics for Scotland bear out the conclusions already arrived at in regard to England and Wales, and they serve to show that, comparatively, death by poison is by no means so serious a danger as it is sometimes represented. At the same time these data justify the inference that the obligations attaching to the keeping, dispensing and sale of poisons have been as efficiently observed in Scotland as they have in this country.

The particular kinds of poison that have been most frequently the cause of accidental death in Scotland are in some respects the same as those that have been found to hold that position in England. Thus, for example, the accidental deaths caused by opium and other narcotics have been most numerous, no less than twenty-three out of the fifty cases having been due to those drugs. Among the suicides by poison again there were fifteen cases out of the twenty-six caused by opium and morphia. In regard to carbolic acid, however, there is a marked difference between the returns for Scotland and for England, only one case of death caused by this substance being recorded, that being a case of accidental poisoning. The mineral acids also appear to have been but seldom the cause of death, either accidentally or by suicide, only three cases being recorded under the former head and none under the latter. Chloral hydrate was the cause of two accidental deaths and one death by suicide. Chloroform was the cause of two accidental deaths and ether of one, but it is not stated whether they had been administered by inhalation or otherwise. Cyanide of potassium was the cause of one accidental death, and in four cases of suicide prussic acid was used. Lead poisoning, which figures so largely in the returns for England and Wales, does not appear to be a frequent cause of death in Scotland, only three cases of accidental poisoning in that way having been reported.

The Edinburgh Chemists' Annual Ball took place on the evening of Thursday, January 23, in the Assembly Rooms, George Street, the corridor of which was beautifully decorated with plants kindly lent by Mr. James Buchanan, Oswald Road. There was a company of two hundred present, and a highly enjoyable evening was spent, a result largely due to the complete arrangements of the committee, and especially to the energy of Mr. J. P. Thomson, convener. Messrs. G. Lunan and W. J. White acted most efficiently as masters of ceremonies.

* * *

We understand from Mr. Charles Thompson, the Honorary Secretary of the Midland Counties Chemists' Association, that the annual ball took place on Thursday, the 23rd inst., at the Edgbaston Assembly Rooms, and proved to be in every way a great success, over two hundred persons having been present. It is consequently anticipated that there will be a good balance to hand over, and we presume that, as is usually the case with the proceeds of these festive gatherings, it will serve to augment the resources of the Benevolent Fund.

* * *

A case of accidental poisoning reported in the *Pharmaceutical Record* illustrates the danger of allowing druggists' shops to be kept by unqualified persons. A carpenter who owned a drug store and employed a young physician to carry on the business was called upon in the absence of his assistant to supply some antipyrin. He gave five grains of atropine, which caused the death of the person it was administered to. The coroner's jury censured the owner of the drug store, and found that death resulted from his ignorance. The violation of the pharmacy law in carrying on business without being licensed, and in selling a poison without registration, will no doubt give rise to further proceedings against the owner of the business.

Provincial Transactions.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The usual fortnightly meeting was held on Thursday, the 23rd inst., the President, Mr. H. Wyatt, Jun., in the chair. A paper was read on—

GLYCO-GELATINE, ITS PREPARATION AND SOME OF ITS USES.

BY T. S. WOKES, PH. CH.

I do not propose either to tell you or show you anything new, but as there are doubtless some here who have neither had occasion to dispense or make glyco-gelatine, and as I have had several opportunities of doing so during the last few years, I venture to bring before you some samples of glyco-gelatine and pastilles.

The term glyco-gelatine is the name given in the throat hospital Pharmacopœia to the bases there ordered for making their official pastilles.

For the purposes of this paper I propose to apply the term glyco-gelatine more generally to other combinations containing glycerine and gelatine (with water) than the T. H. formula, which is—

Refined gelatine	℥j.
Glycerine (by weight)	℥iiss.
Orange flower water	℥iiss.
Sol. carmine	q.s.

The gelatine is soaked in the water for two hours, then heat in a covered water-bath until dissolved, the glycerine added and stirred well together, and the whole strained through muslin. Wring out in hot water, and when sufficiently cooled the colouring is added.

It is easy to make, taking (including the two hours' soaking) about two and a half hours, and possesses good keeping properties. I have had samples over twelve months and they have been still fresh and nice.

To convert this into pastilles you cut off ℥i., melt in a small water bath, add the medicament previously rubbed up with a few drops of glycerine, and pour into an oiled tray, and when cold divide into twenty-four pastilles. The tray which I use is the lid of an ordinary 4 ounce tin lozenge box, and also to insure reasonable accuracy in the cutting I use a piece of card, on the surface of which there are the outlines of the exact size of the sheet of pastilles when turned out of the mould. On the outside of these lines you will see there are short lines dividing it into the required number of pastilles. I use an ordinary table knife for cutting.

There are other methods of cutting the pastilles.

Mr. Wyatt recommends and uses a square tin mould 3 x 3 inches divided into squares by means of deeply impressed lines on the under surface,

Another method is given in the 'Art of Dispensing,' somewhat similar to the last, but possesses the advantage that it is available for varying quantities. It consists of a piece of plate glass with three small pieces cemented on its three sides, the fourth being left open, for which a movable piece of glass is provided; the whole surface is divided into squares by means of grooved lines, and the loose piece of glass is moved up to any series of squares required and secured in its place by means of cork.

The following are official in the T.H. Pharmacopœia.

Acid. boracici, grs. ii.
Acid. carbolici, gr. ½.
Ammon. chlor., grs. 11.
Bismuth carb., grs. 3.
Bismuth grs. 3 et morph. acet., gr. $\frac{1}{20}$.
Bismuth grs. 3 et pot. chlor., grs. 2.
Iodoform, gr. 1.

Quoting from the Extra Pharmacopœia as to the advantages of glyco-gelatine for administering these and other medicines, it affords a ready means of prescribing lozenges to meet individual cases, and pastilles are specially suited to cases of inflammation of the tongue and palate, and their gelatinous nature gives much relief in dryness of the throat. I have here some pastilles:—

Cocain. hydrochlor.	grs. ⅛
Acid. hydrochlor. dil.	♏ ¼

and flavoured with ess. lemon; the acid is added to overcome in some degree the sweetness of the glycerine.

Having noticed that the official pastilles containing ammon. chlor. are slightly moist, I thought a stiffer basis might overcome this objection, and I made one, but it was not a success.

The colouring used for the glyco-gelatine is generally an ammoniacal sol. of carmine, and Mr. Wyatt in his paper gives the following formula for making it, which I find well suited to the purpose:—

Carmine	grs. 30
Sol. ammonia	q.s.

Dissolve the carmine in ʒvj. of the ammonia, filter, and wash the filtrate with sufficient to collect ℥j. of the colouring. I have used another colouring, viz., liquid saffron, which I made as follows:—

Saffron	grs. 30
Boiling water	q.s.
S. V. R.	ʒj.

About 1 ounce of boiling water to be poured on the saffron, and infused until cold, filtered, pressing the marc, add the S. V. R. and any necessary water to make ℥j. About 5 minims of this added to an ounce of the mass gives a good tint.

The subject of flavouring is rather a wide one; many different substances may be added where suitable. Ext. glycyrrh. liq., or, better still, glycyrrhizin, suggests itself as an admirable thing for covering the taste of am. ch.; the fruit juices would in many cases be admirable substitutes for the orange flower water used in making the basis.

I must not omit to mention tolu, the efficacy of which valuable medicine would in no way be impaired by being exhibited in the form of pastilles.

I have also used the essences of lemon, vanilla, and almonds for flavouring at various times.

A gelatine basis has long been used for making pessaries, and I will not waste your time on this part of the subject, but show some pessaries of a particular shape, and the mould in which they were made.

Having a prescription for one dozen pessaries, and not possessing a suitable mould, I softened a piece of paraffin wax and pressed into it a piece of wood the size of the required pessary. When the wax was set, I withdrew the wood and poured in the gelatine, etc., afterwards breaking away the wax. The pessaries turned out splendidly.

For the making of suppositories, gelatine and glycerine basis is displacing to some extent cocoa butter, and it is admirably adapted for the purpose in many instances, particularly where extracts such as belladonna and conium are ordered. I have found considerable difficulty in making suppositories containing ext. conium with cocoa butter.

Having dispensed large quantities of gelatine suppositories, I have never heard that there was any reason for thinking that they were less useful than they would have been if made with cocoa butter.

Speaking as a dispenser, I will only add that using the gelatine basis they were made quicker, and they invariably presented a more satisfactory appearance.

In using gelatine for suppositories and pessaries an allowance of about one-third extra must be made for heavier specific gravity as compared with cocoa butter.

If any lubricant is necessary for the moulds I always use almond oil.

The President said he had listened to Mr. Wokes's paper with great pleasure, as it had proved to be a most practical one, on a subject of growing interest to every pharmacist, and one to which the author had done entire justice. The specimens exhibited were excellent in every respect, the transparent pastilles, such as those of carbolic acid, being very brilliant. He would suggest instead of the carmine solution he had himself advocated in a paper on the same subject, that the method of dissolving the carmine by means of ammonia, adding some glycerine and evaporating until ammoniacal fumes could no longer be perceived and making up to a given volume with glycerine and water would be an improvement, as there would be no alkalinity in such a colouring, and consequently no danger of decomposing any alkaloid salts ordered in the pastilles. This point was of importance in apomorphine hydrochlorate pastilles, as the ammonia soon caused the characteristic green coloration apomorphine assumes in contact with an alkali. Where an acid is used with these pastilles a good colour not easily bleached by it could be given by using a tincture of cudbear, one part in ten of dilute alcohol (1 of S. V. R. to 1 of water). The method proposed by Mr. Wokes for extemporising a mould for bougies and pessaries was novel, and judging by the specimens turned out by it, effective, the objections to its use resting solely in the time it occupied as compared with the usual tin-foil case, which he had always found gave excellent results, the stripping of the foil coat off the finished pessary being easily effected if commenced at the apex of the cone, and not as usually done from the base. His experience led him to the same conclusion arrived at by Mr. Wokes, that the best way of making pessary glyco-gelatine was to use plenty of water to soak the gelatine, and then to evaporate down to a given weight, as by this an extra stiff mass could be obtained by increasing the quantity of gelatine, which was of use where a tincture formed part of the ingredients ordered in the pessary.

The discussion was continued by Mr. Johnson, Mr. Mitchell and Mr. Riddle.

Mr. Wyatt said he had great pleasure in announcing the following donations to the Library and Museum:— A materia medica cabinet, from Messrs. Southall Bros. and Barclay, and a Remington's 'Practice of Pharmacy,' and specimens of strophanthus, from Messrs. Burroughs, Wellcome and Co. He was sure these would be of inestimable value to members, and moved a hearty vote of thanks to the donors, which was unanimously carried.

Dr. George Tate, F.I.C., F.C.S., has promised to deliver a lecture at an early date on "The Chemistry of the Yeast Plant."

The next meeting will be held on Thursday, February 6, when a paper will be read by Mr. A. E. Shaw on "The Estimation of Pil. Pot. Permang.," and Mr. R. H. Mitchell will contribute a note on "Cannabis Indica."

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The usual fortnightly meeting of this Association was held on Wednesday evening, January 22, in the Mosley Street Café. There was only a moderate attendance. In the absence of the President, the chair was occupied by Mr. D. H. Oxen.

The minutes of the previous meeting having been read and confirmed, and several additional names having been received for the competitions, the Chairman— who expressed his regret at the fewness of the members present—called upon Mr. A. J. Curwen to read his paper on "Sugar and its Preparations."

After a lengthy and rather humorous introduction, the author stated that sugar existed in vegetable and animal substances, but more abundantly in the former. To a large extent sugar as a vegetable product was found in dried fruits, figs yielding about 60 per cent. of sugar; tamarinds, 12 per cent.; prunes, 16 per cent.; and dates as much as 35 per cent. The sugar cane requires about twelve months to mature, and its life lasts about one year, after which the cuticle becomes smooth and it is ready for crushing, etc., during which process lime is added to neutralize free acid present and to render the product more liquid and separable. The uncrystallizable portion is called molasses or treacle. The raw or brown portion thus formed is again purified by the lime and bullock's blood process. Sugar, he said, should not contain too much sand for table use and not enough for building purposes. After speaking of the composition of sugar and the various functions it performed, he called attention to sugar as found in the B.P. Forty-four preparations in the B.P. contained sugar. In pulv. glycyr. co. he thought the quantity of sugar too great. By that he meant there was more sugar than anything else. Speaking of syrups, he gave the following formula for syr. simplex as being a much more satisfactory preparation than the B.P.:—

Take of—

Sugar	2 lbs.
Aq. destill.	Oj.

M. sec. art.

This he stated was not perfect, but it had the merit of being a syrup, whereas the official preparation was sugar candy and composition unlimited. In the iodide of iron syrup he recommended the addition of ½ grain of citric acid to the ounce, as it would retard the chemical change and preserve the colour for a considerable time. In syr. scillæ he suggested the addition of 1 per cent. of acetic acid. Saccharin was much too dear for ordinary practical purposes, although probably in time it would supersede sugar.

A discussion followed in which the Chairman, Mr. G. F. Merson and Mr. Bell took part.

A vote of thanks was accorded to Mr. Curwen for his paper.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

This Association held its usual meeting on Wednesday evening, the 22nd inst. The President occupied the chair, and after approval of minutes, called on Mr. William Bowie to read his essay, the subject being "Some Notes on Plant Life."

The essayist began by noticing the increased interest now manifested in the phenomena of plant life, and spoke with approval of the increased attention paid to the cultivation of plants in Glasgow as a means of window and house decoration; bulbs from Holland, cut flowers from the Channel Islands, and hardy pot-plants from local nurseries alike finding a ready sale, and by their presence in the people's homes assisting to brighten their surroundings. The spread of botanical knowledge he considered due to the efforts of the Kyrle Society, the teaching of botany in schools and the lectures in connection with the Technical College; the result being that there are few among the young but know a little of the science. The wonderful reproductive power of plants was dwelt on at length, and it was explained that while plants and animals ware alike developed from a motile protoplasm plants alone can grow from any growing point. An oak may be produced either from an acorn or a broken twig. A garden can be filled either from seeds or slips. As an illustration of the rapid spread of wind-fertilized plants attention was drawn to the rapid covering of a newly formed railway embankment by flowers of the Composite order, shown against a background of grasses. It was also mentioned that a good instance of the power of plant life could be seen at Hogganfield, where the loch, about 60 or 80 acres in extent, was at one time as free from vegetation as such places usually are, and formed a source of income to the Corporation from the ice taken from it in winter. The anacharis appeared and has spread to such an extent that the loch has almost disappeared in spite of the efforts of the authorities to clear it by means of a trawling apparatus worked by a stationary engine. The peculiarity of the anacharis is that it is not propagated from seed. The pistillate flowers only are found in the West of Scotland. In dealing with the subject of cross-fertilization the essayist declared his belief in the theory now generally held that the questions of shape, length, colour, perfume and mechanism can all be answered with reference to the visitations of insects. As an example of the part played by insects in fertilization an experiment was described. If a piece of muslin be tied over part of a currant bush when just about to flower it will be noticed by and by that the free flowers have dropped off and berries have formed, but those covered by the muslin though remaining longer on the bush on dropping off gave no fruit. The subject of plant movement was very fully treated. In describing the dodder, one of our native parasites, an explanation was given of the law of the alternation of generation. In the first stage the dodder exists as a true plant, drawing nourishment from the soil by means of roots; by and by, however, it fixes itself on some other plant and becomes parasite to it; at last, having found an easier way of getting a living, it withdraws its roots from the ground and is nourished entirely by the plant on which it has squatted. The mechanism of the sensitive plant (*Mimosa pudica*) was also described, the essayist remarking that he had been told by a gardener at Kew, that if a plant were called on to perform too often for the entertainment of visitors it soon sickened and died—much the same thing as Lord Shaftesbury used to say happened to infant acrobats and theatrical prodigies who could not stand the strain of public entertainment. The various kinds of movement were next explained, geotropic, heliotropic, and nyctotropic, and in speaking of the latter Mr. Bowie mentioned that in the case of the *Lychnis vespertina*, a beautiful flower possessing a fine perfume, and growing near Glasgow, the order of things was reversed, as it closed by day and opened at night, Sir John Lubbock explaining this by saying it requires to be fertilized by moths or other night insects. In the last part of his paper the essayist described the three insectivorous plants of the Clydesdale flora, *Drosera*, *Pinguicula* and *Utricularia*, explaining the method by which the insects were trapped and absorbed. In concluding, Mr. Bowie urged the members of the Association not to give up the study of botany immediately on being qualified, but to continue it through life, as there was no branch of science which asked so little and gave so much enjoyment in return.

The President said the essay had been a very interesting one, and showed that its author was speaking from experience and observation. He was evidently one of the school of physiological botanists, studying the plant in life and the manifestations of that life. In that he had followed the example of the great master, if not founder of that school—Darwin—to whose researches we owe so much of our knowledge regarding that branch of botanical science. Darwin's observations on the movements and fertilization of plants were marvels of patient investigation. Now botanists were studying the living plant, and from that working back to morphology and classification. With regard to the Kyrle Society, the speaker had had proof of the statement of the essayist, from the interest manifested by some of the younger members of his family in bulb-growing and plant-collecting. The Society is not sparing in its encouragement by means of small prizes, which no doubt added to the interest of the young botanist.

Mr. Gilmour thought it was well when recreation could be made useful in their work, and doubtless this was the case with botany. He was doubtful whether there was any great increase in the love for botany, the interest in their own case being promoted by the necessities of the examinations. A great deterrent to the study of botany was no doubt the very hard (though necessary) nomenclature. He mentioned Jussieu as having done more for systematic botany than even Linnæus. He thought it profitable to reflect that the colour, beauty and perfume of flowers were not intended for man alone, but as a means to their own fertilization. While believing that "the proper study of mankind is man," he agreed with the essayist that it is good to go out and meet and commune with nature face to face.

On the motion of the Chairman, a hearty vote of thanks was awarded to the essayist, who afterwards exhibited a fine collection of mounted specimens from the Rocky Mountains, the manner in which the bright colours of the flowers had been preserved eliciting general admiration.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held in the Silver Street Hall, on Friday evening, January 24, the President, Mr. Curtis, in the chair.

The paper for the evening was entitled "A Botanical Study," by Mr. Wallace.

Mr. Wallace, who is an able botanist, gave a very interesting account of fertilization, and dwelt at some length on the various contrivances exhibited in plants to secure cross-fertilization. The paper was very carefully prepared, and delivered in such a fluent and attractive manner as to claim the closest attention of all present.

A hearty vote of thanks was awarded to Mr. Wallace, after which the President intimated that the next meeting would be devoted to the reading and discussion of the magazine papers, the editor being Mr. Clark.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The Association met in the rooms, 74, Commercial Street, on Thursday evening, January 23, to hear a paper on "Tar," by Dr. P. Murison. There was a good attendance. The President, Mr. John Forsyth, in the chair.

The author, after a few introductory remarks, in which he gave his reasons for selecting the subject, said that he would treat first coal tar, and then wood tar. He gave an interesting history of coal and its various sources, then detailed the processes through which it went before gas was obtained, in the manufacturing of which tar was a bye-product. In this he was aided by a large and beautifully executed diagram of a gas-works, which to many who had never seen the internal arrangements of such an establishment proved very interesting. Having now obtained tar and separated it from the ammoniacal liquor, he, figuratively speaking, transferred it to a retort, and then subjected it to distillation in order that it might disclose its hidden properties. The retort having been heated until no more came over, the distillate was examined and found to consist of three layers, namely, light oil, watery fluid and dead oil. These light and heavy oils were then subjected to fractional distillation, and the essayist described a few of the more important substances related to pharmacy which were obtained from each. A lengthened description was also given of the preparation of aniline dyes, and the author stated that it was his intention to have practically demonstrated this part of his subject by preparing some of these, but he had been unable to obtain pure aniline in Dundee, and it was too late to send elsewhere for it. The preparations of carbolic acid and picric acid were also fully detailed among others. In conclusion, the author referred briefly to wood tar, and enumerated the various substances which were obtained from it.

The lecture was listened to with great attention all through, and at the close a hearty vote of thanks was accorded to Dr. Murison for his valuable communication, on the motion of the President.

Proceedings of Societies in London.

ROYAL INSTITUTION.

The Scientific Work of Joule.

A lecture was given on Friday, January 24, by Professor Dewar, on the Scientific Work of Joule. The lecturer premised that the duty of rendering this tribute to the memory of Joule had devolved on himself in consequence of the inability of Sir William Thomson, Joule's colleague and fellow-worker, to leave his other duties in order to undertake the task. He then briefly recapitulated the chief incidents of the life of Joule, who was born in 1818 at Salford, the second of five children, and of delicate health, so that he was not sent to school, but received his education at home at the hands of tutors until he attained the age of fifteen. His father and grandfather were brewers, and Joule then worked in the brewery, of which he and his brother afterwards became the managers. While working at the brewery, he was sent by his father to learn chemistry under Dalton, who was then teaching at Manchester, instructing his classes first in arithmetic, algebra and geometry, and then passing on to natural philosophy. In 1847 he married, but his wife died in the year 1854. Joule's scientific career began in 1838, and during his life he produced no less than 115 papers on complex and varied subjects. During his first epoch, from 1838 to 1843, he was concerned chiefly with electricity, and published four important papers. Among these was one on electro-magnetic machines, effecting considerable improvements in their construction; others dealt with the conversion of electricity into heat in the circuit of a galvanic cell (a Daniell's cell being employed for the purpose), and enunciated the laws as to the relation of the amount of heat produced to the intensity of the current and to the resistance. He also showed that in the case of electrolysis of salts the heat absorbed by the electrolysis is part of that produced by the chemical action in the cell. By the year 1841 he had completely discovered the laws of the distribution of energy in the electric cell, and his researches were leading him on towards his greatest achievement, the determination of the mechanical equivalent of heat. In February 1843 he said in a footnote to one of his papers that he had no doubt but that if a magneto-electric engine were introduced into the circuit, the amount of heat produced would be less by the exact equivalent of the mechanical work done by the machine, and his first determinations of this equivalent were made by electrical means, an exceedingly difficult method and open to many sources of error, just as in the case of many other great discoveries comparatively difficult means of arriving at them were first employed. The method consisted in rotating a coil in the field of a large electro-magnet by means of a measured mechanical force, and accurately measuring the electric currents produced by means of a tangent galvanometer, while the thermal effects in heating a known quantity of water were measured by thermometers of great delicacy which he specially constructed for the purpose. (One of these thermometers, which had been employed by Joule and Sir Lyon Playfair in their experiments on the maximum density of water, was shown by Professor Dewar; it had unfortunately been smashed, however, during transmission from Cambridge that morning.) The result arrived at from these experiments was 848 foot pounds as the equivalent of heating a pound of water 1°; a result which, though slightly too high, was very close indeed considering the method employed. By determining the heat produced by the friction of water in glass tubes he arrived at a value of 770 foot pounds; he also got similar results by many other methods, such as the determination of the diminution of heat when an electric current did mechanical work, the compression and expansion of air, etc. His standard experiment by means of the friction of water produced by falling weights was reproduced by the lecturer, who also showed the ingenious experiments by which Joule and Sir Lyon Playfair determined the maximum density of water, and illustrations of their joint researches on atomic volumes. From 1852 to 1862 Joule was engaged with Sir William Thomson on long and laborious researches on the compression and expansion of gases, and the relations between gaseous volume, pressure and temperature, which showed that Boyle's law required some modification. Other subjects studied were the passage of gases through porous plugs or narrow apertures, and the heat produced by the movement of meteorites, etc., through the atmosphere. The lecturer concluded by reading some personal reminiscences of Joule, furnished him at his request by Sir Lyon Playfair.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, January 16. Dr. W. J. Russell, F.R.S., President, in the chair. The following papers were read:—

A New Method of Estimating the Oxygen Dissolved in Water. By J. C. Thresh, D.Sc., M.B.—The process is based on the observation that whereas, in absence of oxygen, nitrous acid and hydrogen iodide interact to form iodine, water and nitric oxide; in presence of oxygen the nitric oxide becomes re-oxidized, and, serving as a carrier of the oxygen, an amount of iodine equivalent to the oxygen present is liberated, in addition to that resulting from the initial action of the nitrous acid: hence, deducting the amount liberated by the nitrous acid and by the oxygen dissolved in the solutions used from the total amount, the difference will be that corresponding to the oxygen dissolved in the water examined. The solutions used are: (1) a solution containing ·5 gram sodium nitrite and 20 grams potassium iodide in 100 c.c.; (2) a solution of 7·75 grams sodium thiosulphate in 1 litre, 1 c.c. of which corresponds to 0·25 milligram of oxygen; (3) a clear solution of starch; and (4) diluted pure sulphuric acid (1 : 3). The apparatus required is a very simple one. It consists of a wide-mouthed, white glass bottle of about 500 c.c. capacity, provided with a caoutchouc stopper, through which four holes are bored. Through one passes the neck of a cylindrical "separator" funnel of known capacity, and through the second a tube drawn out to a fine point, which is connected by a short length of caoutchouc tubing with the thiosulphate burette; while inlet and exit tubes for coal gas are passed through the third and fourth holes, the exit tube having attached to it a sufficient length of caoutchouc tubing to permit of connection being established between the bottle and the separator when the stopper of the latter is withdrawn. The separator is filled with the water to be examined, and 1 c.c. of the nitrite-iodide and 1 c.c. of the acid solution are added; if the pipette be held vertically, with its end just below the surface of the water, the solutions flow in a sharply defined column to the lower part of the separator, so that an infinitesimally small quantity (if any) is lost in the water which overflows when the stopper is inserted. The admixture of the liquids having been effected by inverting the apparatus several times, a sharp current of coal gas is passed into the bottle to displace the air, the escaping gas being allowed to burn at a jet attached to the exit tube. Fifteen minutes after adding the solutions to the water the flame is extinguished, a cork is attached in place of the jet and is inserted in place of the stopper of the separator, and the water is then allowed to flow into the bottle; the exit tube having been disconnected from the funnel and the gas set fire to, thiosulphate is run in until the colour of the iodine is nearly destroyed; about 1 c.c. of starch is then added from the separator and the titration is completed. The effect of the nitrite, dilute acid, and starch solutions is readily determined by removing the separator and adding 5 c.c. of each in succession and then titrating; the effect of the oxygen in the thiosulphate may be allowed for on the assumption that as much oxygen is dissolved in it as distilled water would contain at the same temperature. It appears that there is no advantage in passing the coal gas through alkaline pyrogallol. The author states that concordant results are easily obtained, and that the results in the case of freshly distilled water closely agree with those recently published by Sir Henry Roscoe and Mr. Lunt. Thus:—

Temp.	Thresh.	Roscoe and Lunt.
10°	7·81	7 77
15	7·02	6·96
20	6·17	6·22
25	5·69	5·60
30	5·45	5·43

Mr. Warington said that on the occasion of Mr. Holland having suggested in the *Chemical News* a method of estimating nitrites in water by means of potassium iodide, he had pointed out that the method was fallacious in presence of air. The delicacy of the iodine test for nitrites was doubtless ascribable to the occurrence of the series of changes of which Dr. Thresh had availed himself.

Mr. Green stated that he also had called attention to the influence of oxygen about four years ago, in a communication to the University College Chemical Society.

Dr. Stevenson said that he was not satisfied with the method of estimating nitrites in water proposed by the author; a comparison with other methods would be desirable.

Mr. Chapman Jones drew attention to the use of manganous hydrate in estimating the oxygen dissolved in water.

Note on a Milk of Abnormal Quality. By F. J. Lloyd.—The author is led to give the results of his examination of the milk afforded by two cross-bred shorthorns, as its quality appears to be altogether remarkable; there being no evidence either that the cows were suffering from disease, or that they were insufficiently or improperly fed, he is of opinion that the normal quality of their milk is such as has never before been recorded. In the milk from one cow the total solids in the morning yield taken over a period of two months ranged between 10·04 and 11·88 per cent., of which the fat ranged between 2·17 and 3·44 per cent., and the solids not fat between 7·50 and 8·47 per cent.; the evening milk contained total solids 11·32 to 14·34 per cent.; fat, 3·64 to 5·71 per cent.; other solids, 7·68 to 8·63 per cent. The figures for the milk from the second cow were:—Morning: total solids, 11·28 to 12·18 per cent.; fat, 3·07 to 3·93 per cent.; other solids, 11·28 to 12·18 per cent. Evening: total solids, 12·52 to 13·38 per cent.; fat, 4·26 to 5·13 per cent.; other solids, 8·10 to 8·52 per cent. Several complete analyses, made with the object of discovering whether the loss fell on any special constituent, show that this is not the case, the caseine, sugar and other constituents, except the mineral matters, being equally affected.

Dr. Stevenson expressed the opinion that the animals in question were in some way suffering from malnutrition, or were subject to some latent disease.

Mr. Warington said that the amount of total solids was not below the accepted lowest value.

Professor Kinch remarked that equally low results had been obtained in certain cases at the Agricultural College, Cirencester.

Professor Thomson mentioned the case of a cow having the propensity of eating heather tops affording a milk containing a lower proportion of total solids than that of other cows of the herd which had not the propensity.

Mr. Lloyd, in reply, said that in the cases considered by him the small amount of solids other than fat was what he desired to bring under notice; the total solids often varied, but the variation was chiefly in the amount of fat, not in the solids other than fat.

The Sulphates of Antimony. By R. H. Adie, B.A.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, January 23, Mr. H. W. K. Pears in the chair.

A paper was read by Mr. E. B. Sherlock on Alkali Manufacture, describing the various operations of the Leblanc process as carried out in alkali works he had visited; he also described the other manufactures carried on in conjunction with the soda industry, viz., the making of sulphuric acid, hydrochloric acid, and bleaching powder, and the recovery of manganese and sulphur from the bye-products. The paper was copiously illustrated by means of specimens and photographs, and gave rise to a discussion, in which the Chairman, Messrs. Dymond, Shepheard and the Secretary took part.

In the absence of Mr. Hawkins the following report was read by the Secretary:—

Report on Inorganic Chemistry.

BY L. W. HAWKINS, F.C.S.

Estimation of Hydrogen Peroxide.—A sufficiency of potassium iodide and sulphuric acid is added to the solution to cause all the available oxygen to be used in liberating iodine. The free iodine is then estimated by titration with sodium thiosulphate, from which result the amount of peroxide of hydrogen is readily calculated. If the solution is stronger than two volumes it should be diluted to about that strength before estimating. 10 c.c. of two volume solution require 20 c.c. of 10 per cent. solution of potassium iodide and 20 c.c. of dilute sulphuric acid (1 in 5), or half the quantity of acid if the potassium iodide be doubled. With less than this the results are found to be too low (Kingzett, *Analyst*, 13).

Volumetric Estimation of Alkaline Sulphates.—This method is of great convenience when the sulphate exists of itself in a neutral solution. Excess of barium chloride is first added, and then this excess estimated by means of volumetric solution of sodium carbonate, phenolphthalein being used to indicate when all the barium is precipitated. Calcium or magnesium must not be present (Sidersky, *Mon. Sci.*, 32).

Another method is to add to the solution of sulphate a hydrochloric acid solution of barium chromate

Barium sulphate and chloride of the alkali are formed and chromic acid liberated, which is estimated by titrating with ferrous sulphate, the excess of barium chromate being first removed by adding excess of ammonia (Quantin, *Bull. Soc. Chim.* [3], 1).

Preparation of Nitrous Oxide.—The gas may be evolved regularly and quite pure by boiling a mixture of 5 parts of stannous chloride, 10 parts of hydrochloric acid, sp. gr. 1·21, and 9 parts of nitric acid, sp. gr. 1·38. If other than these proportions are used the evolution is irregular, and explosions are liable to occur (Campari, *Ann. Chim. Farm.*, 8).

Estimation of Cobalt and Nickel.—The solution of the cobalt salt is boiled with caustic potash and peroxide of hydrogen. Brown sesquioxide of cobalt of definite composition Co_2O_3 is thus precipitated. After cooling, potassium iodide and hydrochloric acid are added. The equivalent of iodine is thus set free and is estimated with sodium thiosulphate. The presence of nickel does not interfere with the result, as no corresponding sesquioxide is formed under these conditions, the precipitate being nickelous hydrate.

Nickel can be estimated in the absence of cobalt by treating the solution with caustic potash and either bromine or a hypochlorite. By this means the nickel sesquioxide Ni_2O_3 is formed, and can be estimated in the same manner as the cobalt (Carnot, *Compt. Rend.*, 108).

Detection of a Trace of Mercury Sublimate.—The substance is sublimed in a tube. To the non-volatile portion is then added 2 drops of strong nitric acid and a drop of strong solution of iodide of potassium. On again heating the tube, iodine volatilizes and forms the characteristic red iodide with the mercury, if present. If arsenic and antimony iodides are also present they are liable to mask the mercury, but on continuing the heat to the tube the fumes of the nitric acid more readily decompose these than the mercury iodide (Johnstone, *Chem. News*, 59).

Detection of Cl, Br, I and S in Organic Compounds.—The substance is heated with finely divided zinc in a sealed tube. The residue is then treated with water and the usual tests applied for the halogens. For sulphur, hydrochloric acid is added, and the gas evolved tested with lead acetate paper (Marsh, *Amer. Chem., Journ.*, ii.).

Decomposition of PbS with Fe_2Cl_6.—Finely divided sulphide of lead is quickly acted upon by a concentrated solution of ferric chloride, chloride of lead, ferrous chloride and sulphur resulting. The action takes place readily in the cold, but much more quickly when warmed (Gabba, *Chem. Centr.*, 1889).

Reduction of $BaSO_4$ to BaS.—When sulphate of barium is ignited with filter paper, a proportion of the sulphate is liable to be converted into sulphide. The quantity was found to be less when conducted in an open crucible. For accurate experiments the author recommends the mass to be treated with sulphuric acid, and again ignited (Marsh, *Chem. News*, 59).

A New Tin Oxide.—A solution of stannous chloride in hydrochloric acid is treated with excess of hydrated barium dioxide. The turbid liquid is then dialysed until barium chloride ceases to pass through the membrane. The colloid residue is then heated on a water bath, when a white mass results, having the formula $H_2Sn_2O_7$, which may be regarded as the derivative of a new oxide of tin, perstannic anhydride, SnO_3. The reaction is expressed as follows:—

$$SnCl_2 + BaO_2 = SnOCl_2 + BaO.$$
$$SnOCl_2 + BaO_2 = SnO_3 + BaCl_2.$$

(Spring, *Bull. Soc. Chim.*, [3], 1.)

Conditions of Action of Nitric Acid.—The elimination of the intervention of nitrous acid by the employment of carbamide has been found to very greatly reduce the activity of nitric acid. Thus 50 c.c. of nitric acid, sp. gr. 1·05, dissolved 4·46 grams of copper in four hours, but in the presence of carbamide under the same conditions only ·02 gram was dissolved. The formation of nitrocelluloses was not found to be impeded by the carbamide, which goes to prove that these compounds are alcoholic nitrates (Cross and Bevan, *Chem. News*, 60).

Volumetric Estimation of Silver and Mercuric Salts.—The solution is acidified with nitric acid containing nitrous acid and starch paste added. It is then titrated with decinormal potassium iodide until a permanent blue colour remains. The method depends on the insolubility of silver and mercuric iodides in nitric acid. It has also been applied to thallium, but the iodide being more soluble makes the results less trustworthy. Palladium cannot be so estimated on account of the dark colour of the iodides (Carnot, *Compt. Rend.*, 109).

After a short discussion on the report, Mr. T. S. Dymond invited a discussion on the subject of Spirit of Nitrous Ether, and the solution of Ethyl Nitrite proposed by Dunstan and Dymond as an improvement on it. The subject was discussed by the Chairman, Secretary, Messrs. Sherlock, Allez, Shepheard, Chambers, W. Wilson and A. Smith, and the meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association held on Thursday evening, January 23, the following paper was read as an introduction to a discussion on—

THE ADVISABILITY OF AN UNIVERSITY DEGREE FOR PHARMACISTS.

BY FREDERICK DAVIS.

The duty has devolved upon me to open the discussion upon our programme this evening "On the Advisability of a University Degree for Pharmacists." My opinion is, that a university degree for pharmacists is advisable, and I base my opinion upon the following points:—The pharmacist of the present day is a man of no mean calibre, he is in no way comparable with the pharmacist of days gone by, say fifty years ago; this is evident by the most casual glance at the current half sessional programme of our own Association. If we look further into the very heart of the Pharmaceutical Society and view the vast strides which during the past few years have taken place, under the very able presidency of Mr. Carteighe, the increased and laudable stringency exercised in our qualifying examinations, it will be evident to the most sceptical that the time has arrived at which the senates of our various universities should consider a scheme for granting a degree or degrees to pharmacists.

At the present the universities have faculties in engineering, law, science, art, music, surgery and medicine. I ask, therefore, why is there no faculty in pharmacy? Is it because the business of a pharmacist necessitates the keeping of open shop. If such is the case this argument should fall to the ground at once, as we see upon all sides and at every angle doctors of medicine doing precisely the same thing.

When we consider the long list of honourable names of university graduates connected with our Society as workers in our laboratory and occupying the professorial chairs, etc., we cannot but feel that already we are in touch with that knowledge which it is to our advantage to accrue.

I fancy I can hear some discontented pharmacist saying that a university degree would not put more money in his pocket or better fit him to carry on his business. To such an individual I would say, "Knowledge is power;" the more knowledge we have the greater power we possess of turning that knowledge to account, and the more knowledge we turn to account the more money we put in our pockets. There are, however, two classes of pharmacists, workers and drones, the latter class constituting the greater number. These individuals expect the Pharmaceutical Society and other workers to do for them that which as a matter of fact they should do for themselves. Individual work is a great thing, and unless each individual does something to enhance and push forward the welfare of the pharmaceutical community, it is certain we cannot progress or even hold the position which has so far been attained.

Let us glance for a moment at the social aspect of the pharmacist. As things are at present he is in the awkward position of the boy who sat between two stools and came to the ground. I mean this; that the education of the pharmacist unfits him for the company of ordinary tradesmen, whilst the fact of keeping shop renders him, it appears, unfit company for the professional man, etc.; this latter barrier, I take it, should be altogether removed by the pharmacist becoming a university graduate.

If we look at the good work done by pharmacists, and presented in a tabulated form in our year-books of pharmacy, we see results which are indeed encouraging. Some people may take exception to this, saying, "If all this good work has been, and is still being done, it is evident that the present qualifications of the pharmacist are sufficient, and that a university degree is therefore unnecessary." To this I would reply, the same might be said with regard to our medical practitioners. We have our members and fellows of the College of Surgeons; our licentiates and members of the College of Physicians; but we have also the university graduates, bachelors and masters of surgery, and bachelors and doctors in medicine. I ask then why have we not a bachelorhood and mastership in pharmacy as corresponding degrees? I think the time has arrived, now that great changes and amalgamations are proposed *re* a teaching university for London, that pharmacy should also be represented, and indeed I have little doubt in my own mind that if Professor Fraser's suggestions be placed by the proper authorities before the senates of our universities our claim will at once be acceded to.

I will not detain you longer upon this point, but there is another of very great importance indeed; I refer to a degree in "sanitary science" for pharmacists only. I endeavoured some weeks back to raise a discussion in the *Pharmaceutical Journal* upon this very point, but owing to the apathy which unfortunately is too often shown by pharmacists the matter was not discussed. It will be remembered in the short letter then published I stated sanitary science to be occupying a most important position, both educationally and domestically; I pointed out also the various examinations at present existing in this subject of which not one is suitable to pharmaceutical requirements. I ask why is this the case? Surely the subject is of vital interest to the pharmacist, both from the standpoints of education and of trade. It is not for me to suggest any particular curriculum for either the degree in pharmacy or sanitary science, but one point I hope will be worthy of support, namely, that present existing pharmacists and chemists of, say, five years standing shall be permitted to present themselves for examination and obtain the degree or degrees without further curriculum; in fact, that holding the qualification of the Pharmaceutical Society shall be accepted as evidence of proper training in much the same manner as the Durham doctor in medicine is obtainable. It must be understood, please, this is not a paper upon the subject, but a few words wherewith to open the debate. It is for you to discuss and decide what is to be, or is not to be done. One thing I am certain of, if the pharmacist is to hold his position and advance with the times, it is essentially necessary that the points of my remarks must be threshed out in a thorough and efficient manner.

The Chairman said two main points were involved in the consideration of this question. In the first place, do chemists desire a degree? in the second place will the universities grant one? Respecting the first of these, it might be argued that in view of the apathy that had been exhibited in the recent attempt to ventilate the subject in the columns of the *Pharmaceutical Journal*, no such desire existed amongst pharmacists. For himself, however, he thought this feeble interest was no criterion of real feeling in the matter, though he was bound to admit that if pressed home to them the reply would turn in very many cases upon the answer that would result from the application of the question, What is the pecuniary advantage to be derived from the possession of a degree? He certainly was of opinion that it would be advantageous, and if pharmacists would unite in making an appeal for a degree he thought the universities must accede to their request. All other scientific bodies had facilities offered to them for obtaining the academic seal to their studies, and as pharmacy was a combination of science and art, a scientific training was necessary just as it was for a civil engineer or a doctor. As the possession of a degree need not necessarily constitute a right to practice as a pharmacist, there was no reason why the Pharmaceutical Society should not continue to exercise its function as a public examining body quite independently of the universities. It might be suggested also that a man who desired a degree might take the bachelorship of science, but they would quite see that this took a man outside the region of pharmacy, and so did the studies for a degree in arts. Similarly when they were told that the medical profession was open to them, they were bound to admit that it was, but if every pharmacist became a medical man, what was to become of pharmacy? Should the idea be entertained the universities would probably feel called upon to provide certain courses of studies for the benefit of intending aspirants, and they would probably also accept evidence of training in such other schools as they might approve of; this latter point would also have to be settled if and when the projected Curriculum Bill became law. He concluded by reading some of Professor Fraser's remarks on the subject.

Mr. Charles W. Seccombe noticed the great amount that had been written and spoken regarding the position and standing of chemists, and their relationship to all phases of society. They had all felt, and not without reason, that their true social position as professional men was not recognized as it should be, and that their trade rights had not been protected by law as they would desire them to be. It seemed to him that they might apply an old proverb, and say "The law helps those who help themselves." He could not understand why chemists were so apathy stricken, so blinded to their own interests, as to expect others to help them when they did not help themselves. Getting Bills through Parliament was slow and tedious work, and they would remain where they were if they waited till their senators gave them a lift. It all rested with themselves, and the pharmacy of the future would be just what they made it. They must educate the public in the provisions that are made for public safety, and teach them who are best calculated to carry out these provisions. They must qualify themselves as accurate dispensers, competent analysts and sound chemists, so as to merit public confidence. They should go hand in hand with the medical practitioner, pharmacy being the handmaid of medicine. The question before them was, how could they best accomplish all this? The man who wrapped himself up in his business as a mere money-making machine would trouble himself little about it, but they, as the pharmacists of the future, were the trustees of their own fortunes, and it behoved them to look ahead, to advocate a nobler ambition, the insurance of public safety, the advancement of pharmacy and a rightful acknowledgment of its devotees. The idea of a university degree was one which he entirely approved of, since it would be a step in the right direction. The doctor, the lawyer, the scientist, and indeed all representatives of callings in which education and mental training played the most important part, had their degrees, and by these they were known and judged. Surely education was the essential, the mainstay of the pharmacist. He was paid for what he knew; his knowledge was therefore his livelihood, and he (Mr. Seccombe) could see no reason why some scheme might not be formulated, by which, as Professor Fraser had pointed out, a university like that of London in conjunction with the Pharmaceutical Society, could hold annual examinations for some such degree as master in pharmacy. Here they would have something that the public could grasp and understand, which would be infinitely better than a dozen titles that a man could get easily enough by paying for, and which made him appear as a sort of riddle in the eyes of the public, a curiosity they could not quite make out. Mr. Seccombe thought that what the pharmacist needed was more zeal in the practical direction, that he lacked action, and allowed theory very often to outwit and outstrip practice. They had been very prolific in ideas: one was to make the Preliminary stiffer, and compel every one to pass it before being bound an apprentice; another that every branch manager should be qualified; another that candidates for the Minor should undergo a curriculum of study; another that members of the Society be given the more effective title F.P.S.; and now they had another—a university degree for the pharmacist. He hoped that at least one of these would turn up a trump.

Mr. G. W. Phillips thought a degree would undoubtedly be advantageous to chemists, but he thought it should be quite optional.

Mr. Blackham said he was commonly credited with holding opinions which were anything but his own. There was no one more desirous to extend the education of the pharmacist than himself, but he objected to make the process an expensive one; and he maintained that the introduction of a curriculum would not remove the evils under which the present system of education laboured. It had been remarked that "Heaven helped those who help themselves." He was quite prepared to admit that the Pharmaceutical Society had a high origin; its charter, however, was from Westminster, and not from heaven, and from the negative and apathetic interest it exhibited in all matters of a trading nature he thought it had greatly abused its privileges.

Mr. W. L. Williams said he thought if a plébiscite of the pharmaceutical community were taken upon the point under discussion that the majority of replies would be in the affirmative. He thought a degree was desirable, though he had no desire to see it made compulsory. He questioned very much if the universities would grant a degree in pharmacy without previous matriculation, for they enforced this in each of the instances that had been brought forward by Mr. Davis, and it seemed scarcely fair to expect that pharmacists should receive any special indulgence. As one of the objects for which the Pharmaceutical Society was founded was to regulate the examinations, he thought that it would be impossible for the universities to proceed in the matter without the co-operation of the Society, and he believed it would necessitate the affiliation of the Society with the universities. The grounds upon which a degree in pharmacy should be granted would involve very careful consideration; personally he would make it contingent upon the possession of practical skill in pharmacy, as exhibited in the ability to produce satisfactory galenical preparations. He would approach the subject from the art side, making the examination hinge upon practical pharmacy, and making one of the sciences upon which the art was based a subsidiary part of it; the degree would then represent what its name implied. In spite of the practical tests which were enforced upon candidates, a lamentable deficiency in pharmaceutical skill might be discerned on all sides by even a lenient critic; it was attributable unquestionably to the incapacity of many men who undertook to train apprentices, men whose responsibility to the said apprentice seemed to end with the pocketing of his premium. They would bear in mind that the question they were considering had been settled for many years in France, where the pharmacien was associated with the university life and progress of that country, and was in consequence regarded as a professional man. As anything which tended to elevate the craft to which they were devoted was worthy of commendation, and would serve to stimulate the aspirations of the younger members of the body, he would conclude by saying that he believed the possession by the pharmacist of a degree would go some way towards attaining these desired ends.

Mr. C. W. Seccombe asked to make a remark in reply to something Mr. Blackham had said. He wished to make it clear that he did not argue that the pharmacist is not sufficiently educated. He contended that his education should receive better acknowledgment and give him a better social standing, and that a university degree was one step towards its attainment. Mr. Davis's idea of an examination in sanitary science was one with which he thought all pharmacists would agree.

Reviews.

OLD AGE: the Results of Information received respecting Nine Hundred Persons who had attained the Age of Eighty Years, including Seventy-Four Centenarians. By GEORGE MURRAY HUMPHRY, M.D., F.R.S.*

We welcome with sincere pleasure the appearance of this small volume from the pen of the gifted Professor of Surgery at Cambridge. It is the outcome of a suggestion of the author's that much advantage to medical science might be derived from carefully systematized collective investigation by members of the British Medical Association. Circulars of inquiry were issued and nine hundred replies received; a sufficient number to give good and reliable results and to furnish, we think, a most interesting and valuable contribution to the progress of economic science. The inquiries have been directed to all past and present circumstances connected with old people, and Professor Humphry's report has naturally fallen under two headings, concerning those who had become centenarians, and those who were between eighty and one hundred.

In his general remarks the author points out that the current idea of development is associated with the periods of adolescence and maturity. It should not end there, but continue in a definite and orderly manner, though with lessening activity, to the termination of life. This is spoken of as "descending" development, and normally consists in the preservation of the relative proportions of the several structures, under the influence of a well-adjusted diminution of material and of nutritive activity. The author cites as an example the increasing lightness and brittleness of bone with age, proceeding *pari passu* with a narrowing range of muscular action, until a time comes when the machine stops, rather than is stopped by accident or disease, and old age terminates in natural or physiological death.

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* Cambridge: Macmillan and Bowes. 1889. 8vo. Pp. 218.

The requisites for longevity are found to be an inherent quality of endurance, popularly known as a "good constitution," derived, as the statistics show, rather from maternal than paternal sources; a steady, persistent, nutritive force, and a good proportion or balance between the several organs. To attain old age freedom from accident or casualty is necessary, and hence we find that more than 50 per cent. of the centenarians are women, and that a greater number of the female sex attain an advanced age, notwithstanding the dangers inherent to the child-bearing period of life. The more pronounced healthiness of the female infant is not without its share in the production of longevity.

It appears that a medium stature in men and women, viz., 5 feet 6 inches in the former and 5 feet 3 inches in the latter, is constantly observed in people over eighty years of age, and we would add that people of moderate weight figure largely in the returns. How rarely does one find a fat person passing beyond or even reaching to the allotted span of three-score and ten.

Dr. Humphry says that the greater proportion of cases are reported to be of long-lived families, to have enjoyed good health throughout their lives, and to have been moderate or small eaters, especially in the matter of meat. They have generally been accustomed, too, to much out-door exercise. Let those who are pent up in an office for nine or ten hours a day, and then only creep home to rest a brain wearied with a surfeit of badly oxygenated blood, remember this, and take a hint from the next point wherein our old friends excel, viz., early rising. Sleep should come early in the night, certainly before midnight, and healthy people should be able to wake at six and rise at once. With regard to general circumstances, it seems that those who are accustomed to live in comfort rather than affluence attain old age. Moderate drinkers and abstainers are well to the front, although in one or two instances some "have drunk as much as they could get," but from the very fact of their reaching one hundred years of age we are not disposed to believe that they ever could get much. Smokers do not figure well; of forty-five centenarians thirty-two were non-smokers. Nearly all cases are reported to have shown no traces of gout or rheumatism in the hands, thus evidencing a perfect metabolism and physical balance. It is a well-known fact that the appearance of gout before thirty-five is rarely followed by more than a moderate length of years, such people often dying between fifty or sixty, or even earlier.

With regard to disposition, it is interesting to note how often the words "cheerful," "chatty," "amiable," "placid," "good tempered," "energetic" occur. Thus we find one dear old soul dancing on her 101st birthday, and another, Peggy Walsh, reputed to be 124, retained perfect hearing and such good sight as to be able to thread a needle without glasses. Surely the length of their days was not full of sorrow and labour. Vigorous mental labour appears, other things being equal, to predispose to length of days, a capacity for prolonged mental strain arguing great brain power. Happily old age is not often accompanied with dementia, although frequently some evidence of childishness appears.

It is important to note that there is only one instance of death of a centenarian from cancer. It seems that the liability diminishes from about 45 to 55 onwards, and that after seventy there is but little to fear in this direction. With reference to bladder trouble, arising from enlarged prostate, only 7 per cent. were found afflicted, and it was found that after sixty-five was passed the liability becomes constantly less.

The remarkable preservation of the teeth is an object of common remark when skeletons of our forefathers are brought to light, and the conclusion is hastily arrived at, that we of the present generation have certainly degenerated in this respect. There may be some truth in this, but it must be remembered that such skeletons are those of people often cut off in their prime by battle or disease, and that nowadays a larger proportion of people attain to old age than formerly, thus allowing time for dental decay and loss to occur.

But after all, as the author says, "length of life is to be really estimated not by the number of years so much as by good work done, not by the amount of time spent in the tame fruitless manner indicated by the pithy lines of Cowper,

> 'For fourscore years this life Cleora led,
> At morn she rose, at night she went to bed,'

but by persevering efforts to promote the welfare and happiness of our fellow men."

We would most earnestly commend this book to all our readers. Its conclusions are reliable, the knowledge it imparts is valuable, and herein have we the secret of a long life, without resorting to the methods of obtaining vigour in old age described by Professor Brown-Sequard.

Obituary.

Notice has been received of the death of the following:—

On the 24th of January, Mr. Joseph Hughes Merrett, Chemist and Druggist, Hyde Park Road, Southsea. Aged 42 years.

ANSWERS TO CORRESPONDENTS.

Student.—(1) The colour would be probably due to reaction between the calomel and ammonia, and the formation of mercurous ammonium chloride. (2) The publisher is S. F. Hodsoll, 5, Rupert Street, London, E.

Edinburgh.—The subscription is on account of Associateship in the Society, which will lapse if it be not paid.

NOTICES.

Chemical Society.—A meeting will be held on Thursday, February 6, at 8 p.m., when there will be a ballot for the election of Fellows, and papers will be read on "The Oxides of Nitrogen," by Professor Ramsay; "Studies on the Constitution of Tri-derivatives of Naphthalene," by Dr. Armstrong and W. P. Wynne; and "On the Action of Chromium Oxychloride on Nitrobenzole," by G. G. Henderson and J. Morrow Campbell.

School of Pharmacy Students' Association.—The next meeting will be held on Thursday, February 6, when Mr. C. E. Boucher will read a paper on "Dissociation," and Miss M. E. Buchanan will give a report on "Pharmacology."

Society of Chemical Industry.—A meeting of the London section will be held at Burlington House, on Monday, February 3, when a paper will be read by Mr. A. H. Allen, on "Metallic Compounds of the Phenols;" one by Mr. Watson Smith on a "New Method of Hardening Steel for Projectiles," and a third, by M. Losanitch, on "Bromanil."

Chemists' Assistants' Association.—The next meeting will be held on Thursday evening, February 6, when a paper will be read by Mr. J. Castell Evans, F.I.C., on "Some Blow-pipe Reactions interesting to Pharmacists."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Waage, Davies, Findlay, Anderson, Edinburgh, Inquirer, Apprentice.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 8, 1890.

THE COUNCIL MEETING.

The unfortunate coincidence of the hearing of the appeal in the case of the Pharmaceutical Society *v.* Wheeldon with the meeting of the Council last Wednesday, and the great length of the reports of the proceedings in both instances, have made it necessary to devote the whole of the ordinary space of the Journal to their publication and to add a supplement of twelve pages. These reports, however, will be of especial interest to all connected with the practice of pharmacy, and it is therefore unnecessary to offer any apology for giving them so much prominence. The first business at the Council meeting was the settlement of the question which of its members were to retire from office in accordance with the bye-laws. The result was that Messrs. Abraham, Carteighe, Greenish, Hills, Leigh, Martin and Schacht will retire by lot, and that Messrs. Atkins, Evans, Gostling, Hampson, Harrison, Richardson and Robbins will retire by rotation. One pharmaceutical chemist was elected a member of the Society, and one person was elected a chemist and druggist member; twenty-seven persons were elected associates, and twenty-nine persons were elected apprentices or students of the Society. The Registrar's Annual Report on the numerical strength of the Society and the statistics of the examinations and registers was presented, and will be found at pages 624, 625.

The report of the Finance Committee, recommending the selling out of Stock to the amount of £4,500, and a payment to the contractors for the new buildings, was adopted, and it was mentioned that this sale of stock would provide for the payment of the remaining cost of the Society's new premises. On the recommendation of the Benevolent Fund Committee a grant of five pounds was made to the widow of a former member of the Society. This was the only application that had been received during the past month, and regret was expressed by the President that the resources of the Fund did not admit of a grant of £25, or even £50, instead of the meagre amount of £5, which was all that it could afford to give. The further consideration of the proposal to subscribe to some of the orphanage institutions, in order that nominations might be made, had been postponed in consequence of the absence of the Vice-President owing to illness. Mention was also made of a request that had been received from Mr. Woolley to call attention to the case of Thomas Ernest Taylor, the son of a commercial traveller connected with the trade who is, for the third time, a candidate for election to the Commercial Travellers' School, and is supported by many wholesale houses. Mr. Woolley's firm, in Manchester, has undertaken to receive proxies in favour of the case.

An application from the Midland Counties Chemists' Association for a grant was mentioned in the report of the Library, Museum, &c., Committee, as having been under consideration, and the conclusion had been arrived at that since the Association did not fulfil the conditions requisite a grant could not be made at present. This application appears to have been made under some misapprehension, and without regard to the fact that such grants are only made to associations which maintain an efficient school of pharmacy, which Mr. Southall said was not the case with the Birmingham Association. Some discussion arose as to the propriety of this limitation, but eventually it was shown to be strictly in accordance with the regulations that had been adopted in regard to this matter, which involve a very important principle. As regards Birmingham, the chief obstacle to the establishment of an efficient school appears to be the difficulty of obtaining students, and although there is a possibility of being able to arrange classes at Mason's College for pharmaceutical students, as has been done at Nottingham, and at the Durham College of Science in Newcastle, it has not hitherto been found practicable to carry out this plan, nor does it seem likely that such will be the case, until the introduction of the curriculum renders attendance at classes compulsory.

The report of the Law and Parliamentary Committee first referred to the subject of medicated wines, in regard to which the President has been in communication with the Board of Inland Revenue. In a letter received from the Secretary of the department it is stated that the Commissioners have no intention of interfering with the sale of *bonâ fide* medicated wines by chemists, either those included in the British Pharmacopœia or others which in the judgment of the Board are so far medicated as to be unfit for use as beverages. Within those limits no licence will be required. Thus, for instance, pepsin wine containing 320 grains of pepsin and 2 drachms of strong hydrochloric acid per pint, or coca wine containing half a grain of cocaine per fluid ounce, and made sufficiently unpalatable, may be sold without a licence. But the mere fact of wine being ordered by a medical man will not be held a sufficient ground for its sale without a licence, unless the above-mentioned conditions are also fulfilled to the satisfaction of the Inland Revenue authorities. The grant of a special licence for chemists, to meet the case of medicated wines, has been considered by the Board to be undesirable as well as impracticable; but with the declaration now made by the authorities as to the conditions under which

Third Series, No. 1024.

such wines may be sold, there does not appear to be any need for apprehending inconvenient interference with the business of chemists in this respect. The subject of the Patent Medicine Stamp Act has also been under consideration by the Committee, in consequence of the memorials received from the Durham and Northumberland chemists and from Exeter, but this matter has been postponed.

A draft Pharmacy Bill has been prepared by the Committee, and it was presented with the recommendation that it should be adopted by the Council. This Bill will be found on page 628 of the report. The discussion that took place on the President's motion that the recommendations of the Law and Parliamentary Committee be adopted had reference chiefly to the proposed Bill. A number of amendments were proposed and discussed very fully, with the general result that the draft Bill was approved, and the Committee was instructed to take the necessary steps to provide for its introduction into Parliament. With so full a report of the proceedings of the Council any summary of them would fail to satisfy the interest they may be expected to excite, but we cannot omit to direct the attention of our readers to the speech of the President, in which he explained the circumstances by which the Committee had been guided in the drafting of the Bill and the various considerations by which its deliberations had been influenced.

The remaining business of the Council meeting comprised the adoption of the Report of the Research Committee, which gave a satisfactory account of the work that has been carried on and is in progress in the Society's Research Laboratory and of the general beneficial influence that is being produced by this newly instituted department. On the motion of the President it was resolved to invite a number of pharmacists to form the committee for assisting the General Medical Council in the preparation of an addendum to the Pharmacopœia as that body has requested. The names of those selected for that purpose will be found at page 638, and while the selection has necessarily been subject to considerations of practicability in the formation of a working committee, it will, doubtless, be received as having secured good representatives of British Pharmacy.

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, at 17, Bloomsbury Square, on which occasion Professor Dunstan will read a communication from the Research Laboratory on the so-called Double Cyanide of Zinc and Mercury, which has recently been experimented with by Sir Joseph Lister in the preparation of antiseptic dressing. In addition the Curator will read some notes on recent donations to the Museum, the subjects being (1) *Kraussia coriacea*, a reputed poisonous Natal plant, with some remarks on its properties by Professor Cash; (2) Oil of Lavender, with some remarks on the cultivation of the plant and the distillation of the oil, by Mr. Sawer; and (3) *Cinnamomum Cassia*, with some information as to the collection of the bark from Mr. J. Humphreys.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 5, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

Messrs. Allen, Abraham, Atkins, Cross, Evans Gostling, Greenish, Hampson, Harrison, Hills, Leigh Martin, Martindale, Newsholme, Richardson, Robbins Schacht and Southall.

The minutes of the previous meeting were read and confirmed.

The PRESIDENT, on behalf of the Vice-President, expressed his regret at not being able to be present, this being the first time that he had ever been absent from the Council through ill-health. Mr. Watt also, he was sorry to say, was not well enough to travel.

BALLOT FOR RETIREMENT OF MEMBERS OF COUNCIL.

The lot having been taken in the usual manner, to determine the seven members of the Council who should retire in May next, the following names were drawn:—

Abraham.
Carteighe.
Greenish.
Hills.
Leigh.
Martin.
Schacht.

The following, who remained in by lot last year, retire by rotation.

Atkins.
Evans.
Gostling.
Hampson.
Harrison.*
Richardson.
Robbins.

The following seven remain in office another year:—

Allen.
Bottle.
Cross.
Martindale.
Newsholme.
Southall.
Watt.

The following, being duly registered as a pharmaceutical chemist, was granted a diploma stamped with the seal of the Society:—

Cowie, George.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemist.

The following, having passed the Major examination, and tendered his subscription for the current year, was elected a "Member" of the Society:—

Flint, Charles ....Bedford.

Chemist and Druggist.

The following, who was registered as being in business before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society:—

Nobbs, James William ....London.

ASSOCIATES IN BUSINESS.

The following having passed their respective examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Ballard, Walter ....London.
Cocker, Robert Benjamin......London.
Gale, William Wheatley ......Gateshead.
Jacks, Frederick..................Stone.
Maddock, Herbert ....Todmorden.
Newey, Frederick Albert ......York.
Rhodes, Alfred Barrett ....Manchester.
Rubbra, Francis Edmund......Crewkerne.
Wilkinson, Charles Edward ...Hemel Hempsted.

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* In place of Mr. Symes.

Modified.

Lawford, Charles William	Sheffield.

ASSOCIATES.

The following, having passed the Minor examination and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Allwood, William Smithurst	Mansfield.
Boucher, Charles Ernest	Bristol.
Brown, James Henry	Sudbury.
Clark, Alfred Turner Sims	London.
Emberton, Frederick Charles	Silverdale.
Harley, Thomas	Dundee.
Harris, Herbert	Kirton Lindsey.
Head, George	Bridgnorth.
Lyle, William	Rothesay.
Mallett, Henry Philip	Norwich.
Mawer, William Fred	Grimsby.
Plews, Harry William	Bedale.
Robertson, John Wright	Dundee.
Smith, Robert	Dundee.
Turner, John Wm. James	Sheffield.
Walker, Herbert	Nottingham.
Wrench, Frederick William	Silverdale.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Appleyard, Percy	Keighley.
Bray, George Thomas	Lincoln.
Campkin, Bernhard Sidney	Cambridge.
Clutterbuck, Charles	Nottingham.
Coker, Alfred P.	Stonehouse.
Coleman, Edgar Thomas	Northampton.
Coleman, John David	Cardiff.
Cooch, Wm. Albert Brooks	London.
Corrigall, Peter	Newcastle-on-Tyne.
Cross, Herbert Francis	Cambridge.
Davies, Evan James	Cardigan.
Edwards, Samuel	Godalming.
Gare, George Henry	Blandford.
Harding, Hy. James Cooper	Sudbury.
Hornby, Arthur Smith	Easingwold.
Joseph, Leopold	Cardiff.
Milton, William	Edinburgh.
Partridge, Charles Henry	Clifton.
Pate, Charles	Lincoln.
Pickard, Samuel Norman	Ossett.
Poole, Thomas Brice	Sawbridgeworth.
Sanderson, Joseph	Glasgow.
Sanford, Joseph Michael	Exeter.
Silversides, Richard B. Garbutt	Darlington.
Smith, Gilbert	London.
Stanley, John	Goole.
Taunton, Edgar	Sittingbourne.
Tiley, Arthur Percival	Frodsham.
Walton, Henry Egbert	Idle.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Thomas Davies, 9, Blackburne Place, Liverpool.
John Moore, 26, Varthen Street, Walton Breck Road, Everton, Liverpool.
John Robinson, Market Place, Beverley.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

REGISTRAR'S REPORT.

The Registrar laid on the table his report on the numerical strength of the Society, statistics of the examinations and the Registers.

The report is printed on pp. 624 and 625.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee submitted various accounts for payment, and also recommended that stock not exceeding £4500 be sold out, and that a sum not exceeding £1000 be paid to Messrs. Kirk and Randall during the month on the certificates of the Society's architect.

The **PRESIDENT**, in moving the adoption of the report and recommendations, said there was nothing calling for special notice in the receipts. The two special payments were the Fire Insurance policy for seven years, which had been effected on somewhat lower terms in consequence of a hydrant having been fixed at the back of the premises; and there was also the solicitor's bill for the half year. The sale of stock recommended would cover the whole expense of the contract for the new building.

In reply to questions, the **PRESIDENT** said there had been a larger number of prosecutions than usual during the past half-year. The amount already paid to the contractors for the new building was £3000; the total would be about £7500.

Mr. **EVANS** asked if it was intended to alter the windows of No. 17, Bloomsbury Square, to make them accord with the new building.

The **PRESIDENT** said when the new building was finished no doubt the question would be considered.

The report and recommendations were adopted unanimously.

BENEVOLENT FUND.

The report of this Committee recommended the following grant:—

£5 to the widow (age 64) of a former associate and member from 1841 to 1863. Applicant is an invalid and has no friends able to assist her. She had a previous grant in 1888.

The **TREASURER**, in moving the adoption of the report, remarked that while at the January Council meeting there were a large number of cases submitted and nearly £80 was granted, there had been only one application during the past month, a circumstance which he never remembered to have occurred before. It was very pleasing to the Committee to have so little to do, and he hoped the same state of things might continue. Owing to the absence of the Vice-President, it had been thought better to defer the consideration of the proposal to subscribe to some of the orphan institutions in order that nominations might be made.

The **PRESIDENT** said he feared the Treasurer's hopes would be disappointed, and he was quite sure the Committee was not desirous of shirking the work which came upon it. He hoped the members would continue to furnish it with funds to an even greater extent than heretofore, for the relief of distress. Apart altogether from the number of cases there was not enough to give away. What was £5 to the widow of one who had belonged to the ranks of pharmacy? They ought to be able to give £25, or even £50 in some cases, in order to give the applicants a start. Although there had been only one application this month, he had no doubt there would be many more coming forward.

Mr. **HAMPSON** said the Committee would be very glad to have sufficient funds to make larger grants. It was a mere accident that only one application had been received this month, and he was quite sure that the Fund would still require all the assistance that friends could give it.

The motion was carried unanimously.

REGISTRAR'S REPORT.

MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1889.

	Life Members.		Subscribing Members.		Associates in Business.	Associates not in Business.	Apprentices
	Pharmaceutical Chemists.	Chemists & Druggists.	Pharmaceutical Chemists.	Chemists & Druggists.			
Number in 1888	209	2	1473	641	1281	...	...
„ restored, 1889 ...	1	...	5	...	3	...	...
„ elected, 1889 ...	...	...	73	9	94	...	...
	210	2	1551	650	1378	...	...
Deaths, Secessions, etc. ...	4	...	92	42	152	...	...
Total Strength of the Society	**206**	**2**	**1459**	**608**	**1226**	**920**	**908**
Summary:—							
1888	209	2	1473	641	1281	941	1023
1889	206	2	1459	608	1226	920	908
Increase	...	...	...	...	...	...	...
Decrease	3	...	14	33	55	21	115

COMPARATIVE STATEMENT OF THE NUMERICAL STRENGTH OF THE SOCIETY FOR 5 YEARS: 1885-89.

MEMBERS.—PHARMACEUTICAL CHEMISTS.

	1885	1886	1887	1888	1889
Restored to Membership ...	8	2	4	2	5
Elected „ ...	50	44	57	55	73
(Total additions) ...	58	46	61	57	78
Deaths, Secessions, etc. ...	91	88	88	99	92
Decrease ...	33	42	27	42	14
Total Number of Subscribing Members	**1584**	**1542**	**1515**	**1473**	**1459**

MEMBERS.—CHEMISTS AND DRUGGISTS.

	1885	1886	1887	1888	1889
Restored to Membership ...	6	2	1	3	...
Elected „ ...	8	6	9	8	9
(Total additions) ...	14	8	10	11	9
Deaths, Secessions, etc. ...	29	40	40	32	42
Decrease ...	15	32	30	21	33
Total Number of Subscribing Members	**724**	**692**	**662**	**641**	**608**

ASSOCIATES IN BUSINESS.

	1885	1886	1887	1888	1889
Restored	8	5	3	8	3
Elected	113	121	100	130	94
(Total additions) ...	121	126	103	138	97
Deaths, Secessions, etc. ...	94	106	114	127	152
Increase ...	27	20	...	11	...
Decrease ...	...	...	11	...	55
Total Number of Associates in Business	**1261**	**1281**	**1270**	**1281**	**1226**

ASSOCIATES NOT IN BUSINESS.

	1885	1886	1887	1888	1889
Increase ...	53	12	7	35	...
Decrease ...	...	...	...	...	21
Total Number of Associates not in Business	**887**	**899**	**906**	**941**	**920**

APPRENTICES OR STUDENTS.

	1885	1886	1887	1888	1889
Increase ...	64	...	...	...	...
Decrease ...	...	26	69	102	115
Total Number of Apprentices or Students	**1220**	**1194**	**1125**	**1023**	**908**

LIFE MEMBERS.

	1885.	1886.	1887.	1888.	1889.
Pharmaceutical Chemists	**225**	**216**	**211**	**209**	**206**
Decrease	3	9	5	2	3
Chemists and Druggists	**2**	**2**	**2**	**2**	**2**

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1889.

FIRST OR PRELIMINARY EXAMINATION.

Number of Candidates during the Year.	Number of successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average number of Candidates at each Examination.	Average number of Rejections at each Examination.	Percentage of Rejections.
1351	659	692	4	337·75	173·00	51·22

Number of Certificates received in lieu of the Preliminary Examination ... 62

MAJOR, MINOR, AND MODIFIED EXAMINATIONS.

ENGLAND AND WALES.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations 30
Average attendance of the Members of the Board of Examiners at each meeting ... ... 15·90

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of rejections at each Meeting.	Percentage of Rejections.
Major	129	76	53	6	21·50	8·83	41·08
Minor	793	313	480	6	132·16	80·00	60·53
Modified	2	0	2	2	1·00	1·00	100·00

SCOTLAND.

Number of days on which the Board met for conducting the Major, Minor and Modified Examinations 18
Average attendance of the Members of the Board of Examiners at each Meeting ... ... 8·16

Examinations.	Number of Candidates during the Year.	Number of successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of rejections at each Meeting.	Percentage of Rejections.
Major............	9	6	3	4	2·25	0·75	33·33
Minor......... ...	220	126	94	4	55·00	23·50	42·72
Modified	3	3	0	3	1·00	0·00	0·00

THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS, 1889.

Additions during the year:—

Number of persons who have passed the—	
Modified Examination	3
Minor „	439
Major „ 82*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868	3
Number of persons restored to the Register on payment of a fine	25
	470

Erasures during the year:—

Deaths:—	
Notices from Registrars	152
Other sources	46
Erased at the request of registered persons themselves	4
Increase of numbers on the Register	268
	470

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* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Number of Pharmaceutical Chemists on the Register, December 31st, 1889	2,186	
„ Chemists and Druggists	11,894	
		14,080

Commercial Travellers' School.

The **President** said he had received a request from Mr. Woolley, of Manchester, to call attention to the case of Thomas Ernest Taylor, of Manchester, age 9, who was for the third time a candidate for election to the Commercial Travellers' School. His father was connected with the trade, and was well known in the north of England, and the case was supported by many wholesale houses. Proxies would be received by Mr. Woolley's firm in Manchester, and he hoped their friends would bear it in mind.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
December	Day . .	584	38	3	25
	Evening .	156	17	7	10
Year 1889	Day . .	6075	42	0	21
	Evening .	2017	21	1	10

Circulation of books.	Total.	Town.	Country.	Carriage paid.
December . .	185	91	94	£1 8 4
Year 1889 . .	3275	1731	1544	£20 5 7½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Year-Book of Pharmacy, 1889 (3 copies).
From the **British Pharmaceutical Conference** (2).
From Mr. **R. Bremridge** (1).

Catalogue of the Guildhall Library of the City of London, 1889. From the **Library Committee of the Corporation.**

Philosophical Society of Glasgow, Proceedings, vol. 20. From the **Society.**

U. S. Department of Agriculture, Division of Chemistry, Bulletin, no. 4, no. 13, pts. 1–3, nos. 22–23.
From the **Department.**

Wiley (H. W.), Influence of Food, Animal Idiosyncrasy and Breed on the Composition of Butter, 1889.

— Composition of Sorghum Seed, with reference to its Feeding Value, 1889. From the **Author.**

Whiteaves (J. F.), Contributions to Canadian Palæontology, vol. 1, pt. 1, 1885.
From the **Geological and Natural History Survey of Canada.**

Flückiger (F. A.), Osterferien im Süden, 1889.
From the **Author.**

École supérieure de pharmacie de Paris, Séance solennelle de rentrée et distribution des prix, 1889. From the **École.**

West (W.), The Freshwater Algæ of Maine, 1889.

— The Freshwater Algæ of North Yorkshire, 1889.
From the **Author.**

For the Library in Edinburgh—

Royal Society of Edinburgh, Proceedings, vol. 15 and six parts of vol. 16. From the **Society.**

Ure, Dictionary of Chemistry, 2nd ed., 1830.
From Mr. **George Coull.**

The Committee recommended that the undermentioned work be purchased for the Library in London:—

Thorpe, Dictionary of Applied Chemistry, 3 vols.

Museum.

The Curator's report had been received, and included following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
December.	Morning	365	26	1	15
	Evening	79	12	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of titanium trioxide.
From Messrs. A. J. **Simons** and A. C. **Scrivener.**

Specimens of *Aquilaria grandiflora*, Benth., and of a section of the stem.
From Mr. C. **Ford**, Hong Kong.

Specimen of a new Sandal wood from South America. From Mr. T. **Horne Redwood.**

Specimen of "Mussænda Coffee" seed.
From Professor **Dunstan.**

Specimen of rhizome of *Scopola carniolica.*
From Mr. F. **Ransom.**

Specimen of root of *Scopola lurida.*
From Mr. R. **Lindsay**, Edinburgh.

Specimen of rhizome of *Scopola Hladnikiana.*
From Professor **Goebel**, Marburg.

To the Herbarium—

Eighteen specimens of rare British plants.
From Mr. G. C. **Druce.**

Botanical Description of the Sumatra Benzoin Tree. By J. Dryaender (apparently Sir J. J. Banks' copy). From Mr. T. B. **Groves.**

The Staff of the School (except Professor Attfield, who was unable to attend through illness) had attended and reported on their respective classes.

The application from the Midland Counties Chemists' Association for a grant had been further considered, and after full discussion the Committee had arrived at the conclusion that the Association did not at present fulfill the required conditions, and that a grant could not therefore be made.

The **President**, in moving the adoption of the report, said there was very little to refer to specially. With respect to the Midland Counties Chemists' Association, which had applied for a grant two months ago, the Committee had considered the matter on three occasions, and it ultimately appeared that the association was under some misapprehension in making the application, because on referring to the regulations under which grants were made, it would be found that they could only be made to schools of pharmacy, and at present the association in question had no such a school. Whether it was desirable to aid local associations in forming libraries was another question, but this being an application for books for a library for the use of the members, not for a school of pharmacy, it was clearly outside the conditions. He understood there was some disposition to consider the propriety of starting a school in connection with Mason's College, or otherwise, and if the members of the association in Birmingham were desirous of really having a good school of pharmacy, and made an effort in that direction, and then sent an application later on when their programme was more advanced, no doubt the Council would be glad to render assistance.

Mr. **Southall** said he thought the Midland Association was under a little misapprehension when it applied for the grant. It was certainly not educating the rising generation, but the idea was to keep up the education of those already educated, and in order to do so to improve the library. Of course if grants had not been made for that purpose before they had no right to expect one in Birmingham.

Mr. **Schacht** said he did not dispute the President's statement as to the conditions on which grants were made, but that was not the impression present in his mind. He thought grants had been made to local associations where there was no organized school; for instance, in his own neighbourhood they had, partly through the generosity of the Council, a very nice library and collection of materia medica, and although no doubt it was professed that it should be mainly used by young men engaged in pharmacy, it really was in possession of the pharmacists themselves of the locality.

The President said he thought there was a school when the grant was made.

Mr. Schacht said there was an organization which aimed to help young men to attend lectures, but there was no regular organized school. There was never anything more than an organization which encouraged young men belonging rather to the neighbourhood than to chemists to attend lectures.

The President said it was clearly one of the conditions. In fact, the form of application was so headed, "Grants in aid of provincial schools of pharmacy." It might be that the grant was made to Bristol before that resolution was passed, but he was under the impression that Mr. Schacht was the chief draftsman of the regulations. He himself was not on the Council at the time.

Mr. Schacht said there was no doubt the intention was to aid schools and to encourage their formation, but he had forgotten that it was a *sine quâ non* that there should be a school.

Mr. Martin said the whole of the requirements were drawn with that view.

The President read the following extract from the conditions for making grants, which was printed on the form of application:—"The relative claim of any town to receive aid from the Society must be indicated by the earnestness and efficiency of local effort. A complete curriculum of chemistry, practical chemistry, materia medica, pharmacy, and botany is the standard to be aimed at."

Mr. Hampson said a very important principle was involved in this question.

The President said it was no doubt a distinct question, how far grants should be made to local associations, but there certainly would be a considerable difference of opinion on that point. They were all agreed on promoting the efficiency of education, wherever there was any attempt to provide it, but the question of assisting libraries was a different matter, and in that case there should at any rate be a strenuous local effort, he thought, before grants were made by the Society.

Mr. Schacht asked if any grant had been made to Birmingham before.

The President said there had been no other application in recent years.

Mr. Southall said many attempts had been made to establish a school at Birmingham, but had not succeeded.

Mr. Hampson presumed if the friends at Birmingham were able to establish classes in connection with Mason's College, the Council would not object to vote a sum of money to establish a library for the use of the students. The application would then come before the Council in a different shape.

Mr. Richardson said he should be sorry to discourage any assistance being given to local associations and local schools. There were many places in the country which could not boast of medical schools like those at Birmingham, Sheffield, Leeds, and other large centres; but wherever there was any school where chemistry was taught it would be a great advantage if the chemists in the neighbourhood could be assisted, not so much in the way of lectures as in the way of teaching. He thought the Council should not be too straight-laced in requiring evidence of high education. If there were any method of teaching which was effectively assisted by the local people the Council would be justified in assisting them to help themselves.

Mr. Leigh thought the restriction was rather too severe, because there were comparatively few towns where a proper curriculum could be pursued, but there were a large number of small towns where perhaps one chemist of public spirit drew around him a few apprentices to aid them in their studies, and if such a person had a grant of materia medica specimens on loan for a year or two it would help him greatly in his efforts.

Mr. Schacht asked if it would be admitted a justification for an application if a certain number of pharmacists contributed to the funds of an educational establishment in their locality where good chemical and botanical teaching could be obtained, because that really was the case at Bristol. There was there formerly what, for want of a better term, was called a school of pharmacy, but in reality young men were induced to attend certain classes and lectures in connection with the science and art department. But since then it had been found that a better education was offered in the same sciences at University College, and the local association kept its books in one of the rooms of the College and met there, giving a subscription of so many guineas a year. He could hardly say that that was a Bristol school of pharmacy, but still it was an organization for assisting the young men in the neighbourhood to become qualified.

The President said that was really providing educational facilities, although it was not done directly. The same thing occurred at Nottingham, where a grant had been made, the University College there providing a special class, as was done at Newcastle, for pharmaceutical students to learn chemistry and botany; but of course colleges like that could not be expected to go very far out of their way to teach technical subjects, and therefore specimens and apparatus were wanted which were kept in one of the rooms. There was therefore associated with the University College of Nottingham, and under the auspices of the local association, a complete school of pharmacy, but that was not so in Birmingham.

Mr. Martin said he did not rise to defend the grant kindly made to Newcastle, or to explain that there was practically a department of pharmacy in connection with the Durham College of Science, but to ask whether the discussion had not strayed a little beyond its due limits. If it were intended to widen the scope of these grants he thought notice of motion should be given, and the matter should be discussed formally.

Mr. Allen thought the remarks which had fallen from Mr. Leigh called for some reply. He had spoken of the advisability of lending specimens of materia medica to different associations, but the application under discussion was distinctly for money, and on that ground was refused. The Council had always been liberal in granting specimens of materia medica to associations, not only on loan, but as donations. Such applications were very carefully considered, and were usually granted.

Mr. Southall said there were good classes for chemistry and botany at Birmingham, and if a young man came to him for advice he always told him to attend those classes and finish off at Bloomsbury Square. The Birmingham chemists subscribed to Mason's College, and in some little way assisted the students, but did not do very much. If they could get a sufficient number of students, no doubt they would be able to form classes for other subjects at Mason's College, but they had not found it possible to do this, and he feared they would not until a curriculum was introduced.

Mr. Evans remarked that under the Technical Instruction Act recently passed there would be laboratories connected with every technical school all over the country, which would afford additional facilities for the study of chemistry. These schools would be springing up everywhere; he believed there was going to be one in the town of Llanelly, and if grants were to be made to schools all over the country he should advise the people there to put in a claim.

The motion for the adoption of the report was then put and carried unanimously.

LAW AND PARLIAMENTARY.

At the meeting of this Committee the President had reported the result of an interview he had had with the Inland Revenue authorities on the subject of medicated wines, and the following correspondence on the subject had been read:—

"Robert Micks, Esq.,
"Inland Revenue, Excise Department,
"Somerset House, W.C.

"*January* 2, 1890.

"Dear Sir,—I am instructed by the Pharmaceutical Society of Great Britain to ascertain the views of the Board of Inland Revenue as to the conditions under which chemists may sell medicated wines, such as pepsin or coca, without infringing the law, and I shall be obliged if you will give me the information desired.

"I am, dear Sir, yours faithfully,
(Signed) "M. Carteighe, *President*."

Inland Revenue,
"Somerset House, London, W.C.
"*January* 8, 1890.

"Sir,—In reply to your letter dated the 2nd instant, I am desired by the Commissioners of Inland Revenue to acquaint you that they do not interfere with the sale by chemists without licence of the *bonâ-fide* medicated wines mentioned in the British Pharmacopœia, nor with the sale of any other wines which, in the opinion of the Board, are so far medicated as to be unfitted for use as a beverage.

"I am also to observe that, with reference to the special wines mentioned, the Board have not required a licence for pepsin wine when it contained 320 grains of pepsin and 2 drachms of strong hydrochloric acid per pint, nor for coca wine when it was made sufficiently unpalatable by being prepared from the leaves and contained not less than half a grain of the alkaloid cocaine per fluid ounce.

"I am, Sir, your obedient servant,
"Robert Micks, *Secretary*.

"M. Carteighe, Esq."

The memorials from the Durham and Northumberland chemists, and a similar one from Exeter, on the subject of the Medicine Stamp Act, had been discussed and the further consideration deferred.

The draft Pharmacy Bill had been considered, and was recommended for adoption by the Council in the following form:—

Pharmacy Bill.

1. In this Act—

The term Pharmacy Acts shall mean the Pharmacy Act, 1852; the Pharmacy Act, 1868; and the Pharmacy Act (1868) Amendment Act, 1869.

The term Pharmaceutical Chemist shall mean a person registered under that title under the provisions of the Pharmacy Act, 1852.

The term Chemist and Druggist shall mean a person registered under that title under the provisions of the Pharmacy Act, 1868.

2. The powers of the Pharmacy Acts with respect to examinations required for obtaining certificates of qualification under the said Acts, or either of them, shall be extended so as to allow of the division of the said examinations into preliminary and other parts of the same; also to allow of or require periods of time and courses of in- ction between any of the said parts, and to require persons presenting themselves for the final part of an examination shall have deposited with the Registrar under the said Acts certificates of their having duly attended courses of instruction in chemistry, botany and materia medica, and having for not less than three years in the whole served in the open shops of Pharmaceutical Chemists or Chemists and Druggists or in public hospitals or dispensaries as apprentices or pupils of persons qualified in accordance with the law of the country in which they are carrying on business to practise pharmacy in that country.

3. It shall be lawful for the Pharmaceutical Society of Great Britain from time to time by byelaws, duly confirmed by the Privy Council, to regulate the said division of examinations and also the said periods of time and study between any of the said parts; also to allow and provide for and to regulate the reception of certificates issued by other examining bodies in lieu of or so as to satisfy the examiners in lieu of the preliminary part of any examination; also to provide for and to regulate the courses of instruction in chemistry, botany and materia medica, to be duly attended as aforesaid; also to provide for and to regulate the forms of certificates to be for any purpose of this Act deposited with the said Registrar; and also to provide for and to regulate the notices to be given and fees to be paid by persons intending to present themselves for examination in any part of an examination or desiring any registration under the said Acts or either of them.

4. Sections 18, 19 and 20 of the Pharmacy Act, 1868, are hereby repealed.

5. Every person who has obtained or who shall obtain registration as a chemist and druggist, and being in business on his own account, shall be eligible to be elected a member of the Pharmaceutical Society of Great Britain according to the bye-laws thereof, but no person shall in right of membership acquired pursuant to this clause be placed on the Register of Pharmaceutical Chemists, and the Council of the said Society shall not at any time contain more than ten members who are not on the Register of Pharmaceutical Chemists.

6. It shall be unlawful for any person to compound or to keep open shop for compounding medical prescriptions, unless he be a pharmaceutical chemist or chemist and druggist, or a medical practitioner entitled to and acting within the exemptions concerning certain medical practitioners made by the Pharmacy Acts, or entitled to and acting within the exemption concerning certain executors, administrators, and trustees, made by section 16 of the Pharmacy Act, 1868. Provided nevertheless that nothing in this section contained shall extend to or interfere with any person registered in accordance with the provisions of the Veterinary Surgeons Act, 1881, or holding a certificate in veterinary surgery from the Highland and Agricultural Society in Scotland, in dispensing medicines for animals under his care.

7. Every person acting in contravention of the preceding section numbered 6, shall for each contravention be liable to pay a penalty of £5, and the said penalties of £5 may be sued for and recovered in the manner provided by the Pharmacy Act, 1852, for the recovery of penalties under that Act, and all and every sum and sums of money which shall arise from any penalties so recovered for offences incurred under this Act, or under the Pharmacy Act, 1852, or under section 15 of the Pharmacy Act, 1868, shall be paid to the Treasurer of the Pharmaceutical Society of Great Britain, and shall by him be applied to the purposes of the said Acts, and this Act or either of them. And in any action or proceeding for the recovery of any penalty directed to be sued for by the Registrar of the Society in the name and by the authority of the Council of the said

Society, the name of the said Society alone may be used, and it shall not be necessary to give evidence of the appointment of the said Registrar, or of the authority of the said Council.

8. This Act shall not extend to Ireland.

9. This Act may be cited for all purposes as the Pharmacy Acts Amendment Act, 1890, and shall be construed as one with the Pharmacy Act, 1852, the Pharmacy Act, 1868, and the Pharmacy Act (1868) Amendment Act, 1869, and shall come into operation on the first day of January, one thousand eight hundred and ninety one, but no bye-law for the purposes authorized by sections 1 and 2 of this Act shall come into operation prior to the first day of January, one thousand eight hundred and ninety-four.

The above report having been read,

Mr. SCHACHT asked whether it was not usual when a motion had been made and seconded in committee to record it on the minutes, if it had not been passed.

The PRESIDENT said it was not usual to do so.

Mr. SCHACHT said he wished the motion which he had made to be recorded, or he should have to make some motion or should have to move an amendment in Council.

The PRESIDENT said Mr. Schacht's proposition at the Committee on the previous meeting was to add something to the Bill, and the difficulty was that there were several other suggestions made which were not carried, and it would be very irregular if they were all recorded.

Mr. MARTIN remarked that one gentleman seconded a motion *pro formâ* for the sake of discussion, when he would not have done so in open Council.

Mr. HILLS did not see why an exception should be made in one instance to the general practice.

After some further discussion on this point,

The PRESIDENT said he thought it would be better to adhere to the usual course, and allow the minutes to remain as they were, leaving Mr. Schacht to move an amendment in Council later on, if he thought fit. He had now to move the formal resolution:—

> "That the reports and recommendations of the Law and Parliamentary Committee of December 10, Jan. 7, and Feb. 4 be received and adopted."

Those minutes embraced the consideration of wine licences, as applied to medicated wines, and also the consideration of the memorials on the patent medicine question. The consideration of the latter, however, had been further postponed. The question of the sale of medicated wines was fairly well met by the correspondence which had been read, but he might add that he had had an opportunity of seeing the authorities at Somerset House, and there was a distinct statement that a wine which was *bonâ fide* medicinal would not be interfered with. On the other hand the authorities could not accept the statement which was so often made that when a beverage was ordered by a medical man chemists should necessarily supply it. They reminded him that a medical man sometimes ordered brandy, but it could not be expected that the pharmaceutical chemist should supply that article. If he chose to take out licences he could also dispense brandy or wine. The further question was raised, which had often been raised, as to how far it was possible or practical to grant a special licence to chemists and druggists. He would say nothing about the expediency of that from the chemist's point of view, but it had been carefully considered by the excise authorities, and the conclusion arrived at was that it was not practicable to have more than one licence. He should be very sorry to see the pharmacists of this country converted into a class of drug sellers, of which there were many in the United States who made medicinal wines and spirits a prominent feature in their advertisements. He had lately seen an instance in an advertisement issued by a firm in an important city. The Committee had also had to consider the resolution moved by Mr. Hampson in November last that steps be taken to draft a Pharmacy Bill, with the instruction that certain additions, if it were thought expedient, should be made to what had been called the Curriculum Bill of the last three years, and as the result of its deliberations the present draft Bill was presented. It contained provisions substantially the same as in former Bills, providing for a curriculum and a division of the examinations. Those were two points. It was not strictly true to call it a Curriculum Bill. It was a Bill empowering the Council not only to impose conditions of education, but also to divide the examinations, and that of itself would be a great advantage, even apart from the curriculum. It had always been admitted that it would be a great gain if the Preliminary examination could be passed early in life. If the Council had had the power of prescribing an interval of three years between the Preliminary and the time when the candidate presented himself for the Minor, it would prevent waste of time on the part of the apprentice and would overcome many practical difficulties. Whatever was thought about the curriculum by members of the trade and of the Society who were unsympathetic with those who were supposed to be rabid about education, he hoped they would see there was something in the powers now asked for with regard to dividing the examination which was for their good, and which was almost necessary in order that there should be something like fairness to the candidates. It had been shown over and over again that it was too much to ask a man to be examined in half a dozen important subjects at one sitting; it would be infinitely better to divide the examination and give him something to work for during his apprenticeship; let him pass an examination during that time on certain subjects, and then let him come up at the end of the term for the qualifying examination. The next clause of importance had reference to the status of members of the Society. At present, there were three important classes of men connected with the Society. First, the pharmaceutical chemist members, whether in business or not; secondly, chemists and druggists who were registered by virtue of having been in business before the passing of the Act of 1868, who were also members, and who were called chemist and druggist members; thirdly, the class of examined men who had passed the Minor, who were on the register not by virtue of being in business before 1868, but who had been registered since as having passed the Minor. These men when they went into business had become eligible to be made associates in business of the Society, and to have all the privileges of members, but they had not the same title nor eligibility to a seat on the Council. The proposal was that in future all those engaged in the great commonwealth of pharmacy, when once in business, should join hands inside the Society, so that no question of accident, which often prevented a man going up for the Major examination, should prevent his becoming a full member of the Pharmaceutical Society. It was therefore proposed that every person who passed the Minor after a given date, should upon going into business be eligible for becoming a member of the Society. It was not proposed that as soon as a man had passed the Minor he should be eligible, because it was found on going into statistics and on gathering information that a large number of young men much preferred to be associates for a period, and it would unavoidably cut out that intermediate grade of associates, which was extremely useful, especially to those young men who passed their examination early, say at twenty-one, and did not go into business until they were twenty-five. It was a gain to the Society that such a man should be attached to it as an associate, and it would be a pity to alter the conditions under which he was so attached, but directly he went into the business he was to be eligible to become a member with all the privileges of membership. One of the restrictions of the Act of 1868 was that whilst chemists and druggists who became members by virtue of having been in business should have votes and all the privileges of pharmaceutical chemist members in most respects, it was defined that not more than seven should sit on the Council; it was now proposed to repeal that clause and allow it to stand that not more than half the members of the Council should belong to the class of members who were not pharmaceutical chemists, which would really place the two branches of the Society on a perfectly equal footing politically. The proposition had been made for abolishing the title of chemist and druggist altogether and making every qualified man a pharmaceutical chemist, and there were many reasons in favour of the idea, but it was felt to be difficult to deal with that by statute, and even if Parliament agreed that it was right to abolish the title of chemist and druggist the public would probably continue to use that name, which was extremely well known, and would be as difficult to eradicate from the minds of the public as the old pound was in France, although the metric system had long been the only legal system of weights and measures. It was also felt by a number of men, not only on the Council, but in the Society, that it was a distinct advantage to have two grades; that the title of pharmaceutical chemist should remain as it was, advancing the qualification perhaps from time to time proportionably with the general education of the country, so that it should be a sort of honours examination, and that to have only one grade of dispensers of medicines was not on the whole desirable to recommend to Parliament. It was proposed, therefore, to perpetuate the two classes of registered persons; the registered chemist and druggist, or Minor man, would be debarred from calling himself a pharmaceutical chemist, but he would be able to be a member of the Society and possess the same privileges. Then came an addition to the Bill, which might be said to be more directly in the interest of the public, and that was a provision that only persons who were registered should be entitled to compound and keep open shop for the compounding of medical prescriptions. A clause to this effect was in the existing Irish Pharmacy Act, and it seemed not an unfair thing to ask. Of course it might be said, as Mr. Proctor had said, that no one would get very enthusiastic about it. He feared that many of their friends did not get very enthusiastic about any of the propositions which were made. It was very difficult indeed to draft a Bill which would do any material good within a short space of time. In this, as in all other matters, the Committee thought it better to proceed with caution, and he was not without some doubt whether this clause being inserted in the Bill might not be a serious impediment, and lead to more serious blocking of the Bill than it had hitherto had to encounter. With regard to the curriculum members must bear in mind that it was very easy to draft a Bill and discuss it, and some members seemed to think when it had been discussed there it was law, but unfortunately the Council had not that power. It had to go to Parliament, and it was requisite to persuade the members who were to back the Bill that what was asked for was something reasonable and in the public interest. It was also necessary to go to the Government department and convince it that the Bill was in the public interest. If that were done the members of Parliament would undertake to support a proper Bill, but no member of either House would risk his reputation by taking up a Bill on what was called a private matter unless the Government department which was concerned with the particular subject that required legislation distinctly approved every part of the Bill. He was quite sure that the members desired to see things clearly. He would not treat them as politicians treated public meetings, attempting to throw dust in their eyes and making vague promises which could not be carried out. There were certain things which could not be done. But, on the other hand, there were certain Bills which might be converted into Acts of Parliament by the Society under favourable conditions, viz., if they could get the assent of Government to the proposition and the support of well known men in Parliament, and lastly, which was not the least important, if they could get a portion of the time of the House of Commons. Having regard to all these conditions, he ventured to put it to the Council and the Society at large, who were constantly calling out for further legislation, to consider what had to be faced, and whether they would be content with modest slices of legislation which were distinctly beneficial to the public and not unsatisfactory to the trade, or whether they would adopt the rôle of conjurors and actors and prepare Bills making it unlawful for any corporation to sell poisons or dispense medicines and let them lie on the table of the Pharmaceutical Society to be brought up every year for discussion. It was time to say emphatically that that Council had a reputation and a history. It had its dignity, and the dignity of the craft to consider, and it must not allow those who did not know the whole of the surroundings of pharmaceutical politics to bring forward or support propositions which were held by their best friends in Parliament to be absolutely hopeless. This Bill did not contain substantially anything more than he had said. It did not contain a provision for restricting the sale of poisonous patent medicines to registered persons. He would it were possible that it should, and he thought it was a great mistake on the part of the Government that it did not see the matter in the same light as he did; but Government, like individuals, had to look at the opposition they might have to contend with, and the authorities had told him emphatically, both in writing and otherwise, that they did not think it necessary to place poisonous patent medicines within the purview of the Pharmacy Bill, and all that they were concerned about was certain regulations as to labelling. That was the view which prevailed at the Privy Council amongst men who were not party politicians, but took a calm view of the matter; they had said distinctly that placing patent medicines within the purview of the Pharmacy Act was not necessary for the public welfare. Whether that was the effect produced on them by other people, he could not say, but that was the view they entertained. Again, some six years ago, a Bill proposed dealing with corporations and bogus companies, which probably no one knew much more about than he did. From the very first passage of the Pharmacy Act in 1868 he had been kept advised on these matters, and had been consulted, even when not upon the Council, with regard to this difficult and troublesome question, and he had been entrusted during some years with special cases of prosecution in which these bogus companies had been concerned, and no one knew more the injustice to the public as well as to the craft which was perpetrated by this class of company. They were all agreed about that. It might be perfectly right for associations to dispense poisonous medicines amongst their own members; in that way they practically contracted themselves out of the Pharmacy Act; they were not selling in the ordinary sense, they were only supplying their own members. But when the Council found, say, in a great town in the midlands, a man who had no more legal qualification than a huckster keeping to all intents and purposes a druggist's shop, and selling and dispensing medicines with poison, it looked with astonishment, and cautioned him. He perhaps would write back to say that he was sorry for having broken the law, and would not do anything of the sort in future if it were looked over this time. But his mode of reformation was to form himself into a company with six of his friends, and then to proceed himself, with his own hands, with the dispensing and compounding of the poisons about which he had previously been cautioned. In such cases the Council proceeded against the individual, and he did not deserve much sympathy, although he had to pay £25 for the offence. The fact that so many of these cases came before the Council, and had to be dealt with sometimes by himself during the intervals between the meetings of the Council, had given him more knowledge about these companies than had fallen to the lot of many of his colleagues, and therefore it was not a case of not being willing to act, it was really a case of *non possumus*. The whole difficulty lay in the law of limited liability itself. It was in a certain sense immaterial, but it was never intended to be worked as it had been; on the other hand it had done much good in other ways. It had put money into the pockets of so many individuals, legislators and others, that any attempt to touch a co-operative organization that was called a company was looked upon with very great suspicion. It was not intended that in the case of any trade, to say nothing of a profession like pharmacy, seven persons should be absolutely limited as to capital and responsibility, while the individual next door, the chemist and druggist or the grocer, was unlimited and liable to the uttermost farthing. It was not fair; it was not really free trade, and he did not think the Legislature ever foresaw that the principle of limited liability would be applied to such cases. But unfortunately they knew from the efforts they had made with regard to a proposed amendment of the limited liability Acts how difficult it was to deal with such bogus companies without interfering with those rightfully formed. Those who had been consulted, lawyers and prominent men in both Houses of Parliament, seemed to say that there was no hope in this direction, and that the only hope rested in what might be called the qualification of the seller or manager; that as long as there was in the case of a company a qualified man in the shop, himself making the sales, or directing the sales, or compounding, just as a principal did in the ordinary way, the law could not interfere. When he had pressed this point, for he had spent a good deal of time in the lobby of the House of Commons during the last four years, he was emphatically told that there was not the slightest hope. Even the present Lord Chancellor, who was heartily in sympathy with them, and regarded it as a gross thing that bogus companies should be formed in this way, said plainly that in the present state of public opinion there was not the slightest hope in the House of Commons. When these views were held by all their best friends, was it dignified or consistent with the reputation of the Society to propose to go to Parliament to ask for interference with these companies? He submitted it was not, and the Committee also submitted that it was not desirable, and therefore, if in a certain sense the sensibilities of their members were offended by what were called drastic measures not being proposed, or clauses which would limit the sale of drugs to registered persons, it was simply because it was of no use to do so. It was important that in proposing the adoption of the report and the acceptance of a Bill of this sort the Council should firmly but kindly explain the position. His own personal popularity was not of the slightest consequence, but he was very anxious that the good name of the body with which he had been so long associated and its reputation for common sense should not be diminished amongst educated men and legislators, and possibly amongst future ministers of State, and for these reasons he asked the members to be chary in proposing measures which could not but make them the laughing-stock of the intelligent people to whom they had to go for support. In conclusion he should say that Mr. Watt, who was unable to be present, had sent down an amendment on this particular question, to which the Committee had given the most careful consideration. The subject had been discussed over and over again in various phases, so that the simple record on the minutes did not at all represent the hours and days of labour which had been devoted to it. It was only fair to Mr. Watt to say that his communication had been considered in all its bearings, but the Committee was not able to recommend that the clause suggested should be added to the Bill. Probably if Mr. Watt had been present he would have moved an amendment and made some observations upon it, and they would all, therefore, regret his absence; but the proposition had been considered, and he hoped that whatever resolution might be come to that day it would be the unanimous vote of the Council. When the draft Bill was agreed to it would be the duty of the Committee to introduce it into Parliament, and then someone would have to go and see members and satisfy them that he was not trying to do what some men did, namely, to diddle the average members of Parliament. He would have to show that the Council which he represented was perfectly fair and honourable in its propositions, and above all he would be obliged to say at once that in these propositions there was nothing detrimental to the public, and nothing claiming for the Pharmaceutical Society privileges which could be in any way considered contrary to the public interest. In conclusion he begged to move the adoption of the Report.

Mr. HAMPSON said after the exhaustive and able speech of the President he had very little to say, but he felt a very great interest in the Bill now presented for the sanction of the Council, and would like if possible to emphasize the remarks of the President with regard to the difficulties of passing a measure at all. Ordinarily public Bills passed as the result of an outside impetus; they were national Bills affecting a national interest, or else they were Bills promoted by a Government department. Such Bills generally passed easily, although there might be a conflict over them, but this Bill occupied a very different position. It was a Bill which was not yet demanded by outsiders; the electors were not knocking at their doors demanding such a Bill; but at the same time the Council might fairly ask the House of Commons to pass it, because he conceived it to be in the public interest. He would say nothing with regard to the second clause, on which he trusted there would be no difference of opinion, but with regard to the 5th clause, which he hoped would add largely to the members of the Society—the clause permitting those who had passed the Minor to become members—he maintained that that was a most important proposal. If the Council had not public opinion outside to urge on this question it was all the more necessary to be well supported by the members, and for that purpose a strong Society was required. If the Society was small and not representative of the calling, so small that people outside said it was not representative, of course it was a source of weakness, and to meet that this proposal was made, giving all engaged in the trade the opportunity of coming there, and of having a seat at the Council table. It was a just proposal, a democratic proposal, and a distinctly important one. After all, what chance had traders in the way of protective legislation unless they were organized? Clause 6 was also of equal importance. It was an attempt to place the dispensing of medicines in the same position as the sale of scheduled poisons, and was a just and right proposal. After all, what was the sale of poisons? In one sense it was very unimportant, if the conditions of sale were looked to, but correct dispensing was to his mind the most important thing in the public interest which could be conceived. Dispensing medicine was really focussing the knowledge of the chemist on one point and bringing it out as the result. It was not only of public importance, but of great importance to the medical profession, and medical men ought to hail this as a most important step in their interest. In treating disease it was absolutely essential that the right thing should be supplied in the right manner, and it could only be supplied when men were educated in that function. It was scarcely necessary to speak further with regard to the special clause, but he trusted the Council would speak that day with one voice, for it would be most deplorable if there were the least sound of division, as it would imperil the Bill and probably cause division outside. If the members of Council could not agree amongst themselves they had no chance of passing the Bill at all. In fact, if the bulk of the calling did not agree that this was a just and wise proposal there was not much chance of passing it; he, therefore, begged his colleagues to set an example to the craft by avoiding any appearance of disunion.

Mr. Schacht asked if it was the intention that those words in clause 6: "It shall be unlawful for any person to compound," &c., should apply to the individual who should work the pestle and mortar—the assistant, or whatever he might be—or was it the person who owned the shop?

The President said the wording was precisely on all fours with the existing statute.

Mr. Schacht said he was aware of the difficulty of interpretation, and consequently he asked what was intended? Of course, it would be observed incidentally that it prohibited the preparation of any prescription by other than a registered man.

The President said the phrase was taken from the Irish Act.

Mr. Schacht again asked what was the intention of those who had framed the draft? Was it to exclude the employment of any person to dispense a prescription who was not a registered man?

The President said of course not; but he would prefer that Mr. Schacht should make his speech if he desired to, and he would reply to it later on.

Mr. Abraham said he was sorry to have to enter a protest against the idea that they must either take the Bill exactly as it stood, or be charged with having obstructed it. He thought it was capable of slight amendment and improvement without in any way interfering with its main principles, and he begged to move the following amendment to clause 6, viz.:—

> "That clause 6 be amended as follows: Line 1, after the word 'person' to insert the words 'or persons or company;' in line 3, after the word 'he' to insert the words 'or they,' and also omit the 'a' and for 'chemist' substitute 'chemists.' In line 4, for 'druggist' read 'druggists,' and at the end of the clause to add the words 'nor to *bonâ fide* co-operative societies supplying their own members by the hands of duly qualified persons.'"

A short discussion had taken place in Committee upon this proposition, and it was lost, but he thought it right to bring it forward in Council, because it seemed to him that an amendment of that kind would render the clause useful, whilst he was afraid it was at present useless. That would render it more agreeable to those who really wanted to see the Pharmacy Act made a valuable statute; whereas at present it was becoming altogether useless owing to the facility with which it was evaded. He failed to see what serious opposition could be offered to the amendment.

Mr. Leigh said it was his intention to second this amendment, for though he liked the Bill as it stood, he hardly thought it went far enough at the present time. What the trade suffered most from was the competition of bogus companies, which were formed with the intention of defeating the Pharmacy Act; but he acknowledged the great weight of the President's speech, and although he should like a discussion to take place upon this amendment, he was hardly convinced in his own mind that it would be well to adopt it.

The President said the amendment would substantially provide that all persons who kept an open shop, whether they were companies or not, should be registered, unless they were *bonâ fide* co-operative societies—bodies where tickets were given—which would be specially exempted.

Mr. Harrison said that was how he understood Mr. Abraham to put a clause at the Committee meeting, that the exemption should be extended to co-operative companies provided they fulfilled the conditions embodied in the widow's clause, viz., that they employed a registered person to conduct the sale of poisons, and do the dispensing. It appeared to him that was the method which had to be adopted, whether they liked it or not. Co-operative societies had obtained a standing in this country, and a recognition which could not be ignored. They carried on business on very much the same lines as chemists themselves, and there were only two policies open, the first that of repression, which would, of course, be a drastic policy that might possibly find favour with enthusiastic people, but which it would be impossible to adopt. The only other policy would be that of regulation, and, as he took it, Mr. Abraham's object was to take these societies in hand and regulate them, subjecting them to the same conditions which pertained to chemists and druggists, so that the competition should be perfectly fair. He could not conceive any other way of dealing with this matter, which was one of the most extreme difficulty. As to the general character of the Bill, he was prepared to give it a very hearty support, but he hoped some such clause as this would be inserted, and he confessed he should like to have seen its scope enlarged. The feeling was against him, and he was bound to say that in the end he thought the arguments were against him also. He should therefore be content to take the Bill for the good it contained, believing that at some future time some larger measure might be adopted. He hailed with satisfaction anything which would go towards enlarging the bounds of the Society and attracting a greater number of men to its membership. If there was anything from which the Society suffered now it was that it did not represent the great craft of which it was the true legal representative, and if means could be adopted by which men as they became from time to time qualified should also join the Society it would carry that political weight which was referred to by Mr. Hampson. A small body had, of course, but small political influence, but large bodies had great political influence, and if they wanted to have their influence felt at headquarters the body should be made as large as possible. A good deal had been said about coming to a perfectly unanimous decision, and he thought the proper way to do that was to thoroughly discuss their differences. It could not be said that a number of men were perfectly unanimous because some twenty or thirty agreed to whatever was placed before them. If they were to be unanimous and enthusiastic, they must thresh out their differences there, and having done that, unless some vital principle were involved which could not be overlooked, then they should sink their individual differences and do their best for the progress of the measure. That would be the conduct of men who were loyal to the Society, and who had the interests of their Society at heart. That was the course he intended to adopt. He should like to see this clause amended, but if that were not agreed to he would take as much as remained and do his best to help the Bill through the difficulties which it must go through before becoming an Act of Parliament.

Mr. **Gostling** pointed out that the regulation of sales by purely co-operative societies was already provided for by the decision of the House of Lords that they must employ a qualified person.

Mr. **Allen** asked Mr. Harrison whether he would recognize what was termed a bogus company. He took it that Mr. Abraham would recognize a *bonâ fide* co-operative store which supplied its customers after having first made them purchase tickets. He would not raise any question as to the amount of money given for the tickets, but he would exclude from the operation of the Act entirely what were called bogus companies, but which were registered under the Companies' Act, and therefore were as much companies as any co-operative societies, and which could, without the slightest transposition of their mode of business, make themselves into ordinary co-operative societies.

Mr. **Harrison** said he certainly meant *bonâ fide* co-operative societies, not bogus companies. The line between the two was very difficult to define, and often perhaps no definition could be given. It would be a matter of litigation before it could be decided whether a company was on one side of the line or the other, and he did not think it would be wise to attempt to define what was a *bonâ fide* co-operative society. The same difficulty arose with reference to clubs, and the same means of arriving at a decision would have to be taken as in that case.

Mr. **Martin** replying to Mr. Harrison's remark about threshing out the differences, said that hours and hours had already been spent in Committee in doing that very work, and there was not a single suggestion which could be made by any member which had not already received the most careful consideration. The result was this draft Bill now presented. There was a great deal to be said for and against it, but it was not to the public interest, and distinctly not to the interest of the Society, or of those who practised the calling of chemists and druggists, that members of Council should state there all their reasons for voting for or against particular clauses.

Mr. **Atkins** desired to give this Bill a very hearty support as it stood, and whilst greatly admiring the argumentative speech of Mr. Harrison, he distinctly disagreed with him on one point. He said there was no alternative course between repression and regulation. Repression was altogether utopian, and he hoped the Council would be no party to regulation. He had the most emphatic view in his own mind that it would be false to all its history if it were in any sense to help to legalise that which it only accepted as the inevitable, if it were inevitable. It was distinctly opposed to the education and the traditions of the Society. He hoped, therefore, the Council would not take the step of proclaiming that it intended now to regulate the action of co-operative societies. It might be that this great co-operative movement, so far as medicines were concerned, was but a passing phase; it had never assumed the vast dimensions in the country which it had in London. The difficulties of the country chemist arose not from combination, but from individual action, and he trusted the Council would not accept this amendment. He wished to say how much there was in the Bill with which he agreed. At the outset he had grave doubts whether it was wise to weight this Bill with controversial matter, and ventured to express his dissent, at the same time indicating that he should loyally accept the decision of the majority. He still held that view as to the difficulty of passing the Bill, but as the majority of the Council thought otherwise he should heartily support it. He was very glad that the difficulties as to the number of standings or positions in the craft were going to be reduced, but at the same time he was very glad that the title of pharmaceutical chemist was not to be abolished. He thought the Bill went as far as was necessary to obtain the support of the trade outside. There was a great difference of opinion on the part of those who had earned the title of pharmaceutical chemist by preparation and examination. He heartily agreed with what had been said by Mr. Hampson, that as this was to a great extent a private measure, it could not be passed through Parliament unless a large amount of support was received from their own body. He was delighted to think that that support would be very largely obtained by a measure for increasing the membership, and would again express the hope that when the decision had been threshed out, they would all support the measure in its entirety, not only in that room, but when they went home amongst their friends.

Mr. **Evans** said when he first read the draft, he was very pleased to think there was so much ability in the Committee which drew it up, and also to see that the views of the majority of the Council had been fairly considered. He had never doubted the sincerity of any member, and he must say that he did not know of anyone who wished to throw political dust into the eyes of those in the trade outside. They were all sincere in the views they took on a question of this sort. Mr. Hampson said the Council was a representative body and a democratic body, and he thought if it was going on with a Bill of this sort, and wished to enlist the enthusiasm of members of the trade, it should seriously consider in what particulars it at present failed to represent those members. It appeared to him it would be quite possible to introduce one or two further clauses which would arouse the enthusiasm of the trade throughout the country. He should support Mr. Abraham's amendment without any qualification, but there were one or two little remarks on clause three that he should like to make. Was there to be any limit placed on the period between the examinations, or would it be possible for the Council to make it compulsory for a man to spend one, two, three or four years in the laboratory before presenting himself for examination. Was there any limit, subject to the approval of the Privy Council?

The **President** said nothing could be done in that way except by bye-laws. This was only an enabling Bill. If it were passed it would be necessary for the Council to make bye-laws, which would have to be read three times, then submitted to a special general meeting of the Society, and then have the approval of the Privy Council.

Mr. **Evans** said he quite agreed with Mr. Schacht that it was desirable to have the question of assistants selling or dispensing more clearly explained. Again, he saw that it was proposed to limit the number of chemist and druggist members who could sit on the Council to ten, but as it was a democratic body, it must have some confidence in the chemist and druggist, and he failed to see why any limit of this kind should be placed. It was not worth making the alteration for, nor could he see what it mattered whether a man was in business or not, and did not see why assistants not in business should not be entitled to vote, or to be elected to a seat on the Council, so as to represent the views of the large number of whom they formed a part. A man might be the manager of a large concern, and would represent the views of a large number of people, and be able to do as good work for the Society as a man in business. The only other suggestion he should like to make, but for which he feared he should not get a seconder, would be this, he should like to see how the Act worked for England first, and therefore he should like to alter clause 8 by saying the Act shall not extend to Ireland or Wales.

Mr. Hills suggested that the discussion should be confined for the present to Mr. Abraham's amendment.

Mr. Cross said he should vote for the original proposition on the ground that it was not expedient to attempt to take any course which would savour of a regulation of something which was not recognized. Co-operation could no more be interfered with as the law stood than a man's privilege of the management of his own household. So long as people took on themselves the responsibility of saying they would have nothing to do with the Pharmacy Act, or any other Act, and made themselves into a private association, the law as it stood could not touch them, and he hoped the liberty of the subject in that direction would never be interfered with. With regard to regulation, the question was, the regulation of what? He took it to be the regulation of certain methods of carrying on business which that Council had consistently inveighed against for a great many years, and it would be extremely dangerous to attempt to frame a regulation of that description. Pharmacists had complained, and justly, that no qualified assistant could possibly take the position of a qualified master, and by making a regulation that a qualified assistant might be able to carry on a quasi co-operative society the principle would be recognized that a qualified assistant was all that the public interest required. That was the view which the Legislature took, and therefore it was useless to attempt to touch it. The proper attitude for that Society was not to recognize those bodies in any way, but to let them alone. He hoped the time might come when the State would recognize that the qualification of the individual, although a very good thing in itself, was not sufficient, but that a chemist's business should be conducted by a man who was personally responsible and in the position of the master. With regard to the enthusiasm of the general body, they knew perfectly well that they had not the enthusiasm of their own craft behind them. But why? Because that Council had learnt by experience that the things which were demanded by many outside were utterly unobtainable. He hoped the speech of the President would be carefully read by every chemist and druggist on the register, and if they would do so he felt sure it would do more to enlighten them as to what could be done than any other study they might undertake. The Act of 1868 contained dangerous provisions, which had been found out since. There was an instrument of warfare common amongst savage tribes, which was extremely dangerous to anyone not skilled in its use, viz., the boomerang, which came back and hit the man who wielded it unskilfully. So it was with an Act of Parliament which contained provisions that might be twisted against its promoters.

Mr. Martindale said the danger of the amendment lay in this; that if an attempt were made to regulate co-operative stores, it would only open the way for individual capitalists to carry on the same kind of business. There were many men in London who would like to undertake the sale of medicines and dispensing. And if this were allowed under the care of a qualified assistant, they would seek to do the same under the same protection.

Mr. Hills agreed with the former speakers that it would be very unwise to attempt any regulation of co-operative stores; if such a thing were done it would be the very easiest thing in the world for any people who wished to get up a company to sell poisons, to have a penny or twopenny ticket, and it would have to be decided afterwards in a court of law whether that would constitute a *bonâ fide* co-operative society or not. With regard to repression, he agreed with all who had spoken that it was utterly impossible in the present state of public opinion to pass a Bill containing any clause which would put down trade by co-operative stores. It was as well to speak plainly, and say that the opinion was very general that the public was protected so long as the hander over of the poisons was a qualified man. He wished it were otherwise. Everyone round that table, and most of the leaders of pharmacy, would wish that every pharmacist should be a practical one, and that pharmacies should only be owned by qualified men, and if the work were not entirely done in detail by qualified men, it should certainly be done under the special supervision of the qualified owner of the pharmacy. But they all knew that that was not the case, and they had already admitted the principle unfortunately in the Bill of 1868, that under certain conditions an assistant might have the qualification and sell; that was in the unfortunate widows' clause. Their own people also very largely took that view, for the Council was continually receiving information from the country that registered persons were opening branch shops at long distances from their head pharmacies, and putting them entirely under the control of unqualified persons, and they did not therefore come with clean hands in this matter. Their own members must see that it was necessary either to have a qualified owner of the shop practically always in it, or a qualified man in every shop which was open for the sale of poisons and compounding medicines.

Mr. Hampson said the effect of this amendment, if introduced, would be to put the whole trade in opposition to the Bill at once; they would say, and say truly, "you are recognizing the stores." The whole thing would be laughed at.

Mr. Allen wished to remind members that the original action by the Society, the loss of which had created all the friction that had occurred since, was not an action which had been brought against a co-operative society, but against a grocer who carried on a bogus company. He was surprised that Mr. Harrison should ask the Council to show the grocer or any man who liked to form himself into a company the way to carry on a chemist's business. He certainly could not as a member of that Council ever give his sanction to anything which related to those who were outside the register. They were outside now, and as far as he was concerned they should remain outside.

Mr. Abraham said he believed the amendment he proposed had not been considered for hours.

Mr. Martin said it had been discussed over and over again.

Mr. Abraham said his amendment had been only discussed for about five minutes on the previous evening, or he should not have brought it forward again.

Mr. Robbins said he hoped the Bill would pass.

The **President**, in putting the amendment, said it had been considered in all sorts of ways by the Parliamentary Committee and by the Council itself time after time, not in exactly the same words perhaps, but propositions of precisely the same nature.

Mr. Abraham said he was aware the question broadly had been before the Council, but the actual words had not, and he thought that made a great deal of difference practically.

The amendment was then put and lost by a large majority.

Mr. Schacht said he desired to put on record his wish to add something to this draft Bill, and would therefore move an amendment, but before doing so he should like to say that, speaking generally of the Bill, he should have preferred that it consisted solely of such clauses as bore reference to education and examination, with perhaps the addition of the 5th clause, in which it was proposed to enlarge the ranks of the members. He would rather that the Bill had stopped at that point, because he thought it would then stand a better chance of being passed into law. However, it had been determined that other matters should be added, and on those matters he wished to make one criticism. He feared that the commencement of the wording of clause 6 was not likely to lead to unanimity of sentiment. Those words: "It shall be unlawful for any person to compound physicians' prescriptions," would excite so much anxiety on the part of those who lived by the preparation very largely of physicians' prescriptions, that it would rouse their opposition. He would suggest an addition to that clause which would screen those who were not qualified when they were dispensing prescriptions under the direction of those who were legitimately entitled to dispense. Unless something of this sort were introduced, he thought it would very seriously interfere with the general business of the chemist and druggist, who at times was compelled to employ men qualified in one respect, but not registered. He should, therefore, propose to add the words: "or who are directly employed by," or some such words as those. The President himself had dwelt on the undesirability of attempting that which was impossible, but looking to that clause, he ventured to think the President was speaking against the draft Bill, for he thought it was impossible for that clause to pass as it stood, and he should therefore prefer to see it modified in such a way as to prevent a great deal of opposition. His amendment would be to add after the words "chemist and druggist," in the fourth line, the words, "or directly employed by a pharmaceutical chemist, or a chemist and druggist," so as to shelter the unqualified assistant when employed by a qualified man.

The President: Taking charge of a branch shop?

Mr. Schacht said no, dispensing prescriptions. As this stood, it appeared that no person who was not qualified could dispense a prescription anyhow.

Mr. Martin said he might under the supervision of the master.

Mr. Schacht said the words "under supervision" were not there. As the clause stood, it prohibited an unqualified man dispensing a prescription.

The President said he thought not.

Mr. Martin said it meant that a qualified man must not go three miles away and leave a three months' apprentice in charge.

Mr. Schacht said the words were quite general, and made it unlawful for any person to compound a medical man's prescription unless he were registered. It was not interpreted in the Act of Parliament. All he asked was that if any reservation were intended it should be expressed, and he thought that was a very reasonable request. All he wished was that a young man who was not registered should not be open to prosecution if he dispensed a prescription for his master.

Mr. Hampson asked how far Mr. Schacht would extend this.

Mr. Schacht said the Council was anxious to pass this Bill, and wanted the whole trade to back it up in attempting to do so. He was anxious to urge that which was desirable on all hands, not only for the passing of this Bill, but for the careful carrying on of the business. It was manifestly desirable that an exception should be made, and that young men not registered should not be open to prosecution who were obeying their master's orders.

The President: With the master looking on?

Mr. Schacht said he did not say so.

Mr. Hills said he should want a definition of the words, "directly employed by."

Mr. Schacht thought the words were plain enough; but if not he would say, a young man who was paid by or paid for; he did not care which it was. There were two classes of persons who were not registered who were employed by pharmacists, apprentices and young men out of their time who wanted a few years more experience before passing the examination. The apprentices paid their masters for being taught their business; the assistants were paid by the masters. The persons to whom he alluded were the persons directly employed by the masters, and he said, without hesitation, that he and every old pharmacist had employed many such persons to dispense physicians' prescriptions. He had paid for them, had taught them their business, and he had an impression that those young men ought not to be prosecuted for doing what he told them.

Mr. Hills said a man might be employed to do a thing at a hundred miles distance.

Mr. Schacht said that difficulty might be covered by another clause, if it were thought desirable, relating to the superintendence of branch establishments. He had only to do with that which was presented to him for his approval. It was a very simple matter, but he thought it was a weak point in the Bill which might be amended. On the previous evening he had moved an amendment, which was seconded by Mr. Harrison very kindly: "That the definition of the word 'seller' as employed in the 17th section of the Pharmacy Act be definitely made to apply to the whole Act." That was defeated, and he simply wished to have that fact recorded.

The President remarked that Mr. Harrison, in seconding that motion, stated that he did not agree with it.

Mr. Harrison said for the same reason that he seconded the amendment, which was that it might be placed properly before the Committee and discussed, he would second it again, but he did not accept any responsibility for it.

Mr. Cross asked which amendment was now before the Council.

The President said the amendment placed in his hands was that the definition of the word "seller" as employed in the 17th section be made to apply to the whole of the Act.

Mr. Evans asked what would be the position, if the Bill passed, of a man who kept a couple of apprentices, and an unqualified assistant.

Mr. Gostling said that was not the point.

Mr. Evans said be had a perfect right to ask the President the question. If he declined to answer it there was an end of the matter.

The President said it was difficult to say what interpretation a court of law would give to the clause; it had been simply taken from an existing Act of Parliament, and his impression was that it did not apply and would not be held to apply to an unqualified person compounding medicines under the direction of a qualified person.

Mr. Evans asked if those very words did not apply when an assistant was prosecuted for selling poisons in the absence of his master. Would an unqualified assistant be open to prosecution because he dispensed a bottle of medicine in the absence of his master?

The President said he could not answer that question categorically.

Mr. Evans said unless it were made perfectly clear he had no option but to support the amendment. He thought it was the duty of everyone who had the interests of the trade at heart to consider the position in which hundreds of men in the country who kept unqualified assistants and apprentices would be placed. He would not be a party to those men being prosecuted for carrying on their business as they had done, The amendment, as follows, was then put and negatived.

> "That the definition of the word 'seller,' as employed in the 17th section of the Pharmacy Act, be definitely made to apply to the whole Act."

Mr. Schacht then moved the following amendment to clause 6—

> "That line 3 be amended to read as follows: 'Unless he be a pharmaceutical chemist or chemist and druggist, or is acting under the direct employment of a pharmaceutical chemist or chemist and druggist.'"

Mr. Evans seconded the amendment, saying his anxiety was to protect men, of whom he knew a large number, who kept apprentices and unqualified assistants, and could keep no others. Not only on that Council, but to be perfectly candid he must say that whatever the views of the Council were he should do all he could directly, and indirectly, both with members of Parliament and otherwise, to interfere with that clause being passed unless this amendment were adopted. He could not go so far as his friend Mr. Harrison, and say that if he were beaten by a majority it was his duty to bow to it, and endeavour to get the Bill passed.

Mr. Harrison said he excepted the case where a principle was involved.

Mr. Evans said there was so much principle involved in this that he could not support the clause as it stood.

Mr. Richardson did not see any harm in introducing the words suggested. Since the discussion had been raised he had had a great many coming to him and saying, what a tremendous hardship it would be if a chemist could not employ an unqualified assistant in future. The medical profession was not debarred from employing unqualified assistants, and it seemed to him a great hardship that chemists should have to take a higher range than the medical profession. What had been suggested was probably meant, and he did not see why the Council should be afraid of expressing it in the Act. Country chemists would want to know whether they could employ unqualified assistants, and was this to be retrospective; if so, what was to become of all the unqualified assistants?

Mr. Martindale said he would rather let the clause go than vote for this amendment.

Mr. Martin said he had a great objection to the public discussion of these matters, because it did an infinite amount of harm to pharmacy. He much deplored that a man so experienced, and to whom he looked up with such respect, should at that time of day draw a distinction between the words "qualified" and "registered." Neither the law nor the Society recognized such a distinction. With regard to the words "directly employed by" he could give them a fact within his own knowledge. An apprentice of one week to a registered chemist and druggist was left in charge of the shop to do whatever happened to come while his master went and conducted a prayer meeting two miles away; that apprentice of one week had to dispense prescriptions which might be fraught with mischief to the individual patient. Would he come under the words "directly employed by"? If the apprentice were working in the shop by his master, either in dispensing prescriptions or selling poison, no doubt the master covered the apprentice, just as much as if a clean mortar were necessary to his dispensing, the man who washed out the mortar assisted in dispensing the prescription. The assistant or apprentice who was not registered simply assisted the master or qualified person who was in the shop, and who was personally responsible. He was surprised at the discussion on this point, and deplored that Mr. Schacht should have drawn this distinction. With regard to Mr. Richardson's observations about the medical profession, he would remind him that within the last year or two the Medical Council had become extremely particular, and that persons who employed unqualified men to visit for them had received letters stating that unless they employed qualified assistants they would be struck off the register. In a court of law a qualified man could not recover fees of any sort for the services of an unqualified practitioner. He greatly deplored talking about these things in open Council, because the tendency was altogether pernicious.

Mr. Hampson said if this amendment were passed it would really be establishing a new qualification, and one without examination. After all Mr. Schacht's efforts in the way of education for the purpose of qualification it was most lamentable to find him moving an amendment of this kind.

Mr. Richardson explained that in using the word "retrospective" he meant to ask what was going to be done with all the unqualified assistants.

Mr. Harrison said they must be employed by qualified men, who would take the responsibility. He should deplore the introduction of these words; a man might be a thousand miles away from his principal, and yet be directly employed by him, and the principal would have no opportunity of seeing that what he was doing was right. He would urge on Mr. Schacht to withdraw the amendment, which would be fatal to the objects the Council had in view.

Mr. Gostling was entirely opposed to the amendment, which would be one of the most erroneous steps that could be taken. As Mr. Hampson had said, it would be creating a new qualification. In his own business, unfortunately, during the present epidemic, not only himself, but all the qualified men in the business were ill at the same time, and in bed. He was in great straits, but he felt that if he could not get a qualified person the only proper course would be to close his doors; but fortunately an old pupil of his being in the neighbourhood, at great sacrifice and purely out of kindly feeling, came over to superintend the business for him. If Mr. Schacht's amendment were in force he should have been able to leave his apprentices in charge, and someone might have been killed, or he might open other shops and employ unqualified men, because they would be directly in his employment.

Mr. Schacht said that if it were thought desirable it would be quite feasible to devise some means of regulating the conduct of branch shops, and providing that they should be supervised. He only meant by the words, "direct employment," such as was common to all, and he had no hesitation in saying that in half the pharmacies he knew there were unregistered men employed in dispensing. He simply wanted to exclude the danger of those men being prosecuted.

The amendment was then put and negatived.

Mr. Allen said after this discussion he was prepared to propose an amendment on the same clause in adding the words, "unless he be a pharmaceutical chemist or chemist and druggist, or is acting under the immediate supervision of a pharmaceutical chemist, etc." At the same time he did not wish to press it on the Council if it was not acceptable.

Mr. Evans suggested "general supervision."

Mr. Allen said no; he preferred "immediate supervision," but he would withdraw the amendment if desired.

Mr. Schacht said he would second the amendment.

Mr. Leigh supported it. He did not like the exact wording of Mr. Schacht's amendment, but thought this quite expressed what some of them desired.

Mr. Gostling thought it perfectly unnecessary. He never allowed a prescription to be prepared except under the care of a qualified person.

The President said Mr. Allen did not press his amendment, and he hoped no more would be proposed.

Mr. **Evans** said he wished to move an amendment to clause 5, after the words "pharmaceutical chemists" to omit the remainder of the clause, and to substitute "and that in future there shall be no restriction to the number of chemists and druggists, whether in business or not, who shall be eligible to be elected on the Council."

The **President** pointed out that the insertion of those words would be unnecessary, the section in the existing Act limiting the number to seven being repealed by clause 4.

Mr. **Evans** said if they were going to introduce this change at all it was better to throw the whole thing open. Surely the advantages which the pharmaceutical chemist possessed in his higher qualification and standing in the country were quite sufficient to insure the preponderance of such men on the Council. It was often said in politics "trust the people," and he should say "trust the trade." It seemed almost an insult to change the number from seven to ten, taking great care that it should be impossible that the chemists and druggists should have a majority on the Council.

No member having risen to second the amendment,

Mr. **Martindale** said *pro formâ* he would second the amendment, but should speak against it.

The **President** said that this had better not be done, and there being no seconder the amendment dropped.

Mr. **Greenish** said this amended Bill had his entire concurrence, and he felt much indebted to the Committee for the work it had done. He sincerely hoped the Council would have the gratification of seeing the amended Bill pass in the present session.

Mr. **Harrison** asked if the correspondence with the Inland Revenue Department on the subject of the Patent Medicine Act could be placed in the hands of the Committee before the next meeting.

The **President** said that should be done. In putting the motion for the adoption of the report, he said he need only state broadly that clause 6 as it stood was identical with sections in existing Acts, and he did not think it bore the meaning which had been attached to it. Selling or compounding could be done by unqualified persons under a certain amount of reasonable supervision, but the amount of supervision it was not for the Council to define. That was for those who had to interpret the laws passed by Parliament.

The motion for the adoption of the report of the Law and Parliamentary Committee was then put and carried *nem. con.*

It was also resolved—

> "That the Law and Parliamentary Committee take the necessary steps to provide for the introduction of the Pharmacy Acts Amendment Bill into Parliament."

The Research Committee.

The **President** moved that the following report be received and entered on the minutes, and remarked that the fact of the appointment of a Committee for the preparation of an addendum to the Pharmacopœia, which would presently have to be done, was perhaps not unconnected with the work of this Research Committee.

Report of the Research Committee for the Year 1889.

During the past year nine persons have been admitted as workers in the Research Laboratory, and several important pharmacological subjects have been investigated. The following are the titles of the papers which have already been published:—"On an Apparatus for the Estimation of Nitrites," by Professor Dunstan and Mr. T. S. Dymond; "On the Occurrence of Skatole in the Vegetable Kingdom," by Professor Dunstan; "On the so-called Mussænda Coffee of Réunion," by Professor Dunstan; "On *Scopola carniolica*:—1. Introductory, by Professor Dunstan; 2. The Chemical Constituents of *S. carniolica*," by Professor Dunstan and Mr. A. E. Chaston.

In the last-named research, the co-operation was secured of several well-known specialists who have investigated other questions relating to this plant, giving rise to the following additional papers, which have also been communicated to the Society and published: "Observations on the Therapeutic Action of *S. carniolica*," by Sir Dyce Duckworth, M.D., F.R.C.P., Physician to St. Bartholomew's Hospital; "On the Pharmacy of *S. carniolica*," by Mr. F. Ransom, F.C.S.; "On the Natural History of *S. carniolica*," by Mr. E. M. Holmes, F.L.S.; "The Histological Characters of the Rhizome of *S. carniolica*," by Mr. Thomas Greenish, F.C.S., F.R.M.S.

As regards the published work of the past year, with which the Committee has every reason to be satisfied, it is only necessary to draw attention to the fact that it has been principally concerned with a department of research differing from that which mainly occupied the attention of the Laboratory during the preceding year, viz.: the chemical examination of the constituents of plants, particularly of those which are likely to be of service in medicine or the arts. Such inquiries as these have, in the past been identified with the scientific reputation of the Society in the first instance through the work of Pereira, Fownes, and Hanbury.

Owing to the recent advances in the science of chemistry, it is now possible to make these inquiries much more complete than was formerly the case. Whereas earlier workers, having isolated a constituent from a plant and assigned a name to it, were unable to proceed further, frequently being prevented from obtaining even the pure substance, investigators can now not only prepare the compound in a state very nearly approaching, if not actually attaining to absolute purity, but are also able, more or less completely, to determine its chemical nature, and thus to render considerable service to biological science as well as to chemistry, medicine, and pharmacy.

While thus keeping in view the main purpose for which the Research Laboratory was instituted by the Council, namely, the advancement of Pharmacology in its widest sense, the Committee has not failed to recognise the educational advantages which the Laboratory may render to pharmacy in this country. By the establishment of an institution, even though it be on a comparatively small scale, where the pharmacist may acquire such knowledge as will enable him to pursue the higher branches of his calling, the Society has inaugurated the basis of a true system of "technical education" for the pharmacist. A sound knowledge of the elements of physical science, essential as it is, must only be regarded as introductory to more advanced work in chemistry and physics. Without this more extended knowledge of these sciences in their application to pharmacology, the pharmacist cannot successfully grapple with those "practical" but complicated problems which lie at the root of pharmacy. No more useful post-graduate course for the pharmacist could be devised than that which is afforded by original research carried on under, and controlled by, competent supervision.

Some of the research which has been conducted during the past year yet remains to be published, in particular that which was commenced in the autumn at the instance of Sir Joseph Lister, F.R.S., on the composition of a so-called double cyanide of mercury and zinc which he has found to possess valuable antiseptic properties.

In conclusion, the Committee wishes to acknowledge the following donations to the small collection of books of reference which has been formed for the use of the workers in the Laboratory:—*Journal of the Chemical Society*, 1888, from Mr. S. Gale; *Manual of Chemistry*, by Professor Attfield, from the Author.

January 31, 1890.

MICHAEL CARTEIGHE, *President*.
ALEXANDER BOTTLE, *Vice-President*.
THOMAS GREENISH } *Members of the*
G. F. SCHACHT } *Council*.
MICHAEL FOSTER }
E. FRANKLAND } *Additional*
T. LAUDER BRUNTON } *Members of the*
CHARLES EKIN } *Committee*.

Mr. HILLS asked if the work of the nine persons alluded to would be published in course of time.

The PRESIDENT said the Committee had to keep its own secrets as to the work in progress; all that was reported was that actually finished, and the Committee did not tell exactly what was going on. He would remind the Council, and those who had taken an interest in this work during the year, that it was a distinct gain with regard to education, and it had been found that there was a considerable demand for the workers in the Laboratory. From one point of view it was rather a matter of regret that they did not remain longer, but they stayed long enough to get a very good addition to their education at the expense of the Society, and every one on leaving expressed himself warmly as to the advantages he had gained in the Laboratory. Apart from the actual work the educational effect in raising the tone of the honours men was a thing of which the Council might be proud.

Mr. ATKINS asked if there was any objection to publishing the names of those who took part in the work.

The PRESIDENT said the names of those who took part in any researches appeared in connection with the work. Possibly next year the whole of the workers for the time being would be mentioned, but there were reasons why it was not desirable to do so now.

Mr. RICHARDSON thought it would be better to give the names to the Council privately.

The motion was carried unanimously.

ADDENDUM TO THE PHARMACOPŒIA.

The PRESIDENT then moved

> "That the President, Vice-President, and Messrs. Inglis Clark, Ekin, Gale, Henry George Greenish, Martin, Martindale, and Umney be invited to form the Pharmacopœia Addendum Committee."

He said these names had been recommended by the General Purposes Committee after due deliberation. Of course it would be understood that those of a number of eminent men were not included in this list, and could not very well be. It was necessary that the Committee should be a working one, and he hoped that every one of their brethren throughout the country from whom the Committee might ask assistance would give it loyally. The Committee would also, no doubt, be anxious to place itself in communication with all who had any suggestions to make. There were considerations of distance, and so on, which made it inevitable to leave out many men whose assistance might be of great service. The President and Vice-President were, of course, official members, but, leaving them out, the Committee proposed would consist of men who were as good representatives of pharmacy as could be found in most countries of the world.

The motion was carried unanimously.

MEDICINE STAMP ACTS.

The PRESIDENT said a memorial had been received m Exeter calling attention to the Patent Medicine stion, which would be considered in due course the other memorial.

A letter had also been received from the Chemists Assistants' and Apprentices' Association of Dundee thanking the Council for the gift of the Journal, and expressing a regret that further assistance could not be afforded; also hoping that at some future time, on complying with the requisite conditions, further aid would be granted.

GENERAL PURPOSES COMMITTEE.

This report, which was taken in Committee, included the usual letter from the Solicitor reporting on the progress of cases which had been placed in his hands. Four defendants had paid the penalties claimed and costs without going into Court, and in another case the penalty and costs had been recovered. In one case, tried before a jury, a verdict had been given for the defendant.

An appeal from the decision of the Registrar, refusing to place a name on the register, had come before the Committee, and after examining the papers in the case the Committee recommended that the appeal be not entertained.

On the Council resuming the report was unanimously adopted.

REPORT OF EXAMINATIONS.

January, 1890.

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (29th)	3	1	2
Minor (21st) . . .	13	11	2
" (22nd) . . .	13	7	6
" (23rd)	12	6	6
" (29th)	10	8	2
" (30th)	11	7	4
	—59	—39	—20
	62	40	22

Preliminary Examination.

	Candidates		
	Examined.	Passed.	Failed.
14th	344	177	167

February 4.—Thirteen certificates by approved examining bodies were received in lieu of the Society's Examination.

EXAMINATIONS IN EDINBURGH.

January 21, 22, 23, 29 *and* 30, 1890.

Present each day,—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on the 22nd, 23rd, 29th and 30th on behalf of the Privy Council.

MAJOR EXAMINATION.

29*th*.—*Three* candidates were examined. *Two* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Cowie, George....................Banff.

MINOR EXAMINATION.

21*st*.—*Thirteen* candidates were examined. *Two* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Akeroyd, Peter Martin	Alnwick.
Allwood, William Smithurst...	Mansfield.
Brearley, Richard	Torquay.
Brown, Henry Armstrong......	Sunderland.
Brown, James Henry	Sudbury.
Butchart, Robert..................	Edinburgh.
Carmichael, Matthew...........	Glasgow.

Clark, Adam Rankine Gibson	Dumfries.
Clarke, Andrew	Scarborough.
Donald, John Jameson	Newscone.
Rugg, Walter James	London.

22*nd*.—*Thirteen* candidates were examined. *Six* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dudgeon, James	Edinburgh.
Ford, James	Montrose.
Freeland, James	Bathgate.
Hounam, Christopher	Langholm.
Inglis, Henry	Kirriemuir.
Jones, Owen	Carnarvon.
Keith, Alfred George	Methlick.

23*rd*.—*Twelve* candidates were examined. *Six* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ker, William Law	Dunfermline.
Lee, John George	Alfreton.
Leys, Alexander	Banchory Ternan.
Marshall, Charles Bushby	Shrewsbury.
Matthew, Edwin	Hadleigh.
Neil, William	Arbroath.

29*th*.—*Ten* candidates were examined. *Two* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Furness, Walter	Accrington.
Newey, Frederick Albert	York.
Parker, James Herbert	Littleborough.
Savege, Ernest	Montrose.
Sleath, Edmund Watson	Manchester.
Smith, Robert	Dundee.
Stewart, Charles	Kirkcaldy.
Taylor, Josiah Ellison	Stalybridge.

30*th*.—*Eleven* candidates were examined. *Four* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Walker, James	Aberdeen.
Weir, Alexander Sim	Galashiels.
White, Frank	Liverpool.
White, Sydney Bowring	Worcester.
Williams, David	St. Clears.
Wilson, Abel Ernest	Stockport.
Young, Andrew	Falkirk.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Tuesday, February 4, 1890.

Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Brown, Harold	Southport.
Carlton, Herbert	Horncastle.
Dawney, Charles Benjamin	Bristol.
Edwards, John Griffith	Barmouth.
Heny, Alfred Warrington	Duffield.
Jones, John Harrison	Ruthin.
Plowright, John	Ryde.
Scruton, Tom Edwin	New Wortley.
Smith, Gilbert	Bayswater.
Smith, Thomas A.	Radcliffe.
Southall, Alfred William	Birmingham.
Spoor, Herbert Mather	Manchester.
Sturt, Clifford Henry	Oakengates.

The Report of the College of Preceptors on the Examination held on January 14 was received.

Three hundred and forty-four candidates had presented themselves for examination, of whom *one hundred and sixty-seven* had failed.

The following *one hundred and seventy-seven* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Allan, William	Hull.
Allay, Frederick Wilson	Sowerby.
Ascroft, Benjamin	Ince.
Babbington, John Bett	Market Rasen.
Bacon, Francis Hugh	Bromley.
Bailey, Arthur	Preston.
Barr, Alexander Steen	Liverpool.
Bates, Sydney Lancaster	Birmingham.
Beale, Horace Sharman	Cambridge.
Beedle, Leonard Edward	Weston-super-Mare.
Bendall, Ernest John	Wells, Somerset.
Bennett, Fredk. W. Moncrieff	North Berwick.
Bentley, Thomas	Leek.
Bethel, Benjamin	Pendleton.
Bishop, John Duval	Stroud.
Bisset, Arthur William	Stonehaven.
Blackadar, Charles Barrett	Portsmouth.
Blunt, Henry Roland	Birmingham.
Botham, James Ernest	Manchester.
Bowden, Harold	Patricroft.
Branch, George Thomas	Cambridge.
Bremner, William	Aberdeen.
Bridger, Fred. W.	Eastbourne.
Brittain, Harold	Chesterfield.
Broadbank, Albert Samuel	Stockton-on-Tees.
Broadbent, William Henry	Ollerton.
Broom, George	Treherbert.
Bulman, Tom	Carlisle.
Burnett, George	Aberdeen.
Burns, John	Edinburgh.
Burton, George Stanley	Blackburn.
Cade, Thomas Tunson	Louth.
Cameron, John	Montrose.
Carmichael, George Scott	Edinburgh.
Carter, John Howell	Porthleven.
Charlton, Thomas Dixon	Houghton-le-Spring.
Cheriton, Sidney Richard	Okehampton.
Cole, Arthur	London.
Coulthard, Abram	Silloth.
Croll, David Watson	Paisley.
Dalingwater, Edmund	Louth.
Dallow, Charles Ernest	Stourbridge.
Danziger, Henry	Manchester.
Darney, William Ephraim	Stanley.
Davies, David Arthur	Llandovery.
Davies, Thomas Edgar	Abergele.
Dent, George	Middlesborough.
Dent, John Wallace	Swaffham.
Dickens, Thomas John	Earlestown.
Donston, John Alexr. Malin	Tottenham.
Douthwaite, Douglas George	Ruabon.
Driffill, Frederick William	Leicester.
Dyson, Herbert	Derby.
Eaton, Tom Wilcox	Reading.
Edwards, Thomas Christmas	Corwen.
Evans, James	St. Clears.
Fadelle, Robert Rainy	London.
Finney, Henry William	London.
Fore, Walter Thomas	Birkenhead.
Fortune, Ernest	Harrogate.
France, William Henry	Rotherham.
Francis, Thomas	Llandilo.
Galloway, Alexander S.	Hanley.
Gaul, Ernest George	London.
Gellatly, Walter Davidson	Perth.
Gill, James Alexander	Elgin.
Gorton, Albert George	London.
Green, George Winfield	Tadcaster.
Hamilton, George William	Stirling.
Harper, James William	Barrow-in-Furness.
Harris, Abraham	Sheffield.
Harrison, Thomas Arthur	Bourne.
Hitchon, Charles	Padiham.
Horton, William John	Woburn.
Howard, Percy Sturton	Ely.
Hudson, Charles Frederic	Ash-next-Sandwich.

Humphreys, Nigel Carr	London.
Hutchings, Thomas	Launceston.
Irwin, Hubert Aloysius	Watford.
James, Alfred Clifton	Porthleven.
James, Charles	London.
Jarvis, Samuel Horace	Leicester.
Johnson, Harrison Percy	Prestwich.
Jones, Harold Emery	Holyhead.
Jones, William Henry	London.
Jones, William Rhys	Bettws-y-Coed.
Kay, Llewellyn	South Shields.
Kennedy, William	Hawick.
Kerr, Hugh,	Dalbeattie.
Larcombe, Arthur	Exeter.
Latham, Hugh	Kirkcaldy.
Lee, Wilson	Wem.
Lockwood, Harold Stephenson	Stalybridge.
Lohoar, James	Glasgow.
Lucas, Harry	Andover.
Mackay, Lionel Mitchell	Bridge of Allan.
McKenzie, Charles	Bridge of Allan.
Mackenzie, Thomas	Inverness.
Magee, Vincent Arthur	Castle Eden.
Malcolm, Robert Martin	Dumfries.
Mallaband, William Henry	Sheffield.
Marsh, Albert	Crewkerne.
Marsh, Alfred Edward	Luton.
Mercer, Alfred	Rochdale.
Mitchell, Willie	Halifax.
Morris, Harry Barker	Bilston.
Morrison, Angus Hugh	Perth.
Moss, Sidney John	Coggeshall.
Nall, Walter	Rochdale.
Nock, Frederick Joseph	Congleton.
Oliphant, Andrew Hood	Coleraine.
Osborn, Joseph Bishop	Maryport.
Patrick, Christopher	Bradford.
Peterkin, Henry	Lossiemouth.
Pipe, William	Leeds.
Price, Price Maurice	Ruthin.
Pryor, Sydney Hildyard	Cambridge.
Rambant, John Ackland	London.
Ratcliffe, James Edward	Accrington.
Richardson, James Alfred	Market Rasen.
Ridding, Emily Charlotte	London.
Roberts, Ethelbert John	Tenby.
Roberts, Henry	Morriston.
Roberts, William	Denton.
Robertson, Daniel	Galashiels.
Robertson, David Smart	Carnoustie.
Robertson, James George	Stirling.
Ross, David	London.
Rosser, William Marmaduke	Abergavenny.
Rowan, Donald	Oban.
Salt, John Gerrard	Derby.
Salter, Thomas Lewis	Bradninch.
Sampson, Edwin	Penzance.
Savage, James William	Bradford.
Shelley, George	Bilston.
Shepherd, Joseph Henry	Derby.
Simpson, Richard Todd	Old Hutton.
Sinclair, Arthur	Macduff.
Sloan, James	Greenock.
Smith, Richard Ewbank	St. Leonards.
Smith, Walter	Liverpool.
Snaith, Alfred Lattimer	Middlesboro'.
Soddy, Francis William	Stonehaven.
Spark, Henry Langlands	Forfar.
Stafford, Albert Edward	Nottingham.
Stewart, Arabella Barclay	Hamilton.
Strachan, John	Edinburgh.
Summers, Harold	London.
Sutcliffe, Lot B.	Thorne.
Taylor, Wm. Philip Airdrie	Blackpool.
'emple, Frederick William	Driffield.
hompson, Edwin Butler	Birmingham.
Thompson, Harry	Oldham.
Thompson, James Cook	Truro.
Thompson, William	Armathwaite.
Tomlinson, Nehemiah	Burnley.
Varley, Albert William	Chesterfield.
Vernon, George Henry	Silverdale.
Walters, Robert Thos. Farley	Llanboidy.
Watson, Herbert Shepley	Towcester.
Weight, Samuel Thomas Ford	London.
Whaley, Charles Edward	Newcastle-on-Tyne.
White, Walter Michael	Canterbury.
Wild, George A.	Sheffield.
Wildman, Harry George	Feltham.
Wilkinson, John Horsley	Colne.
Wilkinson, Joseph	Melton Mowbray.
Williams, Owen Robert	Port Dinorwic.
Williams, Thomas	Aberayron.
Wilson, James Munro	Auchmill.
Wilson, John Aikman	Newcastle-on-Tyne.
Wilson, William Brownrigg	Carlisle.
Wood, Charles	Stourbridge.
Woodland, Walter Bayly	Leicester.
Worthington, James	Manchester.
Wright, Lydia Parkes	Sutton Coldfield.
Young, Andrew	Perth.

The questions set at this examination were published in the *Pharmaceutical Journal* for January 18, p. 569.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	8	6	2	Lancaster	5	3	2
Birmingham	17	9	8	Leeds	16	4	12
Brighton	2	2	0	Lincoln	7	5	2
Bristol	5	2	3	Liverpool	17	10	7
Cambridge	6	4	2	London	42	20	22
Canterbury	3	2	1	Manchester	37	19	18
Cardiff	5	2	3	Newcastle-on-T.	16	6	10
Carlisle	11	6	5	Northampton	2	1	1
Carmarthen	9	7	2	Norwich	3	1	2
Carnarvon	6	3	3	Nottingham	15	8	7
Cheltenham	3	1	2	Oxford	3	1	2
Darlington	6	2	4	Peterborough	1	1	0
Dundee	12	6	6	Sheffield	11	6	5
Edinburgh	24	9	15	Shrewsbury	3	1	2
Exeter	9	5	4	Southampton	5	2	3
Glasgow	11	9	2	Truro	7	4	3
Hull	5	3	2	Worcester	1	0	1
Inverness	5	3	2	York	6	4	2

Parliamentary and Law Proceedings.

ACTIONS UNDER THE PHARMACY ACT.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* WHEELDON.

In the Divisional Court, before Baron Pollock and Justice Hawkins, the appeal in the Society *v.* Wheeldon came on for hearing on February 4.

Mr. Finlay, Q.C., Mr. Rawlinson and Mr. Ivor Bowen appeared for the appellants, Mr. Lumley Smith, Q.C., and Mr. Granger for the respondents.

Mr. Finlay in opening the case said, I appear for the appellant in this case, and I will first read the Judge's notes, which are extremely short. The case raises a point of very considerable importance, I think, although a short one, under the Pharmacy Act of 1868, the point being this: whether an unqualified assistan of a qualified chemist who sells poisons in a shop is liable to a penalty under the Act as the seller. I think that is the exact point. I will read the Judge's notes: "This action was to recover an amount of penalty incurred by the defendant on the 15th of September, 1889, in selling poison, viz., strychnine, or a preparation thereof known as Battle's vermin killer, contrary to the provisions of the Pharmacy Act, 1868, 31 and 32 Vict., cap. 21. Poison book is produced. Admitted that the defendant was in sole charge of the shop at which the said poison was sold." All that that means is that at the time this was sold he was the person there; it does not mean anything more than that. "Admitted that the defendant sold to a female a packet of Battle's vermin killer, that he was not duly registered as a pharmaceutical chemist or chemist and druggist. Admitted that the article called Battle's vermin killer contains strychnine, and that strychnine is a poison. George Frederick Burroughs was called. I know Battle's vermin killer; the contents of it contain strychnine. Strychnine is a poison." That proof seems to have been unnecessary. In the first place it was admitted that strychnine was a poison, but to make the point quite certain it appears to have been proved. "Cross-examined: I have known death result from the taking of Battle's vermin killer. One grain of strychnine is enough to kill a person. Defendant's case admitted the employer of the defendant was a properly qualified chemist. The question is whether the defendant is liable to a penalty under 31 and 32 Vict., cap. 21, sec. 15. I was of opinion that the words in section 15 were wide enough to embrace this case, and that the defendant was liable to the penalty. I, however, gave the defendant leave to appeal." My lords, it is necessary to refer to one or two sections in the Act of 1868 besides the section mentioned in the summons. The learned counsel read the preamble and section 1. Pausing there for one moment, I submit that the verb "sell" there refers to the act of the principal, that it is the proprietor of the shop who sells, although it is done by the hand of his assistant. Then section 2 defines what articles are to be deemed to be poisons; they are those enumerated in schedule A, and strychnine is one of them. Then section 3 is this:—"Chemists and druggists within the meaning of this Act shall consist of all persons who, at any time before the passing of this Act, have carried on, in Great Britain, the business of a chemist and druggist, in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners, also of all assistants and associates who, before the passing of this Act, shall have been duly registered under or according to the provisions of the Pharmacy Act, and also of all such persons as may be duly registered under this Act." Your lordships observe there again that the keeping an open shop referred to in section 3 must be the act of the principal; clearly it is not the act of the assistant who acts in the shop which can be described as the keeping an open shop. The 4th section provides for the registration of apprentices and assistants; the 5th provides for the registration of chemists and druggists; the 6th, 7th, 8th, 9th and 10th provide for the examination and registration of pharmaceutical chemists. The 11th provides for the case of death of one whose name is on the register. The 12th relates to the evidence of qualification for registration. The 13th provides that the register shall be published and shall be evidence, and then the 14th imposes a penalty on the falsification of the register. Then we come to the 15th, under which these proceedings were taken, "From and after the 31st of December, 1868, any person who shall sell or keep an open shop"—you will observe that those words are the same as occur in the 1st section—"any person who shall sell, or keep an open shop, for the retailing, dispensing, or compounding poisons, or who shall take, use, or exhibit the name or title of chemist and druggist or chemist or druggist, not being a duly registered pharmaceutical chemist or chemist and druggist, or who shall take, use, or exhibit, the name or title pharmaceutical chemist, pharmaceutist, or pharmacist, not being a pharmaceutical chemist, or shall fail to conform with any regulation as to the keeping or selling of poisons, made in pursuance of this Act, or who shall compound any medicines of the British Pharmacopœia, except according to the formularies of the said Pharmacopœia, shall, for every such offence, be liable to pay a penalty or sum of five pounds." Then the 16th section reserves the rights of certain persons, and it is not material, I think, for the purpose of this case. Then comes the 17th section, which is extremely material; it deals with the regulations to be observed in the sale of poisons. Then the 18th, 19th, 20th, 21st and 22nd relate to other matters, and I do not think are material for the present purpose. Now, upon this section I respectfully submit to your lordships that it is reasonably clear that the present defendant is not liable to this penalty. He acted as an assistant to a duly qualified chemist, and he sold a poison, viz., strychnine, or rather a preparation containing strychnine, and it is said that he comes within the words of the 15th section of the Act, which provides "that after December, 1868, any person who sells or keeps an open shop for the retailing, dispensing or compounding poisons" shall be liable to pay a penalty. I submit that the only words in the section which it is suggested can hit the present defendant is the word "sell." It is said that he sold.

Baron Pollock: And governed also by the words "any person."

Mr. Finlay: Yes, my lord. Any person who shall sell a poison, not being a duly registered chemist, shall be liable to the penalty. I submit that it is impossible to say that this assistant sold this medicine. The seller was his principal, the chemist, as whose assistant he was acting, and that the service of an unqualified assistant is recognized in carrying out the business of pharmaceutical chemist or chemist and druggist is manifest from the 17th section, because your lordships recollect that the 17th section, after laying down very carefully regulations as to the precautions to be observed in the sale of poisons, says about the middle of the section, "For the purposes of this section."

Baron Pollock: "Of this section." It does not say "for the purposes of this Act."

Mr. Finlay: Certainly, my lord.

Baron Pollock: That is rather peculiar. The retail dealer sells, and the thing which is done there, that is preparing the box or bottle or wrapper, is done by the mere man behind the counter.

Mr. Finlay: Your lordship sees the 17th section provides that it shall be unlawful to sell any poison unless the box or bottle be labelled in a certain way. That would be done by the assistant, because the labels would be kept in readiness; they will be partly in print and partly in writing, but the label will not be affixed to the box or packet until the time of the sale, and then it will be done by the assistant who sells, not by the principal.

Baron Pollock: Is that not a strong proposition? If a man comes into a shop and finds a person there apparently 50 or 60 years of age, and he says to him, Will you sell me an ounce of laudanum or forty drops of chloroform or a certain amount of strychnine; if that person knowingly sells it is not he rather the person who sells, and not the principal?

Mr. Finlay: I submit not. It all points to the principal.

Baron Pollock: My difficulty about it is this. This would apply so peculiarly to a single transaction. I can understand that where the duty is cast upon chemists of doing certain things, and then the 17th section says for the purpose of this section the person on whose behalf any sale is made by an apprentice or servant shall be deemed to be the seller. But the absent chemist, who may be in the country, or who may have gone to see some sick person, leaves behind him some competent person, surely it is that competent person who has to exercise the discretion as to whether he will sell the poison or not. You and I or the public are not supposed to know what is a poison or what is not. A woman may come and say, "My child is sleepless. Please give me half an ounce of laudanum." Surely it is for the seller to say whether he will sell the poison or not.

Mr. Finlay: My submission is that it was never intended by the Act to strike at the employment of assistants who did not possess any of the qualifications enumerated in the Act.

Baron Pollock: Then you say nobody is hit.

Mr. Finlay: The business of a chemist could not be carried on.

Mr. Justice Hawkins: You say the man is not liable who did it *de facto*, and the principal is not liable, because he has nothing to do with it.

Mr. Finlay: If the regulations in section 17 and the precautions which your lordships have noticed in the case of selling poisons are observed, then no one is liable. The principal is a qualified chemist, and the regulations prescribed by section 17 have been observed.

Baron Pollock: Then what is the good of section 15?

Mr. Finlay: This, my lord; section 15 is really to prohibit the carrying on of the business of a chemist or druggist as a principal, to prevent anyone from carrying on that business who is not qualified, and then they hit it in every possible way. It would not be sufficient to say that no one who is not qualified shall describe himself as a chemist or druggist; you might have a man carrying on a shop where he sold all sorts of medicines, including poisons, and did not describe himself as a chemist or druggist; he might describe it as a universal emporium, or something of that kind, and without using any designation or style which would render him obnoxious to the operation of the Act, he really would be selling drugs, and therefore to prevent the evasion of the Act in that way section 15 is framed in the way in which it is. And your lordships will see what the real scope of these words is, because they say, any person who shall sell or keep an open shop for the retailing, dispensing or compounding of poisons, or who shall take, use or exhibit the name or title of pharmaceutical chemist, and so on, without being qualified, or who shall use certain titles, shall be liable to certain penalties. Now the keeping an open shop is clearly the act of the principal, and I submit that the selling mentioned there is equally intended to be the act of the principal. If you consider the effect I think it is clear it must be so. It would be absolutely impossible to carry on the business of a chemist if every act and sale of any medicine containing poison had to be done by the hands of the principal himself. He must, in the nature of things, leave these acts to be performed by the assistant. If your lordships will only look at the list of poisons in schedule A, you will see that they enter more or less into a great many prescriptions. Arsenic of course is used as a tonic, and as a medicine in some cases; it is even prescribed, and prussic acid is also a medicine as well as a poison. Cyanide of potassium and all metallic cyanides; strychnine is used constantly as a tonic in small quantities; aconite, emetic tartar, corrosive sublimate, cantharides, savin nd its oil, ergot of rye—ergot of rye is a drug which ay be wanted very urgently indeed for the purpose checking hæmorrhage in labour cases.

aron Pollock: No doubt.

Mr. Finlay: It may be wanted very urgently, and it may be necessary to get it at once, and what a state of things it would be if a qualified chemist could not sell such a drug as ergot of rye, which is wanted, if it is to be of any use at all, at once, without being there himself. Then in the second part of the schedule there is oxalic acid, chloroform, belladonna and its preparations, essential oil of almonds, opium, and all preparations of opium. Your lordship will see that it really would render the transaction of the business of a chemist and druggist absolutely impossible, if this decision stands. It is very difficult to see how chemists and druggists can carry on their business at all unless every assistant employed in the business is himself to be a qualified chemist and druggist, according to this interpretation. My lords, I submit that is contrary to the plain meaning of the Act. So far from providing that, the Act has in terms shown that it contemplated that unqualified assistants might be employed. All that the Act secures is the liability of a competent principal, and if that is secured, and if the regulations in section 17 are observed, there is an end to the matter. There is very little authority upon this Act.

Baron Pollock: You may say one thing, that section 17 does not seem to contemplate that the sale of poisons by an apprentice or servant is an unlawful act. It only says what is reasonable, the sale by the servant shall be taken to be the sale by the master.

Mr. Finlay: Exactly, and that is, as I submit, decisive of this case, because section 17 plainly implies that under the Act it is not unlawful for an unqualified assistant to sell.

Baron Pollock: It does not say "by any apprentice or servant contrary to the provisions of this Act;" it seems to imply that every chemist has, and we know would have, an apprentice who would in course of business sell poisons.

Mr. Finlay: If this decision stands chemists will have to shut up shop.

Baron Pollock: As far as poisons are concerned.

Mr. Finlay: That is practically the whole business, because no chemist could live a week if he were not at liberty to dispense prescriptions containing some of the articles mentioned in schedule A.

Mr. Justice Hawkins: There are some curious provisions in the former part of the 17th section. Take the first, "it shall be unlawful to sell any poison unless the box, bottle, vessel, wrapper or cover in which such poison is contained be distinctly labelled with the name of the article and the word 'poison,' and with the name and address of the seller of the poison." That cannot mean with the name and address of the assistant.

Mr. Finlay: Certainly not.

Mr. Justice Hawkins: "And it shall be unlawful to sell any of the poisons of those which are in the first part of schedule A to this Act or may hereafter be added thereto under section 2 of this Act, to any person unknown to the seller." That can hardly be unknown to the seller in one sense; it could hardly be a compliance with the Act if you could go to a shop, and if you knew the lad who is serving in the shop that that should be sufficient, and yet if the master or keeper of the shop happens to be absent—I do not quite see how it is to be.

Mr. Finlay: There certainly is a difficulty about construing the word "seller" in that clause.

Mr. Justice Hawkins: It may mean one thing in one part and another in another.

Mr. Finlay: I think it probably does.

Mr. Justice Hawkins: Yet when you come to deal with that, it says, for the purpose of this section the person on whose behalf the sale is made shall be deemed to be the seller.

Mr. Finlay: I think that means for the purpose of incurring the liability, the penalty provided by this section.

Mr. Justice Hawkins: It says, "On every sale of any such article the seller shall before delivery,"—in that case, supposing the master happened to be absent from the shop and the assistant is selling the article, if that is to be complied with it must mean the assistant.

Mr. Finlay: I think it does; I think the word "seller" in that section means in the early part about the name and address of the seller the principal, and then in the clause to which your lordship has just called attention, the assistant whose hand actually carries out the transaction for his master.

Mr. Baron Pollock: The difficulty that presses on my mind is a broader difficulty against you, and it is this:—Rightly or wrongly this statute seems pointed to prevent people keeping open shop or retailing and selling poisons unless they be persons who possess a competent practical knowledge of their business. It may be said there is no harm if a man goes into a shop and says "give me some compound rhubarb pills," or "a drachm of castor oil," that is all very well enough, one may sell that. But directly a man comes in there and either asks for these poisonous substances by themselves, say opium, or laudanum or strychnine, or, as would more commonly happen, he brings in a prescription, is it not intended equally that he who makes up the prescription should be a person who knows the force and evil effect of poisons, so that if by mistake, for instance, a medical man should write "6 grains of strychnine" instead of "half a grain," in that case he should not be at the mercy of a boy. According to your construction nobody would be liable then. The boy would make up some prescription containing strychnine, or whatever it may be, and somebody would be poisoned. Then the master would say "I am not liable," and the boy who did it would say, "If you look at it it is put in the right bottle; there was some poison used, but the word 'poison' is on it." That is all right, and what he actually sold was in the prescription, which although written by an eminent physician, might have ordered an absolute amount of poison that killed somebody.

Mr. Finlay: But, my lord, I submit what the Legislature has done, and always has done, is this, to secure the liability of a competent and qualified principal.

Baron Pollock: But you would not make the competent qualified principal liable in that case for what the boy did in his absence.

Mr. Finlay: My lord, it secures there shall be a competent and qualified principal, and then that certain regulations shall be observed in the sale of poisons. It would not make the principal of course liable for any mistake made by the assistant if he had employed a proper assistant of reasonable skill.

Baron Pollock: The case I put might so very well happen. Take quite a respectable young man in a shop—I will not put an extreme case,—and someone comes in and asks for one of these modern preparations, of which there are so many nowadays, of opium, or something containing chloroform, of which there are a great many. The boy says, "All right; I am a careful lad; I do not forget the blue bottle, and the proper badge, and everything else; I sell this as a poison." But in selling it he sells a quantity which no cautious chemist would do.

Mr. Finlay: Your lordship sees to what an extent it would go. It would end in its being necessary that every assistant in the shop should be a qualified chemist.

Mr. Justice Hawkins: That is to sell poisons.

Baron Pollock: He may act in other ways; the man who puts up the parcel, for instance, fills the glasses and so forth, need know nothing about poisons, or there might be a junior who could sell anything in the way of castor oil, or corn-plasters, or compound rhubarb pills, and so on. But when you come to a compound containing poison, surely it is not hard to say to a man you must be qualified.

Mr. Finlay: The principal cannot be always there Of course, my lord, the qualified chemist is bound to exercise due care in selecting his assistants.

Mr. Justice Hawkins: Is there any penalty if he does not? Suppose he says, I have known this boy for a long time; he is a very harmless boy; he obeys orders very well; I do not think he knows much about chemistry or anything else; but he knows where the bottle is which contains the magnesia, where the rhubarb is, and where the other things are that I use; he knows the way to make up pills, and he can do it very well. It is very likely that for several times running it may be all right, but at last a time may come when he may be a little careless or in a hurry, and he puts in a poison which is to form part of the ingredients of the pill in such a quantity that it causes the patient great uneasiness and discomfort.

Mr. Finlay: I take it, my lord, that any chemist would be liable who employed a boy such as the chemist in "Pickwick" left in charge of the shop.

Mr. Justice Hawkins: May a chemist employ anybody as his assistant, qualified or unqualified, and give him authority in his absence to sell poisons or dispense poisons?

Mr. Finlay: I submit so.

Mr. Justice Hawkins: Now take that one step farther. May a chemist have two shops?

Mr. Finlay: My lord, he may be able to ride two horses at once.

Mr. Justice Hawkins: Some people can ride or drive six or seven, but is that a lawful thing for him to do?

Mr. Finlay: In every case of that kind it would be a question of fact whether the chemist did really superintend *boná fide* the business of the shop.

Mr. Justice Hawkins: It is in his absence the mischief may be done. Mischief may be done if he is out of the way.

Baron Pollock: He may be at dinner or at lunch; the chemist is not usually sent for on every application, but one sees practically it would drive those horses you were speaking of through this Act of Parliament, if that construction is done away with.

Mr. Finlay: I think not, my lord, for this reason—

Mr. Justice Hawkins: Is it not the real intention of the Act that poisons shall not be sold by any person except that person is qualified? It may be that you will find in nine cases out of ten no harm may be done. The boy may know where the laudanum is; he may know where the other poisons are. It may be that he knows where to put his hand on the bottle in which the laudanum is, so as to be able to serve anybody with it, and hand it over. But then there is another thing which the law requires to be done in the case of poisons, and that is this. It says poisons shall not be sold unless the seller knows the individual who buys. Suppose that in the absence of the master or a qualified person, in comes a person who is a stranger to the boy; can that boy sell him some poison? He does not know him at all. Is the boy responsible for selling to a person whom he does not know, or is the employer responsible? Or is it sufficient that when the employer comes home, or comes into the shop, the boy having sold the poison to a stranger who left his name, then the master says: "Oh! I know him." The guarantee required by the law is that you shall not deliver poison to a man whom you do not know at the time you deliver it; and so you have no such safeguard as that, if a boy may be delivering out poison to people who come in and possibly use the name of his master.

Baron Pollock: Then there is the restriction on the other side, too, you must remember. You or I, or anybody else, however apparently respectable, or whatever our age may be, if we are in a strange town we cannot, if we have the toothache, get relief by some well-known thing that you really know something about. But yet if you go to someone who knows you, if you call at a banker's, or a solicitor's, who will say, Oh! this is a gentleman of respectability, I introduce him; you then can buy, and the seller, on his side, may sell you what he likes. It is rather a strong proposition.

Mr. Finlay: Of course innumerable cases of some difficulty, and some subtlety may be put, but my argument, broadly speaking, is this. The Legislature might have thought fit to enact that no unqualified assistant should be allowed to make up and dispense medicines containing any of these poisonous ingredients, but it has not done so, and it has not done so, I submit, because the burden would be intolerable on those carrying on business.

Mr. Justice Hawkins: Not intolerable. You say that, Mr. Finlay, but why? Because a man may carry on his business as a chemist and druggist, and he may sell, and does sell, a whole host of things in the course of his business which are not poisons, that is to say, not poisons within the schedule. Why is it not a reasonable thing to say that if poisons are to be sold you must have a qualified man to sell them? Take Battle's powder, for instance, as here. We all know perfectly well that Battle's powder has been used over and over again; it contains strychnine in considerable quantity, and we know it has been over and over again used for murderous purposes. Should you indiscriminately sell such things—which are generally and often sold indeed—to people of a class who do not know much about them themselves, except that they know they are poisons. Is it not right that the seller should exercise some discretion and control?

Mr. Finlay: No doubt, my lord, and that discretion and regulations were provided for by section 17, and I submit to your lordship that not only has the Legislature not enacted that every assistant employed shall be a qualified assistant, but it has shown plainly by section 17 that an unqualified assistant may be employed.

Mr. Justice Hawkins: Not every assistant employed shall be a qualified assistant. Where is it enacted that he shall?

Mr. Finlay: I say that Legislature has not enacted it.

Mr. Justice Hawkins: Then I say a world of mischief must be done. Take the case which has often happened of a person obtaining Battle's powder for the purpose of putting an end to children—all sorts of things have been done with Battle's powder. If a person comes in and sees nobody but a boy in the shop, or he waits until the principal is out, and he comes in and asks for this, and says: "I know your master very well." The boy says, "I cannot serve you with the poison without you know him," and he says, "Oh, I know him very well, and he knows me very well. I want a couple of packets of Battle's powder." Well, the boy sells them upon the faith of the man knowing his master, on the man saying he knows his master. Probably the master comes in, the boy has made no entry at all, and does not know the provisions.

Baron Pollock: There is another curious point. You did not read the end of the 17th section quite properly for that purpose, but at the end of that section which you cite in your favour, there is this:—"Nor shall any of the provisions of this section apply to any medicine supplied by a legally qualified apothecary to his patient, nor apply to any article when forming part of the ingredients of any medicine dispensed by a person registered under this Act." Therefore in that case it is provided the medicine must be labelled in the manner authorized with the name and address of the seller, and the ingredients thereof be entered with the name of the person to whom it is sold in the book. Therefore, as we all know, if you get a prescription which is written by a medical man made up by a chemist, you do not get it in a poison bottle. But why? Because you get the security of its being made up by a person who is registered under the Act. Therefore this curious consequence would follow: if a boy could make it up then he would be obliged to put it in a poison bottle; he would be within section 17. Does not that all point to the intention being that in dealing with poisons it should be the person who is registered under the Act who deals with it?

Mr. Finlay: The words your lordship has called attention to show very clearly that a sale by an unqualified assistant is contemplated and lawful, for this reason. After laying down these regulations which have been read, it says: "Nor shall any of the provisions of this section apply to any medicine supplied by a legally qualified apothecary to his patient, nor apply to any article when forming part of the ingredients of any medicine dispensed by a person registered under this Act." Surely, my lords, from that it is as clear as words can make it that the provisions of the section and the precautions to be observed are only to apply in cases where the poison is dispensed by a person not qualified under this Act.

Baron Pollock: It is very curious. I never knew of a person getting a blue bottle, for instance, marked poison to be taken three times a day, and of its being answered, if the question were put, "Why was this bottle blue?" "Why if Mr. Jones, the chemist, himself had made it up you would have got it in an ordinary physic bottle, but he being away from town his assistant made it up, and you get it in a poison bottle."

Mr. Justice Hawkins: When in all probability the patient would not take it.

Mr. Finlay: Your lordship will see what the reason of it is. If the poison is merely an ingredient in a medicine dispensed by a qualified person then these precautions need not be observed.

Baron Pollock: Always provided that the prescription is made up by a registered person.

Mr. Finlay: If it be dispensed by a qualified person, the regulations do not apply. But these regulations do apply when it is made up by an unqualified person.

Baron Pollock: Do you not think that the provision was rather made to meet that which all mankind know, viz., commonly where there is a prescription of real difficulty it is always made up by a registered man.

Mr. Finlay: My lord, the section says these regulations shall not apply to registered men.

Baron Pollock: I say is not that meant to meet the case that I should have thought everybody must know happens if any prescription contains arsenic or any other poison, because it is commonly known that qualified medical practitioners and chemists make up these things, and that in such cases regulations are not required.

Mr. Finlay: But then, my lords, the regulations do apply, if the article forms part of a medicine dispensed by an unqualified person.

Baron Pollock: Yes, I know; that does sound to me like what was probably in the mind of the Legislature.

Mr. Finlay: I submit that the consideration your lordship is good enough to suggest might be very good reason for altering the Act, but no reason for construing the Act in a different way from that in which it is worded.

Mr. Justice Hawkins: I suppose there is no objection to a qualified chemist saying, I am a chemist, I carry on business, I have a large profit from my business, I do not want to give it up, but at the same time I am quite old enough to take it easily, and I shall only visit the shop once a day. I have tolerably good assistants, very good assistants, there is no necessity for me to go oftener than once a day. It is quite true he may conduct his business with great safety and with profit, but if he carry on a shop in which he only is present once a day why may not another man do it? Why may not every man who is qualified say, "I will go and carry on my business through an assistant?"

Mr. Finlay: I take it the question in every case would be whether there was a real control by the principal.

Mr. Justice Hawkins: Where do you find the section?

The case was then adjourned.

Wednesday, February 5.

Mr. Finlay: My lords, there are only, so far as I am aware, two cases which have arisen on the construction of this statute that have any bearing whatever on the point before your lordships. The first, which I need merely mention, is the case of the Pharmaceutical Society *v.* London and Provincial Supply Association, which went to the House of Lords, and is reported in Appeal Cases, v. 857. The point there decided was that a corporation was not within the language of the statute, that a corporation was incapable of undergoing the necessary examination and performance of those conditions required to become a pharmaceutical chemist, and that therefore a corporation was not liable to the penalty for selling drugs.

Baron Pollock: That is a limited company.

Mr. Finlay: Yes, my lord. I do not think that that case has any bearing upon the present.

Mr. Justice Hawkins: It does not touch this question.

Mr. Finlay: It clearly touches it, but I do not think it affords any assistance.

Mr. Lumley Smith: According to my view it has some bearing upon this case.

Mr. Finlay: I will leave my learned friend Mr. Smith to explain that case. The only possible bearing is this, that the assistant employed by the association happened to be a qualified chemist, and I think that Lord Selborne in giving his opinion in the House of Lords, said that he thought a corporation, if it carried on the business of a chemist and druggist, was bound to employ a qualified assistant. The other case, which has really some bearing on this point, is that of Templeman *v.* Trafford (8 Queen's Bench Division, 397). That case arose under the 17th section of the Act which I read yesterday. "The respondent sold at his shop in Friar Street, Oxford, a packet of poison labelled only, 'W. Paterson, Chemist and Druggist, 3, Cowley Road, Oxford,' the name and address of a registered chemist who had supplied the poison to the respondent and paid him a commission on the sale:—Held that the respondent was the 'seller' with whose name and address the packet should have been labelled, and he was liable to a penalty under section 17, which applies to the person keeping the shop or conducting the business in which the sale is made." There the respondent kept the shop, being paid a commission by W. Paterson on all goods that he sold at the shop, and it was held, and, as I submit, properly held, that the respondent was the seller within the meaning of section 17.

Mr. Justice Hawkins: It was not a question as between the respondent and the shopman in his employ.

Mr. Finlay: That question arose incidentally. The facts as to the sale are these: The appellant entered the shop, over which no name was painted up, and *inter alia* asked a woman who was behind the counter for a pennyworth of red precipitate, and was supplied by her with a packet of the same, for which the appellant paid the woman. The packet was not labelled with the name and address of the respondent, but was labelled with a label in print thus: "W. Paterson, Chemist and Druggist, 3, Cowley Road, Oxford." Mr. Justice Grove and Mr. Justice Lopes, in giving judgment, dealt with the point, Mr. Justice Grove saying this: "Who is the seller? No doubt difficult questions may arise on any construction of the word, but I am of opinion that in any case within section 17 the seller is the person who actually conducts the business of sale, although not necessarily the person by whose hand the sale is made. For instance, I do not think that the woman who, in the present case, handed the packet over the counter was the 'seller,' nor do I think that the chemist, Paterson, who supplied the poison to the respondent, and who lived some considerable distance away, can be regarded as the 'seller' within the meaning of this section, because as he did not live or carry on business on the premises he could not possibly comply with the provisions of the statute."

Mr. Justice Hawkins: As between the shopkeeper and the woman, who was selling on his behalf, I do not see how any doubt could possibly have existed, because section 17 says: "For the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller." Therefore, as between the servant and the shopkeeper for every offence committed under section 17 that same section declares who shall be deemed to be the "seller." I do not think the authority you are referring to assists us much.

Mr. Finlay: It does not carry us further; it is merely an illustration of section 17. I pray in aid section 17, and I use this case as an illustration. This case shows that the seller should be the principal—the person who keeps the shop, not the person living at a distance.

Baron Pollock: Is not that tolerably obvious from the words? Suppose a chemist is proceeded against for selling a bottle of poison without a label, and he says, "I did not do it. I was away at the time; my servant did it;" this section then makes him liable for the act of the servant. The moment you get to the real question of selling a poison, the section goes back and says where there is a prescription made up, or where there are ingredients dispensed by a person registered under the Act, then the Act does not apply. In both those cases the Act requires that it should be made up with his own hand.

Mr. Justice Hawkins: What is passing through my mind is this, that there seems to be very good reason why a person who is cognisant with these matters should be the person to actually sell. Take for instance part II., or if you like part I.,—it does not signify which. We will take "arsenic and its preparations." A qualified person would know precisely what quantity of arsenic might be capable of doing an enormous amount of harm and mischief, but an unqualified person might not. The Act requires that a qualified person should sell this. If a person who was a comparative stranger came in and said I want so much arsenic, there would be all sorts of inquiries made as to why it was wanted, and for what purpose, because the person who sold it would know that it might cause a great deal of danger. Take oxalic acid. Small quantities would not do much harm, but in larger quantities it might do immense injury. In dealing with poisons, some more or less strong, I can thoroughly understand the Legislature saying that a qualified person should sell them. I know it will be said that it is a hardship, because when I come to look at the list of registered chemists before me I see that our judgment may affect some thousands of persons. You say it will affect them all. So it will, to a certain extent, but there is another class of persons to be considered, who say that if a person keeps an open shop he cannot leave his shop unless he leaves a qualified person in it. A man who wants to sell poison may very well say all my poisons are kept in a cupboard, and when I go out I turn the key, and anybody who wants to buy poison must buy of me when I am in. I shall be at home at nine in the morning, or at four in the afternoon, and they can come then if they want to buy poison; if they want to buy poison they must buy it when I am there, and I will not allow it to be sold when I am absent. If I do not choose to go to the expense of keeping a qualified person to represent me in my absence, then I must lock the poisons up until I come back.

Baron Pollock: The same statute gives the same opportunity to apprentices and assistants who have been for a period of three years actually engaged in dispensing—a right on passing an examination to be declared competent to carry on the business. Any respectable young man might do that.

Mr. Finlay: The apprentice would spend his period of probation in being summoned and fined for acting before he was qualified; he never could get to the stage of necessary experience. He would become an expert lawyer, so far as the Pharmacy Act is concerned, but so far as experience in the shop, which is of more importance to the person himself, he would have little or none.

Mr. Justice Hawkins: Why not, when his master is there superintending, unless we go back to the old special pleading days when a man was supposed to get his experience by being in a special pleader's chambers? There seemed to be something in the atmosphere of the place.

Mr. Finlay: It was a very sound system, and I do not know whether they have improved much upon it. Will your lordships allow me to point out this. I am quite sensible of the weight of the observation made from the bench, and if I may say so with respect, there would be more in the point if the proposal were to alter the law and to enact that no person shall be employed in a chemist's shop if he has not passed a certain examination. I can satisfy your lordships that whatever might be the reasons for making such an enactment, the Legislature has not done it, and I can suggest one very good reason for the Legislature stopping short at that point, and it is this: if the law were as the Pharmaceutical Society would have it declared it would shut up all the smaller chemists' shops altogether. The bigger chemists can have a staff of qualified assistants, so that there shall always be in the shop a qualified person to conduct the business. A smaller chemist, who is a qualified man himself, cannot always be in the shop; he may desire occasionally to have dinner or supper or attend divine service.

Mr. Justice Hawkins: Or some other occupations.

Mr. Finlay: I put only the most urgent which the most serious chemist, without derogation to his character, can attend to. That being so, what is to become of his shop? Is he to put up the shutters when he goes to church or supper?

Mr. Justice Hawkins: He might do as lawyers do, put up such a notice as "Return at 2 o'clock."

Mr. Finlay: The effect would be to ruin his business. That is all very well in the interests of the larger chemists, whose Society has brought the prosecution. Your lordships will see how many prescriptions there are, into the making up of which some of the drugs in schedule A enter. It is impossible for the business of a chemist's shop to go on unless a prescription containing, it may be, one of these drugs, can be made up. If it is to be said that the business of the shop is really to stop—because that is what it comes to—whenever a chemist is away from the shop, unless he can afford to have a qualified assistant, it means ruin to the smaller men.

Mr. Justice Hawkins: Prudence would dictate to m to stick to the shop.

r. Finlay: He cannot always be there. He may ummoned on a jury. My client informs me that a registered chemist is not liable to serve on a jury. But I hope no influence unfavourable to the class I represent here would be drawn from that.

Mr. Justice Hawkins: That is an express reason why he should not leave.

Mr. Baron Pollock: A chemist was called upon to act as a juryman in the case of Bardell *v.* Pickwick.

Mr. Finlay: I think I can demonstrate to your lordship from one section of the Act that the Legislature has not done what might or might not be desirable. It would involve the extinction of the smaller chemist—there is no doubt about that. It may be that the chemist ought to be offered up as a sacrifice for the good of the public, but I think there are some reasons against it, and I will demonstrate to your lordship that the Legislature has not done it. The 17th section contains provisions as to the sale of poison which must be complied with. Then we come to this clause, "Nor shall any of the provisions of this Act apply to any medicine supplied by a legally qualified apothecary to his patients, nor apply to any article when forming part of the ingredients of any medicine dispensed by a person registered under this Act,"—provided certain conditions are complied with. There you have a section with regulations to be observed on the sale of poison, but a provision that these regulations shall not apply where the poison forms part of the ingredient of any medicine dispensed by a person registered under this Act. That clearly shows, as I submit, that the Legislature contemplated that the poison might form part of a medicine dispensed by a person not registered under this Act, in which case the regulations laid down by section 17 were to be complied with. I submit that that provision in section 17 demonstrates that the Legislature did not intend to do what might or might not be desirable. I am not concerned to argue that case. I submit the whole scope of the Act shows that the word "sell" in section 15 refers to the principal who keeps the shop, and not to the assistant who is engaged in it.

Mr. Lumley Smith: My lords, I appear with my friend, Mr. Granger, in support of the decision of the County Court Judge, and I would submit to your lordship that that decision carries out the construction of the Act, which will support what was the intention of the Legislature in dealing with the matter they had to deal with in the Pharmacy Act. No doubt one of the main objects was to prevent misadventure arising from poison being sold by ignorant persons, and to prevent the mischief that might result from persons for nefarious purposes obtaining poisons. When my learned friend says that in a case of this sort it would shut up the smaller chemists who are not able to afford to keep a qualified chemist if they are always obliged to be in their shop, I may ask your lordships to remember that if the contrary was the case a person who desired to obtain poison for an improper purpose would only have to watch till the chemist went to church, or out of his house for some other purpose, in order to go in and buy poison, as the poor girl who bought Battle's vermin killer did and destroyed herself, and no one would be responsible. The scheme of the Act is this: Under section 15 two persons are exposed to penalties—first of all any unregistered person who shall sell poison, and in the case before your lordships undoubtedly the defendant was such a person. Undoubtedly he did sell the poison, and therefore the person who sold the poison is made amenable to the penalty under that section. As cases might arise where it was impossible to prove that a person had actually sold the poison, although he kept an open shop for its sale, the Legislature says, in that case we will put in something which will hit the head of the establishment—the master—so that you have a section carefully prepared to strike at both the assistant who sells and the master who keeps the shop. If proof of the sale of poison in an open shop is given the master would be liable, because it would be clear evidence of his having kept an open shop for that purpose. These persons are liable to what I may describe as a civil penalty of £5, that is as to selling of the poison, but in addition to that there is a criminal section, namely, section 17.

Mr. Baron Pollock: Section 15 would apply to anyone who sold poison in a grocer's shop.

Mr. Lumley Smith: Undoubtedly, anywhere; whether he is master or man.

Mr. Justice Hawkins: It must be so, because it says so. It is not "any person keeping a shop shall sell therein," but "any person who shall sell, or keep an open shop."

Mr. Lumley Smith: Yes. And then section 17 applies to general regulations always to be kept on foot in a chemist's shop where poisons are sold. The qualification for the purpose of that section, that the person on whose behalf any sale is made is to be deemed to be the person by whom it is made, goes to show that in other sections the word "seller" has the ordinary meaning. This is not the first time that this has been discussed in the courts, and when my learned friend spoke of the Pharmaceutical Society *v.* London and Provincial Supply Association, I may say that he argued that case with very great ability in the House of Lords, and that then he took an opposite view. The point there was that a corporation is not a person keeping an open shop. A person who had been proceeded against by the Pharmaceutical Society without being registered got six or more people to join with him, and he turned the business into a limited company, and one of the persons was a qualified chemist and he was proceeded against. But the House of Lords decided, having regard to the word "person" used in the Act, that on the whole view of the Act the corporation was a *casus omissus*, and that it was not amenable. One of the main arguments for saying that a corporation would be liable was this: If you hold a corporation is not liable the public will lose the protection of section 15, because there is nobody who can be proceeded against, therefore it became essential for the noble lords who had to consider the appeal to consider how far the question was so, and they considered the question now before your lordships, and both Lord Selborne and Lord Blackburn in their opinions stated that their view was that the person who sold in section 15 would include the assistant—the person who actually made the sale—and my learned friend, Mr. Finlay, then argued that selling the drugs, not keeping the shop, would be the offence. I will read an extract from the judgment of Lord Selborne. This very point was argued at considerable length, and the person appearing for the corporation said it is true under the section you cannot hit us for keeping an open shop, but if anything improper takes place you can hit the person who sold. Lord Selborne deals with the very point now before your lordships, and he said, "I have now to consider the main argument of the appellants, namely, that the Act will fail to accomplish its purpose unless a corporation, as well as an individual, can be included in these sections. It seems to me, my lords, that this argument cannot be successfully maintained. The act of selling, the act of compounding, and every definite and particular act mentioned in the 1st section and in the sections by which penalties are imposed, are struck at, whether the person who does them is a principal to whom the business belongs, or any one whom he employs to carry on the business. The words, 'keep open shop,' may perhaps not be so; upon those words I will make an observation presently. But that the word 'sell' is, and that the word 'compound' also is, seems to me clear from that very clause, in the 17th section which I just now read; that 'for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be defined to be the seller.' That, if it does not necessarily mean, beyond all doubt naturally implies, that this is a special construction for the purpose of that particular section, and that it is not to be extended to sales generally, when mentioned in other sections of the Act. I will add that regard to the mischief which beyond all controversy the Act was intended to prevent, leads necessarily to the same conclusion, namely, that he who sells, whether he be master or servant,"—that is the very point before your lordships —"whether he be the principal or a person to whom the conduct or management of sales is delegated is struck at by the 15th section"—that is the section before your lordships—"because otherwise a very wide door would be opened to the evils which the Act was intended to guard against. If it were otherwise, nothing more would be necessary, according to the appellant's own argument, than that the business should belong to a person who does not himself carry it on, but who is qualified under the Act; and he might be at liberty to employ in the management of his business persons not qualified by whom the actual sales would be conducted, and then the public would be exposed to all the dangers which the Act was passed to prevent. The statute, therefore, in order to be effectual, must strike at the particular acts of those who actually conduct the sales, who actually compound the medicines, and it does strike at these acts." That is completely in point. It occurred to Lord Selborne, as it did to your lordships, that a chemist might have two shops and an unqualified person in both shops. Lord Blackburn was of the same opinion. After dealing with the argument that "person" ought to include corporation, he goes on to say, "Now is there anything in the object of the Act here which would require that we should so read the Act? I quite agree that a body corporate may keep an open shop and no mischief is done, if for the purpose of conducting the sale of drugs they keep qualified assistants, and if these qualified persons perform or superintend the sale. There I see no harm that can arise. But no doubt the Legislature, for what reason it is for those who passed the Act to say, have thought it best to say that a 'person,' which I take to be a natural person, shall not only not sell, but shall not keep an open shop for the sale. I might think that probably one reason for that was to facilitate convictions and another may have been that it was thought if there is a person who keeps a shop, who is unqualified, he may have a qualified assistant, and he will be able to correct the qualified assistant at any moment he pleases, and there may be danger in that. At all events these would be intelligible motives. But neither of these motives applies in the case of a corporation, for the corporation, the body corporate itself, could not interfere, and however much and however little the body corporate may be unqualified, its being so would not affect the matter at all. Then, my lords, comes another objection. It is said if you put that construction upon it you defeat the Act altogether. That I cannot agree to. I hold distinctly that there can be no sale, whether a corporation be the ultimate vendor or not, unless a 'person'—meaning a natural person—manages the sale, and that natural person if unqualified would, in my mind, clearly become liable to the penalty under the Act." It is found as a fact in this case that Wheeldon was in sole charge of the shop, and, therefore, conducted the sale. In the Court of Appeal in that very same case, so far as it was necessary Mr. Baron Bramwell said, "Further than this, I am by no means certain that the statute is not levelled at the individual actually acting, and not (at least in all cases) his employer. Who would be liable under section 15 for compounding medicines of the British Pharmacopœia otherwise than according to its formularies? Surely the actual person compounding. Section 16 supposes there may be a qualified assistant and not a qualified master; again, section 17, which specially provides that for certain matters the master is liable, seems to suppose that otherwise he would not be." Lord Justice Baggallay, speaking of the 1st section, which no doubt goes with the 15th section, says, "In my opinion the seller referred to in the 1st section is the actual seller, and not the individual or corporation on whose behalf he may act, and this view is supported by the language of the 17th section, which, when dealing not with the simple selling of poisons but with selling particular poisons without the adoption of special precautions imposes a comparatively small penalty on the seller, but declares that for the purposes of that section the person on whose behalf the sale is made shall be deemed to be the seller, thus implying that except for the purposes of that section, the person referred to in the Act as selling means the person actually selling, and not the person by whom he is employed." So the two judges in the Court of Appeal and two noble lords in the House of Lords, having this very point before them, and it being essential to the argument to consider it, expressed that opinion. Your lordships, of course, are not precluded by that authority, because although they were dealing with a strong argument advanced, still the decision was on the point whether "person" included corporation. It does not preclude the matter, but these judgments are, I submit, worthy of weight. They also say this—that so far from the words of section 17 not applying to the master, that it is clear that the person on whose behalf the sale is made is to be the seller because it is so stated. Templeman *v.* Trafford was not in my learned friend's favour. That was under the 17th section. There the sale had been by a woman behind the counter, and as the section says the apprentice or person is not to be deemed the seller, but the person for whom it is done, therefore it was necessary to consider whether any person was behind him. I submit that any other decision than that which has been come to here by the county court judge would defeat the object of the section.

Mr. Rawlinson: My lords, I have only a few words to say in reply, in addition to what has been said by my learned friend, Mr. Finlay. I say that this is a penal statute, and that there must be a direct clause prohibiting what we have done before the penalty can be inflicted upon us. We have here certainly this fact, that the Act might have been considerably clearer. It might, if it had chosen, have said at once it should be an offence to compound or for an unqualified assistant to compound or to sell particular poisons. What has it said? There is a preamble which never mentions the sale of poisons at all, which is directed entirely against the people who keep a chemist's shop open for the purposes of selling poisons, and you have the only reference to this particular offence in section 15. That is this: "Any person who shall sell or keep an open shop for." I submit those are clearly offences *ejusdem generis*. What was meant was this, that there should not be a shop left without some qualified person in general charge of it who should know the ingredients of any particular poisonous matter which left the shop. Here you have this; you have a particular article, Battle's vermin powder, the constituents of which were perfectly well known to the manager of the shop, who is a duly qualified man, and there is no suggestion that the defendants have made up a poison in any way.

Mr. Justice Hawkins: The assistant here was not a duly qualified man?

Mr. Rawlinson: The defendant was not, the other istant was, the manager in charge was.

r. Justice Hawkins: That makes it rather less a case where we should sympathise with the defendant. If there was another duly qualified man in the shop the person who was not qualified should have said, "I cannot sell this."

Mr. Rawlinson: He was not in charge of the shop. He was absent at the time. The man left in charge was unqualified. He simply conducted the sale to that extent by handing over the particular preparation, the constituents of the preparation being known to the employer, and nothing different would have happened had the qualified manager been there. There is no suggestion that the requirements of section 17 were not complied with.

Mr. Lumley Smith: You must not say that.

Mr. Rawlinson: No suggestion was made before that the requirements were not fulfilled. The only accusation against us is that under section 15 we sold a certain poison. I submit that was never meant to apply to the case of an apprentice simply selling across the counter, but was merely meant to apply to the case of a man compounding or sending out drugs, the contents of which he did not know.

Mr. Justice Hawkins: You must go the length of saying that if a duly qualified person opens a shop for the sale of poison, and he has an apprentice who knows nothing whatever about it, who comes fresh and innocent to the shop the moment after the indentures are signed, you say the principal person who is qualified may if he likes go to church all day long, or dine all day long, or amuse himself all day long out of the shop, leaving the young apprentice in it, and if he sells forty packets of vermin powder with which people poison themselves that no penalty attaches to the boy because he is innocent, and no penalty attaches to the shopkeeper because he is taking his pleasure or amusement, or observing other duties which he thought it proper to observe. The protection the public receives is mighty small if that state of things is admitted.

Mr. Rawlinson: That might be a direct evasion of the Act.

Mr. Justice Hawkins: No. We do not assume that the man went out of the shop in order that the poison might be sold by the apprentice. It is not an evasion of the Act at all.

Mr. Rawlinson: Supposing your lordship holds in the way my learned friend asks you to, then even the apprentice can still sell any poison made up in certain ways. What is the difference between selling a packet of vermin killer and such a thing as Fellowe's syrup of hypophosphites, which has strychnine in it?

Mr. Justice Hawkins: You could not have a more dangerous poison or a poison in a more dangerous form, as everybody who has had experience at the criminal court knows. In time gone by it has been largely used for criminal purposes, and for murdering, and it is a very dangerous thing if you are to trust this to an apprentice who is not acquainted with the law relating to the registration of poisons, as his principal is, or ought to be, before he embarks in a business of this sort. Take the case of an apprentice or assistant not qualified at all, a good, decent fellow, not wishing to do wrong in any respect, who is left in charge of the shop when his master is away, and in comes somebody and asks for vermin killer. He would say, "What do you want it for?" "For killing rats," is the reply. The boy thinks it is a matter of 2*d*., 3*d*., or 6*d*., or whatever the packet comes to, and hands it over, and does not think it necessary to register it. Then some sad catastrophe happens—somebody is poisoned, wilfully or otherwise. Then arises the question where was the poison procured, when was it procured, how do you trace this poison to the hands of the criminal? Search the neighbourhood, look at all the registers of poison sold. You may look in vain, if an innocent, ignorant boy has sold the box, and made no entry of it in the poison book. In that way the public would be very great sufferers.

Mr. Rawlinson: It is expressly provided that that would be a criminal offence, and would be provided for by section 17, as it would be a case of selling a poison.

Mr. Justice Hawkins: Where a master is deemed the seller for the purpose of that section.

Mr. Rawlinson: That would be selling poison without taking the proper precautions, and that is the gist of my submission.

Mr. Justice Hawkins: The master would be liable for it if you could discover it, but how could you discover it? The mischief is done, and there is no discovery. The person who bought the packet of Battle's vermin killer containing the strychnine, if wanted for a criminal purpose, would not proclaim to the world, Here I am, I bought it for a criminal purpose; now convict the seller of it.

Mr. Rawlinson: It may be the protection is insufficient, but I submit the only protection against a nefarious person is section 17, which makes it a criminal offence if poison is sold to anybody who comes in without the precautions recommended by section 17. The object of the Act was to strike at chemists who kept shop who were previously to this Act not necessarily qualified men, but the whole of the Act is directed against such people, and is not directed against the apprentice or person who literally handed over the article. Look at it in this light. The only suggestion in the preamble is this: "Whereas it is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing or compounding of poisons"—that is the only offence mentioned in the preamble.

Mr. Justice Hawkins: It is quite clear the moment you begin enacting, for section 1 says, "From and after December 31, 1868, it shall be unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons."

Mr. Rawlinson: The reason for the insertion of the word "sell" is that in the preamble it is "keeping open shop," and it struck them that it might not strike the quack, who might sell medicine outside the shop, who might conduct business in a tent or cart.

Mr. Justice Hawkins: Do you say that if any private individual happened to have a quantity of strychnine which he lawfully had in his possession, and somebody said, I want half a dozen grains of it—will you sell it to me? and he sold it, he not being in a shop or a regular salesman at all, he would not come within the penalty for selling poison.

Mr. Rawlinson: He would, because he would not be doing it in the shop of the person.

Mr. Justice Hawkins: Then you must admit the preamble does not govern the whole Act.

Mr. Rawlinson: That will be *ejusdem generis* with keeping open shop.

Mr. Justice Hawkins: No. If a man comes into your private room and says, "I understand you have a bottle of strychnine for a particular purpose, and you have not used it all; you have some still; can you let me have it?" Would he not be liable if he did so?

Baron Pollock: The section means this; no other person than a pharmaceutical chemist or a chemist and druggist within the meaning of this Act, and registered under this Act, shall sell poison. It does not matter, to my mind, a bit whether he is a grocer or baker, or pastrycook, or anybody else, or whether he is an assistant to a chemist.

Mr. Rawlinson: "Shall sell"—sell for his own benefit.

Mr. Justice Hawkins: No; a striking argument, on the contrary, is to be found in a variety of decisions which have taken place upon the Gaming Act. The preamble of that Act recites that mischief had sprung up from gambling in public houses and other places, and reciting the dangerous character of betting, and then it went on to enact that nobody should bet one way or the other. The Act is much more extensive in its operation than the preamble.

Mr. Rawlinson: As your lordship has put the case of another Act by analogy, I may, perhaps, put another one, that the case is parallel to a case under the Licensing Act. There the penalties are directed against a man who is licensed to keep a public house, and I have never heard of it being suggested that a barman who sold whisky was infringing the Licensing Act.

Baron Pollock: The Act was not passed for the protection of those who drink the beer, but for the purpose of upholding the Excise Acts, and so forth. If an Act were passed, such as has been suggested during the past few years, relating to the sale of revolvers, the curious result of your argument would be that the shopman might sell the revolver, but the master might not.

Mr. Rawlinson: Provided he complied with certain requirements.

Baron Pollock: No.

Mr. Rawlinson: No sale can occur without section 17.

Baron Pollock: It is another and additional protection.

Mr. Rawlinson: This Act has been in existence for twenty-one years, and before the County Court I challenged the gentleman against me to point to a single conviction under it. That shows there must have been a pretty widespread intention that section 15——

Mr. Justice Hawkins: I think also you have against that, that it proves people have not read very attentively the case in the House of Lords, reported in the fifth appeal cases.

Mr. Rawlinson: I will deal with that case in a moment. There are two different penalties under the Act. Section 15 is to recover £5 in the County Court, and the other is a criminal proceeding. If the Legislature really meant that section 15 should be directed against a chemist's assistant would it have given such a penalty as that? Surely it would have made it a matter to be recovered before the justices. The £5 was meant to be recovered from the man who carried on a shop, who sold, or kept open shop, sold what was his own to sell, and who would necessarily be a man of some substance and not a man against whom a judgment of £5 would be valueless. That, as a small point, shows that the section was meant to be against the proprietor and not against the assistant. My submission upon the question of "sale" is this, that a man must be selling something of which he can possess the title himself, that in some way or other he is getting a benefit from it, that it has never been made to touch, and was never meant to touch, the case of an assistant who got no benefit from the transaction, and who simply handed over the particular article, as it was made up, to the purchaser. My learned friend, Mr. Lumley Smith, has put against me the remarks of Lord Selborne, but they were remarks made in reference to the case which was before the House of Lords, namely, as to whether an unregistered person was liable when he had a qualified manager to superintend the business. Lord Selborne had not in his mind a case such as this, where there is a qualified manager and where there is also an unqualified person who hands over the particular poison. He says: "It is true that the Legislature has required for the benefit of the public this safeguard"—that is section 15—"that there shall be an assistant duly qualified, but the Legislature shows that having that case in view, it was not thought necessarily inconsistent with the object or the policy of the Act, that the principals or proprietors of the business, the persons deriving profit from it, to whom those actually selling the drug would be responsible might be unqualified persons, provided that there was in the business a duly qualified assistant. It by no means follows that all the drugs would necessarily be sold by that duly qualified assistant, or that he might not be, as in this case, under the general superintendence of a manager not himself duly qualified; all that is left open. It is, at least, not thought indispensable that the persons carrying on every such business should themselves, without exception, be duly qualified." Those words, "it by no means follows that all the drugs would necessarily be sold by that duly qualified assistant, or that he might not be, as in this case, under the general superintendence of a manager not himself duly qualified," I submit, do show that Lord Selborne did not mean to decide a case such as this.

Baron Pollock: Do you not think that the words, "all the drugs" there are applicable to innocuous drugs? Did not Lord Selborne mean that some drugs were innocuous; that a man might sell ninety-nine drugs out of one hundred, for outward application as well as inward, which are innocuous, but when you come to the hundredth, which was poisonous, then the man ought to attend to it himself?

Mr. Rawlinson: I should not say that was the meaning of Lord Selborne if he was referring to innocuous drugs: "It by no means follows that all the drugs would necessarily be sold by that duly qualified assistant, or that he might not be, as in this case, under the general superintendence of a manager not himself duly qualified; all that is left open. It is, at least, not thought indispensable that the persons carrying on every such business should themselves, without exception, be duly qualified."

Mr. Justice Hawkins: You say Lord Selborne did not have it in his mind, but his language is this: "The act of selling, the act of compounding, and every other definite and particular act mentioned in the 1st section and in the sections by which penalties are imposed are struck at whether the person who does them is a principal to whom the business belongs, or any one whom he employs to carry on the business. The words, 'keep open shop,' may, perhaps, not be so; upon those words I will make an observation presently. But that the word 'sell' is, and that the word 'compound' also is, seems to me clear from that very clause, in the 17th section, that 'for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller.' That, if it does not necessarily mean, beyond all doubt naturally implies, that this a special construction for the purpose of that particular section, and that it is not to be extended to sales generally when mentioned in other sections of the Act."

Mr. Rawlinson: I submit that Lord Selborne was there referring to a person who was in general charge of the shop, carrying on the shop, keeping "open shop." In the case he was dealing with there was a company, which, of course, never came near the shop.

Mr. Justice Hawkins: How do you answer that?

Mr. Rawlinson: I might answer it by the words of Mr. Justice Grove, in the case which has already been referred to: "The object of this Act is the protection of the public, and the protection contemplated by Parliament is that the person who controls the sale of poisons shall be a duly qualified person, so that the public may have a remedy against him, and that he shall be responsible for the state of the poisons, preparations, and labels, and for the shop, and have it conducted in his name." To put it generally, that is, to a certain extent, a paraphraze of what your lordship read from Lord Selborne's judgment, that there must be a duly qualified manager who keeps open the shop generally, that it does not apply to the literal handing over by the apprentice. That is not dealt with by this Act at all. The protection contemplated by Parliament is, that the person who controls the sale of poison shall be a duly qualified person, not necessarily that the woman who hands over the poison, as in that case, or the apprentice who conducts a particular sale, in another case, but that the word "sell" is *ejusdem generis* with keeping open shop, and refers to that man who manages and carries on the real business of the shop, and it is never meant to strike in any way at the apprentice who simply carries out the sale superintended by the manager. I have pointed out to your lordships that this is a penal statute, and unless the words are clear we are entitled to say that the case is not proved against us. That it is a question of importance my learned friend Mr. Finlay has pointed out, for this reason, that it will undoubtedly injure a tremendous number of small chemists throughout the country. It will not, of course, affect people who are sufficiently large to have properly qualified assistants, but it will affect a very large number of chemists in every country town, as was put before the learned County Court judge. It has been the invariable custom for the last twenty years for assistants to sell poisons in this way, provided there is a properly qualified chemist who carries on the main business of the particular shop, and this would be a great innovation, and, if I might say so, a great surprise to a large number of chemists who are carrying on business at the present time. The words of the statute, imposing such a penalty, should be very clear indeed, and should not rest upon inference from other words in the statute. If new legislation is wanted the Society should get it; but it is somewhat hard upon these chemists who are in this position, that for twenty years they have gone on in this way, upon that understanding of the law, and, unless the section is clear, I submit that the penalty should not be enforced in this case.

Their lordships conferred.

Baron Pollock: The court will take time to consider its judgment. It must not be assumed therefrom that at present we have any serious doubt on the subject. From what was said, both by Mr. Finlay and Mr. Rawlinson, the case is no doubt of considerable importance, and whichever way our judgment is it must affect a considerable number of persons—on the one hand the chemists who sell these things, and, on the other hand, the public who have a right to be protected from these things being sold improperly. The matter has been put before us very ably and efficiently, and we should like to consider it before we deliver any actual judgment.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* LAW.

Before his Honour Judge Greenhow and a jury, at the Leeds County Court on the 3rd inst., the Council of the Pharmaceutical Society of Great Britain sued J. W. Law, of 78, York Road, Leeds, to recover three penalties of £5 each under section 15 of the Pharmacy Act, 1868, incurred by defendant on September 6, and October 25 and 29, 1889, in selling or keeping open shop for the retailing, dispensing, or compounding of poison, to wit, a "preparation of opium" called laudanum on each of the said dates.

Mr. Banks appeared as counsel for the plaintiffs.

Mr. Dunn, solicitor, appeared for the defendant.

Mr. Banks stated that the action was brought under the provisions of the Pharmacy Act, 1868, the object of which was to make provision respecting the sale of poisons, and for protecting the public against the danger arising from the indiscriminate sale of poison by unqualified persons. The proceedings were brought and the penalties were incurred under section 15, the dates of the offences being September 6, October 25 and 29 of last year. On each of those occasions a "preparation of opium" known as "laudanum" was sold at defendant's shop. He believed it would not be denied that the business at 78, York Road, belonged to the defendant, and therefore the only questions for the jury were, whether on each of those days a poison, viz., a preparation of opium, was purchased at defendant's shop.

Mr. Dunn: I admit that it is the defendant's business, but I submit that there is a further point, that the sales were made without the knowledge of the defendant and against his express instructions, and that consequently no offence has been committed.

An argument then took place upon the point submitted by Mr. Dunn. Finally, his Honour thought the facts had better be decided by the jury first.

Edith Alice Hargreaves, examined by Mr. Banks: I went to the defendant's shop on the evening of the September 6 last. I purchased a pennyworth of laudanum. I was served by an assistant. He asked me who it was for. I said Mr. Hargreaves. He said it was poison, and if I was not used to take it I must be careful.

In cross-examination by Mr. Dunn witness admitted that she was sent to get the laudanum by Mr. Jones, a neighbouring chemist, who had instructed her, if asked, to say the laudanum was for her father. She handed the bottle with the laudanum to Mr. Jones, and he had kept it locked up.

Thomas Brown, examined by Mr. Banks, proved the purchase of one pennyworth of laudanum and one pennyworth of linseed at the defendant's shop on October 25. He was served by an elderly man, who said to him, "Do not poison yourself."

Cross-examined by Mr. Dunn, witness admitted that he stated he wanted it for a bad finger, and that he handed the bottle with the laudanum to Mr. Jones.

Sarah Hodgson, examined by Mr. Banks, stated that on October 29 last she purchased at the defendant's shop one pennyworth of laudanum and one pennyworth of linseed. The person who served her said: "Now this is the last time you will get it, as there has been so much bother about it, and mind you do not poison yourself."

Cross-examined by Mr. Dunn, witness said that she stated she wanted it for her finger, and that she handed the laudanum to Mr. Jones.

Mr. Jones, chemist, examined by Mr. Banks, stated that he reported the case to the Society's Secretary, and that he had assisted by giving instructions to the witnesses to make the purchases. He had the custody of the bottle containing the preparation purchased by Alice Hargreaves, the other bottles had been kept in the charge of the persons making the purchases. All three bottles were handed over by the witnesses in his presence to Mr. Eastes.

In cross-examination witness admitted having told Hargreaves to say the laudanum was for her father. He had the custody of one of the bottles for three weeks before it was given to the analyst and had not put a seal on it. Neither of the bottles was sealed up.

Mr. E. J. Eastes proved having received the bottles from the witness and having analysed their contents. He found each bottle to contain a preparation of opium.

Mr. Dunn: With your Honour's permission I will reserve my observations until I have called my witnesses.

J. W. Law, examined by Mr. Dunn: I am the defendant. I deal in drugs. I have had fifteen or sixteen years' experience. I have a shop at 78, York Road. I have been fined twice previously for the same offence. I was not living at York Road in October last. On September 6 I was in the Isle of Man. My assistant was not qualified. On September 6 I did not sell or permit anyone to sell laudanum in my shop. My assistant had instructions not to sell poisons. I have two proprietary medicines. I use laudanum in making up one of those medicines; the laudanum was there for that purpose. On October 21 I went through the stock, and there was not any laudanum there. Since then I have made my patent medicines up at my shop in Roundhay Road. On October 25 I had a new assistant named Wright. He had the management from then.

Cross-examined by Mr. Banks: Wright is not with me now. My assistant on September 6 was named Wood. I left the assistant in charge of the shop, and I expected he would be careful.

Re-examined: My instructions to Wood not to sell poison were never withdrawn.

John Wright, examined by Mr. Dunn, said he was in the defendant's employ in October last. There was no laudanum in the shop on October 25 or 29 or between those dates.

In cross-examination witness admitted that he had seen the witness Hodgson before she had been there once or twice. He believed she asked for laudanum, probably on October 29. If he gave her anything probably it was tincture of hyoscyamus.

Mr. Dunn addressed the jury and argued that this action was got up by a rival chemist. He submitted that whatever was done on September 6 was contrary to the defendant's instructions, and that on October 25 and 29 his evidence was that there was no laudanum in the shop, and he asked the jury to believe that no poison was obtained from the defendant's shop on either day. Defendant had been fined twice for a similar offence, and he had instructed his assistants not to sell poisons.

Mr. Banks reminded the jury that if they accepted the defendant's contention it would be saying that the plaintiff's witnesses were guilty of a deliberate and wicked conspiracy, and that there was no evidence to support such a charge. He submitted that the questions for them was whether poison was purchased at the defendant's shop on the dates mentioned. There was a further question: Was it sold contrary to his orders?

His Honour: Gentlemen, those are the questions you have to determine. Before you find for the plaintiff you must be satisfied that the poison was obtained at the defendant's shop, and secondly whether it was sold against his orders. It is for you to decide upon the evidence.

The jury said they were not satisfied that the laudanum was sold on any occasion.

His Honour gave judgment for the defendant with costs.

PROSECUTION UNDER THE SALE OF FOOD AND DRUGS ACT.

At the Birmingham Police Court, on Friday, January 30, Richard Greenway, 46, Stafford Street, was summoned by Mr. Parker, sanitary inspector, for selling adulterated sweet spirit of nitre and saffron.

On December 28, Inspector Parker purchased from defendant 4 ozs. of sweet spirit of nitre and a drachm of saffron. He divided the samples into three parts, and submitted one of each to the public analyst. The certificates of the analyst showed that the nitre contained 50 per cent. of added water, and the saffron 25 per cent of mineral matter and 55 per cent. of calendula florets which had been artificially dyed.

The defendant said he retailed the drugs as he purchased them. It would be hard if he was held responsible for other people's actions.

The Clerk (Mr. Carter): Can you prove that?

Defendant said he could prove it, but it would not pay him to enter into litigation with the parties from whom he purchased the articles, as he would have to leave his business several days. As to the saffron, he did not adulterate it, nor could he tell when he purchased it that it was adulterated. He was a retail chemist and not an analytical chemist. He had been in business twenty-two years, and was sorry this had occurred.

Mr. Ellis told defendant he should be careful from whom he purchased drugs. These were very bad cases, and defendant would be fined £2, and costs in the first case, and £3, and costs in the second.—*Birmingham Daily Post.*

Provincial Transactions.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

The annual assembly was held in the Music Hall Buildings on Wednesday evening, January 29. The company, which was numerous, assembled at 9 o'clock, and dancing was immediately commenced. There was also a contingent of the younger members of the craft from Dundee present.

In the unavoidable absence of Mr. Johnston, the President, a few words of welcome were addressed to the gathering in the middle of the first part of the programme, and thereafter dancing was engaged in till 3 a.m. The M.C.'s., Messrs. A. Royal and J. Spence, undertook their duties with a will, and gave satisfaction to all. About 130 double tickets were issued.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

A supper in connection with the above was held on Tuesday evening last at the Spread Eagle Hotel, Corporation Street. Mr. Councillor R. Gibson was in the chair and was supported by Mr. G. S. Woolley, Mr. W. Bowden, and Mr. W. Wilkinson. After the usual loyal and patriotic toasts a social evening was spent. Forty-nine sat down to a supper which was thoroughly enjoyable to all. Hopes were expressed that another gathering of a similar nature might take place next session.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

What is Lin. Saponis Co.?

Sir,—As "Lanarkshire" in his letter says, I am evidently not aware that lin. saponis is often given when the above is ordered, I wish to state he is right in his supposition.

Had he disputed my placing "opodeldoc" under lin. saponis I might have understood him, but with regard to the above I cannot. I have made inquiry at a great number of pharmacists (in Edinburgh, however), and all agree with my suggestion.

I have searched all the literature in the Society's Library for information, but in vain; in none of the books is the name lin. saponis co. mentioned. Squire says the British Pharmacopœia is the only one which contains lin. opii. Christison gives as synonym for this lin. saponis cum opio, and perhaps you will allow me to offer a theory.

Is it not possible that the name has come into use through the agency of medical practitioners? In prescribing it repeatedly they might have gradually contracted it to the present form, thus, lin. saponis c. opio, lin. sapon. c. op., lin sapon. co.

I readily concur with him that the voice of the profession be heard on the subject, but I see no reason why the older members should be referred to. Are assistants not as likely to know what is supplied in the establishment in which they are employed as the master, or does "Lanarkshire" wish to know what was supplied fifty years ago?

If so, I disapprove of his idea, as, like everything else, we ought to have pharmacy "up to date."

In concluding, I would like to mention that the mere fact, as "Lanarkshire" points out, that opinions differ with regard to a preparation such as this, shows the necessity for synonyms such as I have suggested.

JOHN FINDLAY.

Sir,—Not very long ago I had a prescription to dispense with lin. saponis co. as one of its components. Having some little doubt what was meant, and as the prescriber lived close by, I thought it proper to ask the question. He at once stated that lin. saponis B.P. was meant, and wondered why the question was asked.

I am acquainted with a medical man who dispenses his own prescriptions, and he has in his surgery a preparation labelled lin. saponis simp., which is a solution of sapo mollis, and another labelled lin. saponis co., being the B.P. lin. saponis. I have had occasion to refill bottles for sailors' medicine chests, and found on the sheet for my guidance lin. saponis co. and lin. opii were given as synonyms for opodeldoc, so there is little doubt what they use at sea for lin. saponis co. However, I question very much whether in the ordinary routine of dispensing any chemist would use a preparation other than lin. saponis B.P.

D. HUGHES DAVIES.

Sir,—"Lanarkshire" says that in different parts of the country practice varies. His letter has proved to me that in different parts of Edinburgh practice varies. From an Edinburgh experience of over ten years I have never seen lin. opii dispensed for lin. saponis co.

Of course the question is, which liniment does the prescriber mean? Linimentum saponis co. is not the name of any official preparation, but as lin. saponis contains other ingredients than that which gives the preparation its name, it is essentially a compound liniment.

EDINBURGH.

The Sale of Adulterated Drugs.

Sir,—I forward you a Birmingham paper giving an account of prosecutions for selling adulterated drugs last Friday.

I would call your attention to the defence. The vendor is reported to have said, with regard to the saffron, he could not tell it was adulterated. He was a retail chemist, not an analytical chemist, the meaning of which I take to be that a retail chemist is unable, and ought not to be expected to know if a simple drug like saffron is adulterated.

If it had been a complex article, like tr. camph. co., there would have been some excuse, but carefully looking at saffron will show if calendula is present, while if put in water, as the B.P. directs, it would show at once, as would any insoluble mineral adulterant.

I am told that several other chemists have refused to sell saffron; if that is so, either they knew their stock was adulterated or were incapable of examining it, either of which I think is disgraceful, for when things like this are done, how can a chemist claim higher remuneration than a grocer on the ground that he guarantees the purity of his wares?

Birmingham. DISGUSTED M.P.S.

S.E.L.—See a correspondence on the origin of the word "laudanum" in vol. xvii. of the present series of the *Pharmaceutical Journal.*

Student.—The questions turn upon purely legal points, and should be submitted to a solicitor.

NOTICE.

A meeting of the Chemists' Assistants' Association will be held on Thursday, February 13, when Mr. T. S. Dymond will read a paper on "Crystallography in its Relation to Pharmacy."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Tubby, Johnston, Maiden, M. P. S.

ON THE SO-CALLED DOUBLE CYANIDE OF ZINC AND MERCURY.*

A CHEMICAL STUDY OF THE NEW SURGICAL ANTISEPTIC.

[*Communication from the Research Laboratory of the Pharmaceutical Society.*]

BY PROFESSOR W. R. DUNSTAN.

Sir Joseph Lister has recently drawn attention to the valuable antiseptic properties possessed by a material which is described in many chemical treatises as a double cyanide of zinc and mercury, prepared by precipitating a solution of the cyanide of mercury and potassium with a solution of zinc sulphate (*Lancet*, November 9, 1889, and January 4, 1890). It appears from Sir Joseph Lister's observations that as a surgical antiseptic, a dressing prepared with this material leaves little to be desired. It is distinguished from mercuric cyanide in being devoid of irritating properties, while on the other hand it is found to be superior to zinc cyanide in its inhibitory antiseptic power. An intimate mixture of the two cyanides does not possess these advantages, apparently because the mercuric cyanide is readily dissolved from the mixture, even by cold water, and is then free to exert its corrosive action on the tissues. As compared with other antiseptic dressings the new material appears to owe its superiority in a large measure to the circumstance that being almost insoluble in water, it is not readily washed away from the wound.

During the manufacture of this substance several facts were observed which seemed to throw doubt on the statement that it is constituted of a chemical compound of the two cyanides, but there were other facts which appeared to be explicable only on the assumption that it is a true chemical compound, among them being the experience of Sir Joseph Lister that the substance acts in a manner entirely different from that of a mixture of the two cyanides in the same proportion. Indeed as much might be said for the one view as for the other.

A consideration of these facts convinced me that the question as to the exact nature of the new antiseptic could only be answered by the results of a complete chemical investigation. This investigation was commenced in the Research Laboratory last autumn at the instance of Sir Joseph Lister, who was anxious to learn whether the substance with which he had obtained such encouraging results was a true chemical compound or not, so that he might be able to give directions as to the mode of preparing it of constant composition.

It is stated, on the authority of Rammelsberg, in Gmelin's 'Handbook,' and in other chemical treatises, both English and German, that when the soluble double cyanide of mercury and potassium $HgK_2(CN)_4$, is decomposed with a solution of zinc sulphate, or when the soluble double cyanide of zinc and potassium, $ZnK_2(CN)_4$, is decomposed with a solution of mercuric chloride, an insoluble double cyanide of mercury and zinc is precipitated, the composition of which is probably represented by the formula $[Hg(CN)_2, Zn(CN)_2]$ or $HgZn(CN)_4$, the chemical changes being expressed by the equations :—

$$HgK_2(CN)_4 + ZnSO_4 = K_2SO_4 + HgZn(CN)_4;$$
$$ZnK_2(CN)_4 + HgCl_2 = K_2Cl_2 + HgZn(CN)_4.$$

It is this substance, freed from soluble salts by washing with cold water, that has been prepared for Sir Joseph Lister, and I am indebted to him for having put me in possession of the details which have been followed in the preparation of the material on the large scale. It was observed that in washing the precipitate with cold water large quantities of mercuric cyanide are dissolved from it, only a relatively small proportion, varying from one-fourth to one-fifth of the calculated quantity, remaining in the precipitate. In the absence of knowledge as to the cause of this action, and as to the nature of the precipitate, the manufacture of the substance becomes an entirely empirical operation.

Before beginning a chemical study of the material, I referred to the original paper of Rammelsberg for the details of his method of preparing it, and also for the evidence on which the statement of its composition rests. Rammelsberg's paper is printed on page 131 of the forty-second volume of Poggendorff's 'Annalen.' It contains the first account of the mercury and potassium cyanide which he had obtained in a crystalline state and analysed. It is stated that an aqueous solution of this salt affords a white precipitate when a solution of a zinc salt is added to it, but the precipitate does not appear to have been examined by Rammelsberg, and no analysis is recorded. Rammelsberg, indeed, does not even suggest that the precipitate is a double cyanide. This suggestion evidently originated with Gmelin, who seems to have generalized from the mercury cadmium cyanide prepared by Schüler, which is clearly demonstrated by this chemist to be a compound. Gmelin alludes to the fact that when a solution of mercuric chloride is added to a solution of potassium zinc cyanide a white precipitate is formed, but no perceptible odour of hydrocyanic acid is observed; therefore, he argues, the precipitate is a compound of the zinc and mercury cyanides (Gmelin's 'Handbook,' vol. vii., p. 424 and vol. viii., p. 24). On this slender and inconclusive evidence other writers of chemical treatises have accepted this supposition as correct.

There is no doubt that mercuric cyanide does form a very large number of double salts. Schüler (Liebig's 'Annalen,' 87, 46) has described a double cyanide of mercury and cadmium, whose composition is expressed by the formula—

$$Hg(CN)_2, 1\tfrac{1}{2}\ Cd(CN)_2,$$

and Geuther, Brett, Poggiale, Nylander and others, and still more recently Varet (*Comptes Rendus*, vols. 105, 106, *et seq.*), have prepared compounds of mercuric cyanide with various metallic salts. Varet (*Comptes Rendus*, 92, p. 1417) has also shown that zinc cyanide is capable of forming double compounds. So far then, as previous work goes, there is no proof of the existence of a mercury zinc cyanide, although indications are not wanting that such a compound might possibly be prepared. This being the case it was determined to attempt to prepare a compound of the two cyanides by several methods, all of which would be likely to lead to its formation, provided that the compound exists.

The methods which suggested themselves were—

1. The precipitation of a solution of mercury potassium cyanide with a solution of zinc sulphate $HgK_2(CN)_4 + ZnSO_4 = Hg\,Zn(CN)_4 + K_2SO_4$.

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* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, February 12.

2. The decomposition of a solution of zinc potassium cyanide with a solution of mercuric chloride $ZnK_2(CN)_4 + HgCl_2 = ZnHg(CN)_4 + 2KCl$.

3. The decomposition of a solution containing a formula-weight of mercury potassium cyanide and a formula-weight of zinc potassium cyanide with just sufficient dilute sulphuric or acetic acid to convert the whole of the potassium present into potassium salt; the cyanides of zinc and mercury would thus be precipitated together:—

$$ZnK_2(CN)_4 + HgK_2(CN)_4 + 2H_2SO_4 = ZnHg(CN)_4 + 2K_2SO_4 + 4HCN.$$

4. The simultaneous dissolution of equivalent quantities of freshly precipitated mercuric oxide and freshly precipitated zinc carbonate in strong aqueous hydrocyanic acid,

$$HgO + ZnCO_3 + 4HCN = HgZn(CN)_4 + CO_2 + 2H_2O.$$

The potassium cyanide employed in these experiments was prepared either by extracting the best commercial potassium cyanide with boiling alcohol (almost free from water), whereby potassium cyanide is dissolved, or by passing the vapour of hydrocyanic acid into alcoholic potash, the precipitated cyanide being washed and dried. By this means we readily obtained potassium cyanide free from cyanate and chloride and containing only a very small quantity of carbonate. The preparation of potassium cyanide absolutely free from carbonate is a troublesome operation, owing to the circumstance that the pure salt easily suffers hydrolysis and absorbs carbonic acid from the air. The mercury potassium cyanide was prepared by dissolving mercuric cyanide in aqueous potassium cyanide, or by another method also found to be successful, which consists in the dissolution of mercuric sulphate in excess of aqueous potassium cyanide; the mercuric salt dissolves easily, if added in small quantities at a time, and by recrystallization the mercury potassium cyanide is separated without difficulty from the potassium sulphate. Both methods afforded the substance in well defined crystals. It was not found possible to substitute mercuric chloride for mercuric sulphate, since the double salt cannot be freed from chloride by repeated crystallization, owing apparently to the formation of a compound containing mercuric chloride.

The zinc potassium cyanide was produced by dissolving freshly precipitated zinc cyanide in aqueous potassium cyanide and crystallizing the salt from the liquid. Or more conveniently by adding potassium cyanide to a solution of zinc acetate until the precipitate first formed is re-dissolved. The double cyanide may be completely separated from potassium acetate by recrystallization. If zinc sulphate be employed instead of zinc acetate the potassium sulphate is only removed with difficulty.

Having thus prepared the pure reagents the four above-mentioned processes were successively put into operation for the purpose of ascertaining whether mercuric cyanide will unite with zinc cyanide in any proportion.

Method 1.—This method is substantially the same as that by which the substance used by Sir Joseph Lister has been prepared. Sir Joseph Lister informs me that the process adopted has been as follows: Cyanide of mercury, 24 ounces; cyanide of potassium (about 95 per cent.), 12 ounces 171 grains; zinc sulphate, 27 ounces 159 grains. The potassium cyanide and the mercuric cyanide are dissolved in 4 pints of cold water, and the liquid precipitated by the addition of the zinc sulphate dissolved in 12 pints of cold water. These quantities are calculated from the equation given above. The precipitate is collected and washed with two successive quarts of water (see also *Lancet*, Jan. 4, 1890).

The substance prepared in this manner is a nearly white powder. The composition of a specimen furnished by Sir Joseph Lister was ascertained by analysis. By washing with cold water, until nothing further is removed, the amount of soluble mercuric salt is determined. The total amount of mercury present is estimated by heating the substance with lime and collecting the mercury that distils. The zinc is estimated by precipitation with sodium carbonate after removal of the mercury with hydrogen sulphide, the zinc being finally weighed as oxide. Or the zinc may be determined more simply and with equal accuracy by igniting the original material until a constant weight of zinc oxide remains; any carbonaceous substance which oxidizes with difficulty being removed, if necessary, by moistening the residue with nitric acid and again igniting. The total cyanide is estimated either by combustion, employing a modification of Dumas' method, the nitrogen being collected and measured, or by digesting the substance for about two hours with a hot concentrated solution of sodium carbonate. The filtered liquid is an alkaline solution of sodium cyanide, which is precipitated with silver nitrate and the silver carbonate dissolved by the addition of diluted nitric acid in excess; the silver cyanide is then collected and weighed. These two methods of estimating the cyanide were shown to afford perfectly concordant results.

The results of the analysis were—

Total mercuric cyanide . .	17·77 per cent.
Mercuric salt removed by cold water	2·86 „
Zinc cyanide	67·85 „

There was also present about 10 per cent. of zinc hydrate, or more probably hydroxy-cyanide, originating partly from the alkali contained in the potassium cyanide, and partly, no doubt, from the decomposition of zinc cyanide.

The supposed double cyanide of zinc and mercury, $ZnHg(CN)_4$, would contain 68·6 per cent. of mercuric cyanide; the substance analysed contained less than one-fourth of this quantity, the remainder having been dissolved by the water present during precipitation and by that used in washing the precipitate.

The substance was now prepared by the same method, but more water was added to the solutions before precipitation. The precipitate was washed until quite free from soluble mercuric salt and dried over caustic soda in a vacuous desiccator, to avoid any possible decomposition by heat. The results of the analysis of this specimen were—

Total mercuric cyanide . .	6·77 per cent.
Mercuric salt removed by cold water	None.
Zinc cyanide, including hydroxy-salt	93·3 „

The quantity of water present during precipitation is thus shown to exercise an important influence on the composition of the precipitate. A large quantity of water leads to the retention of much less mercuric salt in a form in which it is not dissolved by water. The amount of mercuric cyanide in this specimen is only about one-tenth of that contained in the compound $HgZn(CN)_4$.

Method 2.—Seven grams of the double cyanide of zinc and potassium were dissolved in water and precipitated by the addition of a solution containing 7·7 grams of mercuric chloride. The entire quantity of water present was rather less than in the preceding experiment. The precipitate was washed with cold water until free from soluble mercuric salt, dried over caustic soda and analysed. The following results were obtained:—

Total mercuric cyanide . .	9·67 per cent.
Mercuric salt removed by cold water	None.
Zinc cyanide	80·61 „
Zinc hydroxy-compound (calculated as hydroxide) . .	7·3 „

This substance contains about one-seventh of the quantity of mercuric cyanide represented by the formula $ZnHg(CN)_4$.

Method 3.—Equivalent quantities of the mercury potassium cyanide and the zinc potassium cyanide were dissolved in water and just sufficient diluted sulphuric acid was added to remove the whole of the potassium. The precipitate was collected, washed until free from soluble mercuric salt, and dried over caustic soda. The following are the results of its analysis:—

Total mercuric cyanide . .	8·46 per cent.
Mercuric salt removed by cold water	None.
Zinc cyanide	84·9 „
Zinc hydroxy-compound (calculated as hydroxide) . .	6·9 „

This method also failed to produce the compound $ZnHg(CN)_4$; the amount of mercuric cyanide contained in it is only about one-eighth of that represented by this formula.

Method 4.—Equivalent proportions of freshly precipitated mercuric oxide and zinc carbonate were thoroughly incorporated and added to a small quantity of concentrated aqueous hydrocyanic acid. Reaction was immediate, carbon dioxide being copiously evolved. The mixture soon lost the odour of hydrocyanic acid. More was then added, until the odour remained permanent after some hours, the mixture being frequently stirred during this time. The precipitate was filtered, washed with cold water until no mercuric salt could be detected in the washings, and dried. It yielded on analysis the following results:—

Total mercuric cyanide . . .	1·6 per cent.
Mercuric salt removed by cold water	None.
Zinc cyanide, including a little hydroxy-compound . . .	98·4 „

This method is no more successful than those previously tried, in producing a double salt of the formula $ZnHg(CN)_4$. It seemed, however, to be a method which might possibly be useful in the preparation of the antiseptic material, since the product is remarkably pure. In the experiment described above a saturated aqueous solution of hydrocyanic acid was employed, and it was thought that the large quantity of water present had prevented the retention of much mercuric cyanide in an insoluble form. Equivalent quantities of mercuric oxide and zinc carbonate were therefore suspended in a little alcohol and the vapour of hydrocyanic acid passed into the liquid until reaction was complete. On filtering and thoroughly washing the precipitate it was found that even under these favourable conditions nearly the whole of the mercuric cyanide had been dissolved.

The analyses which are recorded above of the precipitates obtained by four distinct methods, each of which is likely to afford the supposed compound, provided that it is not decomposed by water, conclusively disprove the existence of a double cyanide of the formula $ZnHg(CN)_4$. Gmelin's suggestion that such a compound may be prepared by precipitating a solution of mercury potassium cyanide with a solution of zinc sulphate or a solution of zinc potassium cyanide with mercuric chloride is clearly erroneous.

Although there can no longer be any doubt that the compound $ZnHg(CN)_4$ cannot exist, yet there remains to be explained the remarkable fact disclosed by the foregoing results that the precipitated zinc cyanide retains some quantity of mercuric cyanide so firmly that it cannot be removed by washing the substance with cold water. In each of the precipitates produced by the four different processes the mercuric cyanide appears to be contained in two forms. The greater part of the mercuric cyanide is evidently in the free state, and is therefore easily dissolved by cold water. A smaller part is not removed by cold water, although mercuric cyanide is a soluble salt. How is this smaller amount of mercuric cyanide retained by the zinc cyanide? Is it (1) chemically combined as a double cyanide? or (2) as a compound of mercuric hydroxycyanide with zinc cyanide? or (3) as a compound of zinc hydrate (or hydroxycyanide)? or (4) is it merely *occluded*[*] by particles of zinc cyanide during precipitation, so that in consequence of a protective coating of insoluble zinc cyanide the water is unable to come into contact with the mercuric cyanide? Experimental investigation alone can furnish a conclusive answer to these questions.

1. The supposition that the mercuric cyanide is chemically united to the zinc cyanide is *prima facie* improbable. First, because the amount of mercuric cyanide retained is not found to be constant, but is observed to vary according to the conditions under which the precipitation has been effected. As much as 15 per cent. has been detected, and as little as 6·7 per cent. Secondly, the supposition is improbable, because the formula that would represent the composition of such a compound stands between

$$Zn(CN)_2,\tfrac{1}{8}Hg(CN)_2 \text{ and } Zn(CN)_2,\tfrac{1}{10}Hg(CN)_2.$$

The first formula corresponds with 22·9 per cent. of mercuric cyanide, the latter with 6·8 per cent. These formulæ are not analogous to those of any of the known double cyanides. Moreover there is no evidence to show that it is not possible to increase the quantity retained beyond the present maximum, or reduce it below the present minimum. The fact that the smallest quantity of mercuric cyanide is retained in the substance made by the reaction of hydrocyanic acid with mercuric oxide and zinc carbonate also tells heavily against the chemical theory, since this ought by analogy to constitute one of the best methods of preparing such a compound.

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[*] It has been suggested to me that some explanation of the use of this word should be given, in view of its special application by the late Professor Graham to designate another, but apparently analogous, class of facts. I therefore take this opportunity of stating that the word is here used in its strictly etymological sense, being derived from *occludo*, "to shut up" or "lock in."

2. The suggestion that the substance contains mercuric hydroxy-cyanide united with zinc cyanide is perhaps less improbable. It is conceivable that owing to the presence of alkali in the potassium cyanide that a mercuric hydroxy-cyanide may be formed.

3. Mercuric cyanide is known to combine with many metallic salts, especially with those containing oxygen. It is therefore possible that the mercuric cyanide may be combined with hydroxide or hydroxy-cyanide of zinc. As a matter of fact, as has already been observed, the material invariably contains more or less zinc in this form, the amount being dependent partly on the alkali in the potassium cyanide employed, and partly also on the decomposition of zinc cyanide during the preparation of the substance.

4. It appears to be highly probable that the mercuric cyanide has been to greater or less extent entangled by particles of zinc cyanide. During the precipitation zinc cyanide and mercuric cyanide are thrown out together; the mercuric salt at once dissolves until it has saturated the water which is present, but among the particles of zinc cyanide which are aggregating to form a precipitate, there will always be some solid particles of mercuric cyanide which have not been able to dissolve, and it seems inevitable that an occlusion will occur of these particles by those of the zinc cyanide which are collecting together to form the precipitate. Thus encased in insoluble zinc cyanide, the mercuric cyanide cannot be dissolved by cold water.

In order to decide between these four hypotheses further experiments were made.

A portion of the precipitate obtained by the first method was re-examined. If the mercuric cyanide be mechanically occluded in the zinc cyanide and not chemically united to it, then it ought to be possible, by breaking down and penetrating with water the aggregation of particles of zinc cyanide, to dissolve away the mercuric salt. The substance was therefore moistened with water and dried for one hour at 100°. It was thought that the slow escape of steam from all parts of the mass, which would occur under these conditions, would be likely to set free some of the mercuric cyanide. The dried salt was washed with cold water, until everything soluble had been removed, and again dried at 100°. This process was repeated four times in succession. On each occasion mercuric salt was set free, and was subsequently washed away with cold water. The substance originally contained 15 per cent. of mercuric cyanide not soluble in cold water.

After the 1st drying and washing it contained 12·0 p.c.
" 2nd " " " " " 10·46 "
" 3rd " " " " " 9·09 "
" 4th " " " " " 8·26 "

It seemed likely that by continuing the successive drying and washing that the whole of the mercuric salt would ultimately be extracted.

Another portion of the salt was therefore boiled for some time with water, it was then thoroughly washed and dried. By this treatment 14·5 per cent. of the mercuric salt, was found to have been removed. This result is in accordance with the hypothesis that the mercuric cyanide is mechanically retained, but it is not conclusive in its favour. If this view be the true one, it ought to be possible to increase the amount of occluded mercuric cyanide by conducting the precipitation under such conditions that the largest number of particles of mercuric cyanide are precipitated at the same time as the zinc cyanide. This state of affairs might be brought about by greatly diminishing the quantity of water present during precipitation, so that little mercuric cyanide can dissolve.

The amount of occluded mercuric cyanide which had been observed up to this time had not exceeded 15 per cent., but no pains had been taken to reduce the quantity of water to the smallest amount possible. An experiment was now made in which, while adopting the first method of preparing the substance, the calculated quantity of potassium cyanide was made into a saturated aqueous solution, the mercuric cyanide was dissolved in this liquid, the process of solution being aided by warming the liquid. The equivalent amount of zinc sulphate was next dissolved in the smallest possible quantity of water, and the two cold solutions were mixed. The precipitate was filtered off, washed with cold water until no more mercuric salt was dissolved, and dried.

Its analysis afforded the following results:—

Total mercuric cyanide . .	36·17 per cent.
Mercuric cyanide removed by cold water	None.
Zinc cyanide, including hydroxy-compound	64·0

Thus by reducing the quantity of water used in dissolving the original substances the percentage of retained mercuric cyanide has been raised to 31 per cent. Here again additional evidence is obtained of the truth of the occlusion hypothesis.

It may, however, be objected that the abstraction of the retained mercuric cyanide by boiling water and also the observed increased retention of the mercuric salt in the absence of much water during precipitation, are facts which are equally well explained by the hypothesis of chemical combination, since the compound formed may be decomposed by water. Thus, it might be urged, when a large quantity of water is present during precipitation the formation of the compound is to a large extent prevented, whilst any compound that may remain will be decomposed by boiling water. According to this view we must hold not only that the supposed compound is decomposed by hot water, but also by the cold water present during precipitation; it has been shown that the larger the amount of water present during precipitation the smaller is the quantity of mercuric cyanide retained in the precipitate. Here there arises a difficulty which the chemical theory cannot remove. If cold water decomposes the salt why does it not extract the whole of the mercuric cyanide during the washing? Other objections to the hypothesis of chemical combination have already been discussed, but it now seemed desirable if possible to dispose of it once and for all by a crucial experiment. If, as may be supposed, mercuric cyanide unites with zinc cyanide to form a compound which is decomposed by water, then evidence of this ability to unite ought to be obtained when these two substances are brought together in the absence of water, and, in order to disprove the truth of the other hypothesis, under such conditions that occlusion of mercuric cyanide by zinc cyanide cannot occur. These conditions are realized when freshly precipitated zinc cyanide is thoroughly incorporated with a strong solution of mercuric cyanide and the mixture evaporated to dryness. As the water disappears chemical combination ought to ensue, and it should be found that cold water is unable to dissolve the whole of the mercuric cyanide from the dry residue. Such a result could only be ascribed to chemical union, since there is little opportunity for occlusion to occur, the particles of zinc cyanide having aggregated before they come into contact with mercuric cyanide; only a very small proportion of the mercuric salt would be locked up in drying the mass. This experiment was therefore made. Zinc cyanide was incorporated with 10 per cent. of mercuric cyanide in the form of a strong solution and the paste was thoroughly dried. Cold water was found to dissolve 9·13 per cent. of mercuric cyanide from the dried material, less than 1 per cent. being mechanically retained. This result finally disposes of the hypothesis of a chemical union between the cyanides of zinc and mercury, and we may reasonably conclude that no such compound exists. There remain for consideration the hypotheses that the substance contains a mercuric hydroxy-cyanide combined with zinc cyanide or a zinc hydroxy-cyanide united with mercuric cyanide. Both of these compounds must be assumed to be resolved into their constituents by the action of boiling water.

If the material contains a hydroxy-cyanide of mercury then this compound ought to be found in the water which has been boiled with the original substance, and from which it has extracted the mercuric salt. This liquid was therefore evaporated and the crystals which separated were examined. They possessed all the physical and chemical properties of mercuric cyanide, and on analysis afforded results which agreed with the formula $Hg(CN)_2$. It was now certain that the material contained mercuric cyanide and that this salt is *not combined* with zinc cyanide, but the mercuric cyanide may be united with zinc hydroxy-cyanide (or hydroxide). To investigate this question an experiment was made in which the proper quantity of mercuric cyanide was dissolved in less than the equivalent quantity of potassium cyanide, a part of the salt being replaced by potash. In fact, the experiment which had led to the formation of a material containing the highest percentage of retained mercuric cyanide was repeated, substituting potash for a part of the potassium cyanide, so that when the zinc sulphate is added to the liquid, zinc hydroxide as well as zinc cyanide will be precipitated. This precipitate was washed with cold water, until no more mercuric salt was dissolved, and then dried. On analysis it yielded the following result:—

Total mercuric cyanide . . .	18·5 per cent.
Mercuric cyanide dissolved by cold water	None.
Zinc cyanide and hydroxy-compound.	82·1.

Now if the retention of the mercuric cyanide had been due to its combination with zinc hydroxy-cyanide (or hydroxide) more would have been retained in this precipitate, which contains a larger quantity of the hydroxy-compound than the precipitate prepared without the addition of potash. As a matter of fact the precipitate containing the large proportion of the zinc hydroxy-compound has retained only 18·5 per cent. of mercuric cyanide while that which contained only a small proportion of hydroxy-compound has retained nearly twice this quantity. It follows, therefore, that the mercuric cyanide is not combined with a zinc hydroxy-compound.

Of the four hypotheses as to the manner in which the mercuric cyanide is retained in the new antiseptic, only one has stood the test of experimental verification, namely, that which supposes that the mercuric cyanide is mechanically retained by the zinc cyanide. With this hypothesis all the facts perfectly accord.

Sir Joseph Lister has stated that the value of this intimate association of mercuric cyanide with zinc cyanide as an antiseptic is largely dependent on its very slight solubility. It is therefore useless to expect that any good result would ensue from the employment of any soluble compound containing mercury, zinc and cyanogen, as, for example, the remarkable compounds containing the mercuric and zinc cyanides, combined with mercuric chloride which have lately been described by Varet. For the present, at any rate, it seems probable that the substance which forms the subject of this communication will be largely employed as a surgical antiseptic.

It is therefore important that manufacturers should know how to prepare it of uniform composition. It has been shown in this paper that the amount of occluded mercuric cyanide contained in the material mainly depends on the quantity of water in which the reacting compounds are dissolved. By increasing the quantity of the water the occluded mercuric cyanide will be reduced to a very small amount, but by diminishing the quantity of the water as far as possible, the amount of occluded mercuric cyanide may be raised to about 36 per cent.; it does not appear to be possible to cause zinc cyanide to occlude a very much larger quantity of mercuric cyanide than this. The manufacturer will therefore have to employ as much water as will lead to the production of a substance which answers best as an antiseptic. So far Sir Joseph Lister has employed a material containing about 15 per cent. of the mercuric salt, but he informs me that the presence of a larger proportion of occluded mercuric cyanide would probably enhance the antiseptic value of the substance. If this should be found to be the case then the quantity of water used to dissolve the reacting compounds must be reduced to a minimum. It may perhaps be useful to mention the details of the process that has been found to answer best. Mercuric cyanide finely powdered is completely dissolved in a warm concentrated solution of potassium cyanide* and precipitated, when cold (12°-15° C.), with a cold saturated solution of zinc sulphate.† The ingredients should be used in the proportions indicated by the equations—

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* In order to prevent the crystallization of the mercury salt from the cold solution 25 c.c. of water must be used for every 10 grams of mercuric cyanide employed.

† If the solutions are mixed while hot more mercuric cyanide will be dissolved and less will be occluded in the precipitate.

$$Hg(CN)_2 + 2\,KCN = HgK_2(CN)_4;$$
$$HgK_2(CN)_4 + ZnSO_4 = HgZn(CN)_4 + K_2SO_4.$$

The potassium cyanide should contain at least 95 per cent. of KCN, but even then a small quantity of a zinc hydroxy-compound will be formed, but its presence to this small extent does not appear to be deleterious. The precipitate is washed free from mercuric salt with cold water and dried, preferably over caustic soda or on porous tiles. If the substance be dried at 100° C. from 2 to 3 per cent. of the mercuric cyanide will be rendered soluble in cold water. It is impossible to occlude the whole of the mercuric salt because the presence of water during precipitation cannot be altogether avoided. If, with a view to economy, a smaller quantity of mercuric salt be employed in proportion to the zinc salt, mercuric cyanide is still dissolved and a diminished quantity is found to be occluded. Under the most favourable circumstances about half of the mercuric cyanide is washed away, but the salt may of course be recovered by evaporating the washings. Mercuric sulphate cannot be advantageously substituted for mercuric cyanide, since although it can be dissolved in aqueous potassium cyanide, more water is needed to keep the products in solution, and therefore less mercuric cyanide is occluded.

In conclusion, I have to express my thanks to Mr. O. F. C. Bloch for the assistance he has renrendered in connection with the experimental part of this inquiry.

[*The discussion on this paper is printed on p.* 663.]

REPORT ON RECENT DONATIONS TO THE MUSEUM.*

BY THE CURATOR.

The specimens presented to the Museum of the Pharmaceutical Society are frequently accompanied by letters containing valuable and interesting information worthy of being placed on record. In some cases the information thus received is fragmentary and requires some additional explanatory remarks. In other cases it is neither possible nor requisite to do so, the notes being complete in themselves.

These notes, I purpose, with the approval of the Council, to throw into the form of a report to be read at the evening meetings of the Society.

I. KRAUSSIA CORIACEA, A REPUTED POISONOUS PLANT OF NATAL.

With Remarks on its Properties, by Professor T. Cash, M.D.

Some months since I received from Mr. J. Medley Wood, the Curator of the Botanical Gardens, Durban, Natal, some berries which he referred to the above-named plant, and which had been sent to him with the statement that they had acted as a poison on those who ate them. Mr. Wood wished to ascertain whether the plant really contained poisonous properties, thinking that it might possibly be turned to account in medicine.

The quantity of berries sent was insufficient for a chemical examination, and under these circumstances, Professor T. Cash, of Aberdeen University, kindly consented to examine them physiologically. In a letter lately received from him he reports as follows:—

> "The berries you sent me must, I fancy, have owed their reputed activity to some volatile constituent. They are inert to frogs, administered subcutaneously; to rats, administered by the mouth and also to myself, one drachm and a half of the tincture made from them being without effect. Of course I shall make fresh experiments before saying decidedly that they are inert."

Subsequently Professor Cash reports, "I took large doses of the tincture on two occasions, but no effect was produced."

It would appear, therefore, that if there be any active ingredient in *Kraussia coriacea* it is certainly not soluble in spirit.

On receiving this report, it occurred to me that there might be possibly two explanations of Mr. Wood's statement.

1. That the berries might contain some principle soluble in water and not in spirit, or two principles which by reaction in a watery liquid might produce a poison, as happen in bitter almonds, etc.

2. That some mistake had occurred concerning the plant which had produced poisonous results.

I therefore asked Dr. Cash to experiment with a cold aqueous extract before concluding that the berries are inert. He reports, in a note received this morning, that neither the berries nor the aqueous infusion produced any result.

With regard to the second supposition, some interesting light has been thrown on it by Mr. N. E. Brown at Kew, who has directed my attention to the close similarity in size, shape and texture of the coriaceous leaves of *Kraussia coriacea* to those of *Acocanthera venenata* and *A. spectabilis*, both of which are recognized as poisonous plants in Natal, the former being well known to kill animals, the most prominent symptom of its action being extreme dysuria. The two latter plants are shrubs, like the kraussia,* and have flowers similar in size and similarly arranged, but the fruit resembles a small plum. It seems much more probable that this fruit would have been eaten by mistake than the small fruits of kraussia, which are no larger than an ordinary pea. I hope, however, to hear from Mr. Wood more exact details concerning the case of poisoning.

II. CINNAMOMUM CASSIA.

With Notes on the Collection of the Bark, from Mr. J. Humphreys.

Mr. J. Humphreys, recently a student of the Society's School of Pharmacy in Bloomsbury Square, on leaving for China a few months since, promised to send for the Museum of the Society the implements used by the Chinese in collecting and trimming cassia bark. Mr. Humphreys has now sent them, and says in the letter accompanying them—

> "According to our Chinese manager the mode of collecting the bark is as follows:—
>
> "Transverse cuts are made round the branch or stem, which is only of the size of one complete quill (viz., about an inch in diameter) at distances of about

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* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, February 12.

* *Kraussia coriacea* differs in having the flowers very hairy in the upper surface of the corolla.

a foot. Then two longitudinal cuts are made right down the stem on each side. This is readily peeled off, and when thoroughly dried presents the appearance of the sample. The chopper-like knife is used for most of the work. The other, a kind of spokeshave, which resembles a plane in its action, is merely to shave off the corky layer or periderm."

He then adds :—

"Our Chinese manager tells me that 'by far the best cinnamon' never gets to Europe and grows wild in a place in Annam. He tells me it differs altogether in appearance from Ceylon cinnamon, being in fact larger than cassia bark. The Chinese pay large sums for it."

I may now point out that until as lately as the year 1884, the exact botanical source of cassia bark was not known with certainty, although it was generally attributed to the tree which is now proved to yield it. The attention of the Colonial office having been directed to the matter by the authorities at Kew in November, 1881, Mr. Charles Ford, the Superintendent of the Botanical and Afforestation Department at Hong Kong, was sent to the cassia plantations on the West River to procure living and dried specimens of the plant. These he succeeded in obtaining, and on November 16 the result of his investigations was brought before the Linnean Society of London by Mr. W. T. Thiselton Dyer. The information then made public has been already published in this Journal, vol. xiii., p. 584.

Mr. Dyer remarked at that time that although the cultivation of the *Cassia lignea* tree has been carried on in Southern China it does not appear to be indigenous there. In Cochin China, however, there appears to be some probability of its being wild. He also quotes Mr. Ford's statement to the effect that very thick cassia bark is sometimes obtained from the trees of ten years old and more, which are reserved for producing seeds to supply the places of the small trees, cut down every year, the ordinary trees being cut when six years old.

These statements throw some light upon Mr. Humphrey's remarks concerning the thick cassia bark from Annam, so that it appears probable that the bulk of the thick cassia bark used in China is obtained from wild trees in Cochin China, small supplies only being obtained from the cassia districts in China, when the older seed-bearing trees are cut down for any reason. The exact part of Cochin China where the cassia tree grows wild is mentioned in 'Pharmacographia,' 2nd. ed., p. 320, as follows:—

"The French expedition of Lieutenant Garnier for the exploration of the Mekong and of Cochin China (1866-68) found cassia growing in about N. Lat. 19° in the forests of the valley of the Se Ngum, one of the affluents of the left bank of the Mekong, near the frontiers of Annam. A part of this cassia is carried by land into China, while another part is conveyed to Banghok in Siam."

A specimen of the thick cassia bark so highly valued by the Chinese exists in the Hanbury collection of Materia Medica.

There are two other points in connection with cassia to which I may now direct attention.

1. Mr. Dyer remarks in the paper read before the Linnean Society (*Journ. Linn. Soc.*, 1884, p. 23) that *Cinnamomum Cassia* is botanically closely allied to *C. obtusifolium*, Nees, one of the species from which a similar product is obtained on the Khasya hills in India. There are specimens of the bark of *C. obtusifolium* in the Museum of this Society from the collection of the late India Museum, received from Kew when the distribution of that collection was effected. This bark differs entirely from that of *Cinnamomum Cassia* in its distinctly fibrous character and in the remarkable coriander flavour it possesses, thus adding another to the many well-known instances in which botanical similarity is dissociated from chemical and structural likeness. It is these curious exceptions that render it so difficult to lay down rules concerning the properties of any one natural order or genus of plants.

The bark of *Cinnamomum obtusifolium* some years since was met with in the London market, and there exists in the Museum of the Society a specimen obtained at the time which had been moistened by steam and bleached with the vapour of sulphurous acid, and was then offered for sale as cinnamon.

The coriander taste of this bark is very marked. Now in 'Pharmacographia' (p. 530) the authors allude to a variety of cassia "vera," occasionally found in the London market, which has a flavour more or less of cinnamon, often with some unpleasant addition suggestive of insects of the genus *Cimex*. This seems indicative of similar chemical changes taking place in this bark to those occurring in the coriander plant, the leaves and unripe fruits of which possess a most offensive odour of a cimex character and quite different from the agreeable fragrance developed in the ripe fruit.

2. I wish to direct the attention of members of our Society and of botanists living in the East to the elucidation of the botanical sources of the several barks so frequently met with in the London market under the names of *Cassia vera* and wild cassia, and which probably come to this country from Batavia, Singapore, Calcutta and Manilla. These barks as a rule contain more mucilage than cassia, the cold infusion made from them giving a thick glairy liquid affording dense ropy precipitates with acetate of lead, but not with alcohol ('Pharmacographia,' 2nd ed., pp. 527, 528, 530).

III. OIL OF LAVENDER.

With Observations on the Cultivation of the Plant and the distillation of the Oil, by Mr. J. C. Sawer.

In the year 1885 I directed attention to the tentative cultivation of lavender and other medicinal plants at Brighton by Mr. J. C. Sawer. He has now presented specimens of the oils distilled from lavender and rosemary, and thinking that he might possibly be able to add something to the already recorded facts concerning lavender, I asked him for any additional information* that he might be able to afford.

In reply Mr. Sawer says—

"A mild damp winter like the present one does more harm to lavender plants than a hard seasonable frost, as the plants are apt to make green shoots prematurely, and late frosts nip off these tender portions, each of which would otherwise have produced a flower spike.

"It is necessary to grow the lavender sufficiently far apart to allow of ready passage between the rows, as the plants soon spread their branches, and it is otherwise very difficult, without injuring the plants, to carry the crop of flowers, if required for distillation. The collection has frequently to be done rapidly when the flower is arrived at a certain stage of maturity, and dry weather must be selected for the work. When the plant once begins to flower the blossoms are shed rapidly, and in damp weather the spikes carry much water and lose fragrance.

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* See *Pharm. Journ.*, [3], xvi., p. 125.

"Some florists in Sussex cultivate a variety of lavender for 'bunching' (*i.e.*, selling in the streets), and they set the plants close together, and the rows also close together. The plants are not so liable to break or split from the stem, in this case, but it is almost impossible to manure the plants or to collect their blossoms without injury.

"The flowers deprived of as much stalk as possible should be distilled, *without previous maceration*, the same day as cut, and not left in heaps, as the flowers rapidly ferment and the character of the oil is quite changed. The still and copper basket employed for rosemary can be used, but of course the condenser and receiver should be different. The receiver should be deep, as the particles of oil passing into it are much smaller than rosemary. If a shallow receiver they might be carried down into the water pipe. The use of the perforated basket is twofold: 1st. It enables the operator to pull out the charge clean, all at once, without 'drawing' the fire, so that the still is ready for a fresh charge. 2nd. It is most important to prevent the flower from scorching by contact with any part of the still. While the basket is being refilled the dirty water is syphoned out and fresh water let in at the same time by a pipe smaller than the syphon, but admitting enough to prevent the copper burning.

"The complement of water is run through the lid of the basket when that has been replaced. The supply of cold water to the condenser must be plentiful, so as to keep the lower half of it always cold. Nearly all the oil will have passed over in half an hour from the time the mass thoroughly commenced to boil; the rest is a heavier oil. The water passing over with the oil should not be returned to the still; the very small quantity of oil saved by doing so would not compensate for the herbaceous flavour communicated to the next running.

"The sample herewith (made as described) is clear, limpid, and pale in colour. It may probably be improved by drying out of it any particles of water held in solution.

"It is said that some consumers add 10 per cent. of S.V.R. to oil which they may have to keep in store, but I find if it be added to *new* oil, in which may remain any traces of water, a peculiar etherification sets in, the odour of which is very unpleasant.

"Mr. Cripps, of Birmingham, has kindly undertaken to examine samples of oil with a view of obtaining analytical data for comparison with other samples of the same oils; as, for instance, the iodine and bromine absorption equivalent, effect of age, etc.

"Of course the tests for adulteration are known, also methods of taking the specific gravity, boiling point, etc."

IV. INDIAN DRUGS.

The following specimens have been presented by Dr. W. Dymock, of Bombay, and the information concerning them is taken partly from Dr. Dymock's letter and partly from his work on the 'Materia Medica of Western India.'

Clerodendron infortunatum and C. inerme.—In the leaves of these plants Mr. D. Hooper has detected a bitter principle, and an acid which he identifies with chiratin and ophelic acid. This discovery is the more remarkable, since chirata belongs to the Gentianaceæ, and clerodendron to the Verbenaceæ, these natural orders being very distinct. The leaves of the *Clerodendron infortunatum* are mentioned in the Pharmacopœia of India as an efficient tonic and antiperiodic, and are said to be used as a vermifuge. The leaves are cordate-ovate, 8 to 10 inches long and 7 to 8 inches broad at the base, hairy and dentate at the margin.

Those of *C. inerme* are much smaller, being only 1 to 2 inches long, oval, smooth and dotted on both sides with dark green dots. The leaves of this species are used as a febrifuge in intermittent fevers.

Alangium Lamarkii.—The root of this tree (which belongs to the natural order Cornaceæ) is used in leprosy, syphilis, and skin diseases. It possesses emetic, diaphoretic and antipyretic properties, and is, according to Mr. Moodeen Sheriff, a good substitute for ipecacuanha in all diseases except dysentery.

Casearia esculenta.—The root of this plant is stated by Dr. Dymock to be of great repute in Goa in cases of hepatic disease and hœmorrhoids. Attention has already been directed to the drug in this country in a paper by Dr. Mootooswamy read at the British Pharmaceutical Conference (*Pharm. Journ.*, Nov. 1889, p. 377).

Chloroxylon Swietenia.—The bark possesses astringent properties, but does not appear to be much used in Indian medicine. The tree yields the Satinwood of India.

Kyllingia monocephala.—This little Cyperaceous plant is given as an antidote to poison. It possesses aromatic properties.

Herpestis Monniera.—Dutt states that this plant is considered to be a nervine tonic, and as such is useful in insanity and epilepsy. Ainslie says that it is diuretic and aperient and is serviceable in cases of dysuria accompanied with constipation.

Adiantum lunulatum.—Used by the Mahometans of India as a substitute for the ordinary maidenhair of Europe, and is employed as a deobstruent and resolvent.

Jatropha glandulifera.—The oil of the seeds of this plant is used as an application to ringworm, chronic ulceration, etc. An account of its properties was published in the *Journal de Pharmacie*, [3], xl., p. 16.

Calotropis gigantea.—The flowers of this Asclepiadaceous plant are used in cough, asthma, catarrh and loss of appetite. The bark of the same plant is used as an alterative, and is said to promote the various secretions of the body, and hence to be useful in skin disease, dropsy, etc.

Asafœtida.—The tears sent are stated by Dr. Dymock to be the largest he has ever seen.

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THE PHARMACY BILL.

THE Pharmacy Acts Amendment Bill that was adopted by the Council at its last meeting may be regarded as furnishing evidence of a desire on the part of the Society's Executive to consider, and so far as may be possible, give effect to the wishes expressed by its members, and to some extent also of that section of the trade which does not in any way give support to the body which ought to be the representative of the entire class. It is not possible at the present time that the interests of any class can be effectively represented, or their protection cared for, except through the instrumentality of a representative organization such as the Pharmaceutical Society, and yet we still find existing the same singular anomaly that existed more than twenty years ago, viz., the great majority of the chemists in the kingdom complaining of grievances and difficulties in the exercise of their business, but still remaining practically indifferent to the only means by which the evils complained of can be attacked and possibly remedied. Within the time mentioned the advantages of registration have been extended; legislation has been obtained to restrict the exercise of the chemist's business to those who possess a legal qualification for that purpose. But the gain thus realized has not been fructified by the general co-operation of the chemists themselves with the object of protecting and advancing the interests of the body to which they belong. Even an association directed exclusively to the conservation of the more material trade interests has failed to command sufficient support, and at the present moment upwards of two-thirds of the chemists on the register are in no way connected with any representative organization. Obviously such a state of affairs constitutes a baneful element of weakness, not only as regards those who are unrepresented, but extending also to a limitation of the influence of the Society which represents British Pharmacy.

It was from some such consideration of the existing condition of pharmaceutical affairs that Mr. HAMPSON brought forward his motion to consider the advisability of including in the scope of the new Bill to be introduced into Parliament some other features besides the provisions for regulating education. The consideration of the question thus raised has occupied the Council on various occasions since then, both in open Council and in Committee, the final result being the adoption of the draft Bill which was placed before our readers last week. The provisions of that Bill will necessarily engage the serious attention of all members and associates of the Society, and it is to be hoped not less that of those who do not belong to the Society. For the present we may omit reference to the second and third clauses of the Bill, which relate to the powers sought to be obtained for further regulating the examinations and for establishing a system of education. This part of the Bill is strictly a reproduction of the Bill of last year, and notwithstanding some amount of anonymous denunciation it may be regarded as having received the assent of the great majority of chemists. It is to the fifth clause of the Bill that we now desire especially to direct attention. Its provisions are intended to alter the constitution of the Pharmaceutical Society, and to afford an opportunity for including within the Society all the associates now in business, and those who enter business after the passing of the Bill. This clause provides that with one limitation, to be mentioned afterwards, every person who obtains registration as a chemist and druggist shall thenceforth be eligible to be elected a member of the Pharmaceutical Society. At present those who pass the Minor examination, and are therefore placed on the register as legally qualified to carry on business upon their own account, can only join the Society in the position of associates, and in accordance with the present constitution two classes of associates are distinguished, viz., those in business on their own account who pay an annual subscription of one guinea, have the privilege of taking part in the public business of the Society and of voting for members of Council. The associates of the other class, who are not in business on their own account, do not enjoy those privileges, but they have the advantage of paying a lower subscription of only half a guinea a year. The associates of the former class have for most practical purposes the same power of taking part in and influencing the action of the Society that members have, but not being pharmaceutical chemists and members of the Society they cannot become members of Council, neither are they eligible as chemist and druggist members. The fifth clause of the new Bill would, as it stands, enable every person passing the qualifying examination to become a member of the Society immediately upon his going into business on his own account, and thus, without the necessity of becoming a pharmaceutical chemist, to become qualified for election as a member of the Council. The limitation attached to this provision and referred to above is that the persons admitted to this position shall be in business on their own account, and the object is to do away with the grade of associate in business altogether, substituting for it a class of members having the same status as the present chemist and druggist members of the Society. It has been argued by some that the distinction between associates who are and who are not in business on their own account is invidious and superfluous, and that both should be free to take the same position if they desired. There is some good reason for this contention, and it is probable that the distinction now made is merely a relic of the original idea that the qualified principal of a business should hold a higher position in regard to the Society than those in the capacity of assistants. That original idea has, however, been so much obscured and transformed by subsequent legislative enactment that there is probably reason for abandoning this relic of it and affording greater opportunity for joining the ranks of the Society in the manner that is provided for by clause five of the Bill. It might even be found expedient to enlarge that provision in the manner suggested by one of our correspondents this week by admitting to membership not only those in business on their own account, but also those who have attained a specified age. There is, however, one other consideration to be borne in mind which presents some recommendation of the present system, namely, that persons in the capacity of assistants can become associates of the Society, after passing the qualifying examination, on payment of the annual subscription of half a guinea. This is an advantage to many which should not be overlooked.

The change in the constitution of the Society which is contemplated and provided for by this clause of the new Pharmacy Bill, is one of far-reaching importance. It opens the door for the great mass of the registered chemists of the kingdom to join hands inside the Society as members enjoying all the privileges of that rank. It would remove the barrier that has hitherto existed to the attainment of that position only through the passing of the higher examination, and there would no longer be the excuse that accidental pressure of business relations preventing chemists from going up for the Major examination shut them out from the possibility of becoming members of the Society. It would also afford an opportunity for augmenting the ranks of the Society and rendering it more representative of the body, while at the same time increasing its power as an organization and its capacity to obtain consideration of such measures as might be found desirable to ing before Parliament. Should this clause of the new Bill become law, its provisions, together with those of the existing Acts, would admit of the whole commonwealth of pharmacy being united in one body, and the only thing that would be requisite in addition would be the earnest co-operation of the individual members in the work of promoting the interests of the body at large. If such active interest in the politics of the body can be excited, if every man who looks to pharmacy for his livelihood would direct his attention not merely to himself and his personal pecuniary gain, but also to promoting the welfare of the body corporate, there would be some hope of improving the state of British Pharmacy. It remains to be seen whether such a desirable response to the action of the Council will be accorded.

At the Evening Meeting of the Society last Wednesday a subject of considerable practical interest was brought forward by Professor Dunstan. Our readers will remember that some months ago Sir Joseph Lister drew attention to the remarkable efficacy of a new antiseptic preparation applicable for surgical dressings. It consisted of what was then supposed to be a compound of mercuric cyanide with zinc cyanide, but some difficulties that were experienced in the preparation of the material led to its investigation in the Research Laboratory of the Society. According to the result of this inquiry it appears that the antiseptic material is not a double compound of zinc and mercuric cyanides, but rather a mechanical association of those substances in such a manner that the mercuric cyanide is no longer soluble in cold water. It is in virtue of the presence of mercuric cyanide in that peculiar condition that the new antiseptic material is valuable for application in surgical dressings as a preventive of bacterial development. The history of the research carried out by Professor Dunstan was given in a very clear and instructive manner, and the conditions under which the antiseptic material should be prepared were fully described. The meeting was not so well attended as the merit of the paper demanded, but Sir Joseph Lister paid a high compliment to the value of the Society's Research Laboratory as affording opportunity for investigation, and rendering assistance to medical men in the solution of difficult problems.

* * *

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, the 19th inst., at 36, York Place, Edinburgh, when papers will be read entitled:—"Notes on Some Gum Samples," by Mr. T. Maben; "The Detection and Separation of Sodium from Lithium," by Mr. J. W. Thomson; "A Simple Process for Estimating the Acidity of Milk," by Mr. J. W. Thomson, and a "Note on Adulterated Anise Fruit," by Mr. W. Lawson. The chair will be taken at half-past eight o'clock.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, February 12.

The fourth evening meeting of the session was held on Wednesday, the 12th inst, the chair being taken by Mr. Michael Carteighe, President, at 8 o'clock.

The first paper read was a communication from the Research Laboratory of the Pharmaceutical Society,

ON THE SO-CALLED DOUBLE CYANIDE OF ZINC AND MERCURY.

BY PROFESSOR DUNSTAN.

The paper is printed at p. 653, and gave rise to the following discussion:—

The **PRESIDENT** said this paper was very important from a surgical point of view, and what struck one at once was that Professor Dunstan had started with the attempt to find a definite chemical compound, whereas, as far as the investigation had gone, he had been obliged to content himself with an ordinary formula. A formula, if definite, and if the percentage of cyanide of mercury were constant, might, however, answer all the purposes required. He would first ask Sir Professor Lister to make any observations he thought proper on the results of this investigation. He understood that Professor Dunstan had supplied him with some of the preparation containing the larger percentage of the cyanide of mercury, but he could hardly suppose he had yet had time to make any experiments with it.

Sir **JOSEPH LISTER**, Bart, F.R.S., said it would be quite unbecoming in him to make any remarks on the chemical value of the paper; but so far as he was able to judge, Professor Dunstan seemed to have proved his point, and on this proof he had brought to bear remarkable acumen. Looking at the matter in a practical view there were three circumstances which struck him as very valuable as the outcome of this investigation. In the first place it had been demonstrated that given this material, wash it as you might with cold water, you could not wash out more than a certain amount; you could not indefinitely wash away the mercuric element. This result was satisfactory, for while the cyanide of zinc itself was to some extent antiseptic, the mercuric element added greatly to its value. It would therefore have been very mortifying to have found that according as one manufacturer or another used more washing the mercurial element would vary. The second practical point shown was that according to the degree of dilution of the solution, there was a variation, not only as he had himself ascertained, in the quantity of the product, but also in the quality. There was a varying amount of the mercurial element in proportion to the zinc according to the amount of dilution of the solution, and it was very important that this should be pointed out in order that manufacturers might be uniform in their action in this respect; and that they might not have one man using a pint of water, and another only a quarter of a pint; because that would alter not only the quantity but also the quality of the product. The third point to notice was that there was a beautiful example of how hypothesis might lead to the attainment of important practical results. Acting on hypothesis Professor Dunstan reduced the amount of water to a minimum, and thereby got more than double the quantity of the mercurial element he had before obtained. He could hardly doubt that if there were no objection to this larger amount, it must be highly advantageous and must increase the antiseptic value of the material. That there was no objection might be fairly anticipated from the fact that washing this stronger product as much as you would, you could not wash out more than a certain amount—the large quantity still remained. As to the precise way in which it was occluded he did not profess to give any opinion; it seemed to him a very difficult question indeed. One might naturally infer that where there was such a large quantity of cyanide of mercury, which when free was very irritating, this new material might itself prove irritating, and that could only be determined experimentally. On the previous day he received a sample from Professor Dunstan, and had only had time to make one experiment, which he made upon his own person. He took a piece of rag and spread upon it some of the substance moistened with distilled water, made into a mud, so to speak, and applied it on the skin of the fore-arm, where there were no hairs; then a piece of thin mackintosh overlapping it was applied, and over that again a piece of what was now no longer to be had in the market—xylonite tissue, which was the dry material of collodion, with a little castor oil to make it flexible when dry. This was put on the overlapping mackintosh, and then a piece of gauze or loose tissue over that, and all fixed down well with collodion, which, of course, went through the meshes of the gauze, and fixed it well down on the skin, and also kept it moist. This was applied at 2 o'clock on the previous day, and at 2 o'clock that afternoon it was removed. At the extreme margin, where the gauze was fixed down with the collodion, there was some irritation caused by dragging in the movements of the limb on the collodion; under the xylonite there was no appearance of irritation; under the macintosh there was a little redness, due, perhaps, to a little of the benzine which had dissolved the caoutchouc remaining; but under the spot where this strong mercurial compound had been the skin had exactly the same appearance as on other parts of the arm. As far as one experiment went, therefore, he inferred that this large proportion of the mercuric element had no irritating property, and he anticipated that this new method of manufacture would prove of great value in surgical practice. He could not but thank the President for his kindness in suggesting that this subject should be investigated in the Research Laboratory, nor must he omit to thank Professor Dunstan for the very able manner in which he had carried out the suggestion. He had been impressed with great admiration at the existence of this Research Laboratory and at the exceedingly handsome terms on which it was thrown open to students of pharmacology. Seeing the enormous advances which were being made in chemistry in all its branches, in therapeutics and in pharmacology, it seemed to him of the utmost importance that Great Britain should keep ahead in some branches of science, as she could hardly hope to do in all, in consequence of the miserably restrictive laws which were in force. But there, at all events, there was no question of cruelty to animals, and he trusted that the experiment which, as he understood it, was for three years, and which was now in its third year, would be continued indefinitely.

Mr. **MARTINDALE** said he had been much interested in the paper, having worked to some extent on the same subject, and it had cast a light on some of his work, about which he was somewhat in the dark. Most of his experiments were conducted somewhat on the lines of the first equation, but he was not previously aware of the difference in the results which might be caused by using hot or cold water. The conclusion arrived at that the cyanide of mercury was occluded rather than chemically combined was supported by some of his more recent experiments. He had tried, as Professor Dunstan had suggested, a direct combination of precipitated cyanide of zinc and cyanide of mercury heated together in an aqueous mixture, but after continuing that for some length of time, filtering and washing the precipitate, it was found that the amount of combined salt had not increased in weight. The paper had also cast a light on the result of using the solution in as concentrated a condition as possible, which was the plan he and his assistant adopted. They always tried to have the precipitate as dense and bulky as possible, as it would then wash more readily than if it were in a finely divided or flocculent condition. There was another point of interest which had not been touched upon. In some of his experiments, on account of the cost of cyanide of mercury, he had tried oxide of mercury, which was readily soluble in a solution of cyanide of potassium, and dissolved with a considerable evolution of heat. The combination took place immediately, and on adding to that a solution of sulphate of zinc acidulated with a little sulphuric acid, they obtained apparently the same reaction as though the true double cyanide of mercury and potassium had been used. The amount of precipitate was much the same, but he could not understand how it was that on adding the acidulated sulphate of zinc there was less precipitate formed. He now saw the reason in the heat evolved. In working on the formula given in Watt's Dictionary, attributed to Gmelin, he was at first disappointed to find that the amount of precipitate formed was not above half, and in some experiments not more than a third of what should be obtained theoretically, according to the equation given, if it were a true double salt. By using solutions cold, and as saturated as possible, they obtained a precipitate which contained a great deal more cyanide of mercury, and he had little doubt that such a preparation would prove to be much more active and valuable as an antiseptic than one containing a smaller proportion of cyanide of mercury.

Mr. **John Moss** complimented Professor Dunstan on the paper, not only on account of the well-devised and conclusive experiments which had been performed, but equally on the irresistible logic by means of which he had carried the whole meeting with him to the same conclusion. They had been warned against using hot water to make the preparation, but it would be as well to ask at what temperature the cold water should be used. Between the cold water of winter at about 50° to 53°, and the cold water of summer at 70° or 75°, there was a very great difference, and it might have some effect on the compound. Of course manufacturers would discover for themselves what would be the best temperature to work at, but if it were laid down beforehand it would prevent many differences in results, and some little trouble in making experiments.

The **President** wished to ask Professor Dunstan why he used the word occluded, which had hitherto been used in a totally different connection. He had a great respect for the distinguished chemist and physicist who introduced it into chemical literature, and he must say he felt a pang when he heard it associated with what used to be called a mechanical mixture. He did not know whether the fact that Joule was to have a statue, and that they were all recently reminded of him, had taken Professor Dunstan away from the mechanical view, but the word had hitherto been restricted to the occlusion of gases, and as one of his first personal acquaintances in the chemical world was the late distinguished Professor Graham, who discovered the wonderful properties of platinum and palladium with regard to the property of absorbing gases, and whose remarkable physical researches and experiments led to the discovery of what he called occlusion, he felt a little uncomfortable at hearing the same word applied to this kind of mixture. No doubt the Professor had a reason for it, and it was very good English, but as the word had always been used in connection with one particular order of facts he thought it would be better if it were not extended to others.

Professor **Dunstan** said the words mechanical mixture must not be taken too literally. It was not a case of chemical combination, but at the same time it was something more than is ordinarily termed mixture. It was a much more intimate association of two substances than could be obtained by merely mixing them together, and he had used the term occlusion in the strictly etymological sense. The cyanide of mercury was "shut in" by the cyanide of zinc in the same sense in which Graham used the word with regard to the "shutting in" of gases by solids, and he did not know that anyone had proposed to restrict that word to the case of gases being shut up by solids; at any rate, he did not see there was any reason for doing so. The word was somewhat unique in its meaning, and it was really necessary to use it. There was reason to believe that what Graham called occlusion in the case of hydrogen was a case of an alloy of hydrogen and palladium. With regard to the amount of precipitate obtained under different circumstances, that depended to a great extent on the amount of cyanide of mercury washed out. If you washed out more than half, or even three-quarters, as happened in one case, of course the bulk would be much less than where only half was washed out. Another point to be borne in mind was the influence of an excess of potassium cyanide, which would dissolve the precipitate to a greater or less extent; an excess, therefore, had to be carefully guarded against. Mr. Martindale had suggested that oxide of mercury might be used in place of cyanide, and he said he had not obtained a good result, possibly because of the heat produced by its solution. But there was another reason; if oxide of mercury were employed potassium hydrate could not fail to be produced, and this would lead to the formation of hydrate of zinc.

Mr. **Martindale** said he made the solution neutral by using sulphuric acid.

Professor **Dunstan** thought if acidulated sulphate of zinc were used there would probably be more water present than would allow of the occlusion of 36·1 per cent. of cyanide of mercury. On the other hand hydrate of zinc also caused the retention of much less cyanide of mercury.

Mr. **Martindale** said he thought this did not occur when strong sulphuric acid was employed.

Professor **Dunstan** said he had not tried the experiment, but he feared the liquid would be too dilute when precipitation occurred. It was certainly desirable to find some substitute for cyanide of mercury, which was an expensive constituent, and he had made a number of experiments in the hope of finding one. Sulphate of mercury was the nearest approach, but it had the objection that so much water must be added that the amount of occluded cyanide of mercury was considerably diminished. Mr. Moss's question raised an important point. He had not yet experimented with water of a lower temperature than 120° C. No doubt using colder water would tend to give a better result, but as the salt would crystallize more readily more water would have to be added to keep it in solution, so that he thought nothing ultimately would be gained by using water having a temperature below 12° or 15° C.

Mr. **Moss** suggested that it would be well to make it part of the instructions to use water at 15° C.

Professor **Dunstan** assented, saying that was about the normal temperature of the water in the laboratory. He was much indebted to Sir Joseph Lister for his remarks on the work of the Research Laboratory. It must be very gratifying to the Society to find that after it had started this Laboratory the College of Physicians in London had instituted one which would be devoted mainly to the pathological side of these questions, the chemical side of which was investigated in the Society's laboratory, and he ventured to hope that before long these two Research Laboratories might be able to work conjointly.

The **President**, in moving a vote of thanks to Professor Dunstan and Mr. Black for this paper, said he did not quite give way on the question of occlusion. He did not think chemistry had absorbed physics, but rather the reverse. He himself had experimented with coal, and obtained such an enormous quantity of what used to be called marsh gas from a piece of coal, that he did not think even Graham in the height of his enthusiasm would have said it was an alloy of the coal. The expression as used by Graham applied to a number of conditions different from those produced by the absorption of hydrogen by palladium, and applied to a number of other bodies, and he could not help expressing a hope that Professor Dunstan would see fit to modify the expression. It was a good English word, but he considered it had been already appropriated, and like a trade mark ought not to be taken away without justification.

The Curator then read a Report on Recent Donations to the Museum, which will be found at p. 658.

The **President** moved a vote of thanks to Mr. Holmes, also to Dr. Dymock and Mr. Humphreys, who had so kindly remembered the Society when away in a foreign country. One advantage of an educating body was that when pupils went abroad they did not forget their alma mater, and the Society's Museum was constantly being enriched by specimens forwarded by old students from all parts of the world.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 5th inst., at No. 11, Harcourt Street, at three o'clock.

The President, Mr. Charles Evans, presided, and the other members of the Council present were the Vice-President (Mr. Wells), Professor Tichborne, Dr. Burnes and Messrs. Beggs, Hayes, Hodgson (Treasurer), and Simpson.

The President said they had all heard of the loss Mr. Merrin a member of the Council had sustained by the death of his wife; and he (the President) begged to move that a letter of condolence be addressed to him on the part of the Council.

Mr. Hodgson seconded the motion, which was unanimously agreed to.

A letter was read from Dr. R. Quain, Chairman of the Pharmacopœia Committee of the General Medical Council, requesting the assistance and the opinions of the pharmacists of Ireland in connection with the preparation of an Addendum to the British Pharmacopœia of 1885.

The Registrar was directed to write to Dr. Quain, stating that the Council would have much pleasure in assisting in the matter, and that they were obliged to the Committee for having brought the matter under their notice.

A letter was read from Mr. R. J. Downs resigning his membership of the Society.

The President: It is a matter for regret that we should lose even one member. Perhaps he will reconsider his decision.

Professor Tichborne moved that Mr. Downs be asked to do so.

Mr. Beggs seconded the motion, which was unanimously agreed to.

A letter was read from Mr. R. Armstrong, of Cootehill, a member of the Society, inquiring whether the license of the Society was accepted in Georgia, U.S.A.

The President said that Mr. A. J. Reid, the United States Consul, had been applied to, but as he had not the laws of the State in his possession he was not able to answer with certainty. Consequently the Registrar was directed to write on the subject to Mr. James Hartford, of 3, Cedar Street, New York, a Licentiate of the Society; and Mr. Hartford had forwarded the following letter, which he had received from Mr. H. R. Slack, analytical chemist of the Secretary's department of the Georgia State Board of Pharmacy:—"January 16, 1890. Dear Sir,—Your letter of the 7th enclosing letter from Mr. A. J. Ferrall received, and in reply will state that the Georgia State Board will recognize a license from the Pharmaceutical Society of Ireland, provided same is granted upon examination. The fee is 5 dollars for licence for the first year, and 2 dollars annually thereafter."

The letter enclosed a printed slip of regulations on the subject.

Mr. Hodgson read one of these as follows: "It shall be the duty of the said board to grant licences to pharmacists who have obtained a diploma from an authorized foreign college or institution or examining board, and who shall exhibit same to the Board of Pharmaceutical Examiners." It would be well to ascertain if a similar rule prevailed in the other States of America.

The Vice-President: The Registrar should write thanking Mr. Hartford for his communication. He has evidently gone to some trouble on our behalf. Perhaps he might be able to obtain the information we want as to what the law is in the other States.

The Registrar said the following was a letter from Mr. Hartford himself, enclosing that of Mr. Slack: "New York, January 21, 1890. Dear Sir,—I duly received your letter of December 24, and would have replied sooner but was waiting to hear from Georgia. I have now much pleasure in handing you the information required. You will notice that the Georgia Board of Pharmacy will recognize the diploma of the Irish Society. As to the other States I regret I cannot give you the information required, but my idea is that if they will not recognize your diploma your graduates need have no fear of the examination. The business, however, conducted in this country by the pharmacist is so different from the old country that he would have to serve his time over again in order to learn it. Enclosed you will find money order for two of my subscriptions."

The Registrar was directed to write thanking Mr. Hartford for the trouble he had taken.

On the motion of the Vice-President, seconded by Professor Tichborne, Mr. Hartford was now elected a member of the Society.

A letter was received from Sir William Kaye, Q.C., Clerk to the Privy Council, enclosing the following report made by the Visitor, Dr. George F. Duffey, on the examinations held by the Society during the year 1889:—"I have the honour to submit, for the information of your Excellency and of Her Majesty's Privy Council in Ireland, the following report on the examinations held by the Pharmaceutical Society of Ireland during the past twelve months. As usual both the Preliminary examination and the Final or pharmaceutical examination for the licence took place quarterly, and were conducted by the same examiners as those in office last year. Fifty-four candidates presented themselves for the Preliminary examination and thirty-two for the licence. These figures show an increase during the year of two in the number of candidates for the Preliminary, but a decrease of eight in those for the licence. Thirty-one candidates were successful and twenty-three failed at the Preliminary examinations. Nineteen obtained the licence and fourteen were rejected at the final examinations. The following table shows the number of candidates annually since I have been the Visitor for each of the two examinations, and the percentage of passes and rejections:—

Year.	No. of candidates.		Percentage passed.		Percentage rejected.	
	Prelim.	License.	Prelim.	License.	Prelim.	License.
1886 . .	46	33	57·8	33·4	42·2	66·6
1887 . .	45	44	52·2	57·	47·8	43·
1888 . .	52	41	54·	61·	46·	39·
1889 . .	54	32	57·7	57·6	42·6	42·4

It will be noticed from the communication dated March 13, 1889, sent by the Registrar of the Pharmaceutical Society for the information of your excellency in Council, in reply to my last report, that the suggestions I had the honour to make in it were approved of by the Council of the Society. The attention of some of the Examiners was directed to certain matters I referred to, and the proposals for the improvement of portions of the examinations that I thought it advisable to make were at once adopted and acted upon. I may mention that my recommendation as to the advisability of examining candidates for the licence as to their knowledge of the legal obligations imposed upon chemists and druggists in the sale of poisons appears to have commended itself to the Visitor of the Pharmaceutical Society of Great Britain, as in his report, dated May 18, 1889, to the Lords of the Council he made a similar suggestion. Analysing the results of the Preliminary examination it appears that of the fifty-four candidates who presented themselves for this examination 31, or 57·4 per cent., passed, while 23, or 42·6 per cent., were rejected. Fifteen of the unsuccessful candidates had also failed at one or more previous Preliminary examinations. Four of these were rejected during this year for the fourth time. The answering, as a rule, was generally indifferent. The highest percentage obtained by any candidate was 72, the percentage on the entire course entitling a candidate to pass being 40. The greatest number of failures was in English (grammar, composition and dictation), and in the subject of weights and measures; eighteen candidates failed in each of these subjects, and sixteen failed in arithmetic. A large number of candidates failed in two or more of the subjects of the examination. Thirteen of the unsuccessful candidates did not obtain passing marks in Latin. But in addition to these thirteen there were at least as many more who were passed, but who also showed gross ignorance of the rudiments of that language. I cannot approve of candidates being allowed to pass their examination, who out of a possible maximum of twenty marks in Latin (easy translation and parsing), and ten marks in elementary botany, obtain only four and two, and two and three respectively; or if candidates who from their inability to answer the most elementary questions in Latin parsing did not obtain (in one case) either a single mark, or (in another case) only got one mark. The lowest percentage on which a candidate passed was forty-four. This candidate (who was not one of those above referred to) scored only two marks out of a possible ten for Latin parsing, and but one mark for elementary botany. In my last report I directed attention to the manifest importance of a good general education to the pharmaceutical chemist; and to the injury that would be done to the status of the Society and to the character of its examinations, by allowing candidates to pass with merely superficial knowledge of some. I regret that the remarks I then made seem still to hold good. In the case of a candidate who fails to obtain a minimum qualifying standard of marks in one or two subjects, but whose percentage of total marks on the entire course might entitle him to pass, it would be well to consider the advisability—as is done lsewhere—of allowing him his examination in the bjects he has passed in. But he should be re-exined in the subject or subjects in which he has failed at the next Preliminary examination, or at some subsequent one within the succeeding twelve months, as might be determined in each case by the examiner or by the Council of the Society. If then successful he should be allowed to present himself for the final or Pharmaceutical examination, without such partial re-examination causing him to lose his year (*vide* Pharmaceutical Examination, Regulation I.). As regards the examinations for the license, I have but little to remark. They have been conducted with efficiency and with fairness to the candidates, and the percentage of passes—as the previous table shows—is satisfactory. The subject in which there were most failures was theoretical chemistry. Ten candidates failed to obtain the minimum pass mark in this part of the examination, but two of these having answered up to the standard in the remaining subjects, were allowed the examination after consultation between the examiners. In practical chemistry—a subject in which there were the largest number of rejections in former years—there were only six failures this year (=16·2 per cent.). The fact that the improvement I noted in the answering and style of work in this subject in my last report has continued, shows, I think, that I was then justified, even after a short experience of the result of the new extended curriculum for practical chemistry (*vide* Order in Council, March 21, 1888), in stating that it "had already produced good results."

Mr. Hodgson: Do not we allow a candidate who has satisfactorily passed in certain portions of the Preliminary examination to come up afterwards and be examined in other portions?

The President: No; the whole thing must be gone through *de novo*.

Mr. Hodgson: How far would it be possible, if a boy be clever and pass brilliantly in one or two subjects, and break down in the others, to allow him credit at a subsequent examination for what he has succeeded in passing in? It is done elsewhere.

The Vice-President: The objection to it is that a young man might "cram" in one subject and pass in it and then "cram" in the others.

Mr. Hodgson: Dr. Duffey suggests the idea.

The President: I would quite approve of it; but candidates should not be allowed to come in prepared to be plucked in certain subjects.

The Vice-President: In the medical examinations they have a great many more subjects than we have, but if you fail in some and not in others, you are afterwards allowed credit for the latter at a subsequent examination.

Mr. Hodgson: The candidate so coming up again might be made to pay a certain amount of fees the second time. He might be charged a guinea at the second examination.

The Registrar: The second examination is now given free.

Mr. Hodgson: But he must come up *de novo*.

The President: Yes, and be examined again in the whole course.

The Vice-President: I think it is a mistake giving free examinations. We lose money by it.

Mr. Hayes: Last year thirty-two candidates were plucked, and their being allowed to come in again free meant a loss of £16 16*s*. to the Society in examiners' fees.

The Vice-President: In the English Society if a candidate is stopped by one examiner it puts him out.

On the motion of Dr. Burnes, seconded by the Vice-President, the report of Dr. Duffey was referred to the Law Committee, with a view to their taking into consideration the suggestions just discussed in connection with both the Preliminary and the Science examination, and reporting to the next meeting of the Council.

A letter was received from the Honorary General

Secretaries of the British Pharmaceutical Conference inviting the co-operation of the Society in an endeavour to increase the membership of that association.

The Vice-President: I think we ought to help the Conference in every way. I have been a regular attendant at their meetings, and I know that these must be a great help to the pharmacists through the country from the amount of information that is brought forward at them. The 'Year-Book of Pharmacy' is really worth the subscription paid. I move that the Registrar be directed to reply to the letter of the Secretaries of the British Pharmaceutical Conference, stating that we will co-operate with them if they will send us the circulars, which the Registrar could send out with our Calendar.

Mr. Beggs: I have great pleasure in seconding the motion.

Unanimously agreed to.

A letter was read from Mr. C. G. Draper, an examination candidate, asking whether, as Easter Monday will fall on the first Monday in April, the Preliminary examination of the Society will be held on that day.

Mr. Simpson: Easter Monday is a recognized holiday. I do not think you could possibly hold it on that day.

Mr. Hodgson said the day was not a religious festival, and he doubted that the Council would be justified in interfering with their settled arrangements.

The Vice-President: The byelaw says that the Preliminary examination shall be held on the first Mondays in January, April, July and October.

The Registrar mentioned that in March, 1887, a similar application was made, and the answer of the Council was that they would submit the matter to the Privy Council.

Professor Tichborne: Did we change the day?

The Registrar: No; we had not time.

The President: We have no power then in the matter without applying to the Privy Council.

Mr. Hodgson: I do not think it would be worth while doing so.

The Registrar was directed to reply accordingly.

A letter from Messrs. C. Griffin and Co., asking the Society to subscribe to the 'Year Book of Learned and Scientific Societies,' was marked read.

On the motion of Mr. Hayes, seconded by Professor Tichborne, it was ordered that no names should for the future be erased from the register without having them previously put in the *agenda* paper, and the authority of the President and Council obtained for their erasure.

Votes of thanks were passed to the proprietors of the *Chemist and Druggist* for the Diary for 1890; to the British Pharmaceutical Conference for the 'Year Book' of 1889; to the Pharmaceutical Society of Great Britain for the Calendar of 1890; and to the American Pharmaceutical Association for their Report of Proceedings, 1889.

A report of the Law Committee was passed.

The Council then adjourned.

Owing to the amount of business the reports from the other Committees were referred to next Council meeting.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The annual meeting of the forty-first session was held at the Royal Institution, on Thursday evening, January 30. The President, Mr. Charles Symes, Ph.D., in the chair.

The minutes of the previous meeting were read and confirmed and various donations were announced.

The Honorary Secretary, Mr. J. S. Ward, now read the annual report, and the Honorary Treasurer submitted his statement for the year, showing a balance in hand of £13 12*s.* 0*d.*

The report stated that during the Session eight ordinary meetings and one special general meeting had been held. At the ordinary meetings some valuable papers had been read, interesting miscellaneous communications made, and discussions upon the Pharmacy Acts Amendments Bill, the Sale of Medicated Wines, and the Railway Rates Bill, taken place. The question of rates was referred to a Committee. The result of the discussion upon the Sale of Medicated Wines was the presentation of a petition from the Association to the Commissioners of the Inland Revenue, stating the case fully, and respectfully suggesting the imposition of an *ad valorem* stamp, in place of the wine licence, as the best way of meeting the case. In reference to the Pharmacy Acts Amendment Bill, it was unanimously resolved that, in the opinion of the meeting, it was undesirable that the Pharmacy Acts Amendment Bill, in the form in which it was then before Parliament, should become law. A special meeting was devoted to the consideration of "Who is intended by the Pharmacy Act to be the seller of Poisons?" and after a lengthy discussion it was unanimously resolved—that in the opinion of the meeting, the Pharmacy Act does not contemplate or authorize legal interference with assistants employed by, and performing duties under the direction of a registered master, and that both in spirit and in letter it regards the master as the seller, the person responsible to the public and amenable to the law. It was further resolved that a copy of the resolution be forwarded to the Council of the Pharmaceutical Society. The Council had had under its consideration the Railway and Canal Traffic Act, 1888, and the proposed New Classifications of Merchandize Traffic and Schedules of Rates and Charges. Acting through a Committee appointed for the purpose, it vigorously protested against the proposed Classifications and Schedules. Another edition of the Liverpool Chemists' Price List had been published, the last edition having been sold out. In this, the eighth edition, the prices have been carefully revised, and in many instances considerably reduced, to meet the requirements of the present system of conducting business, while the addition of all the more recent and popular remedies renders the book a valuable adjunct to the dispensing counter. The Committee appointed to revise the list consisted of Messrs. T. F. Abraham, J. Bain, and J. R. Day. During the Session four new members had joined the Association, and sixteen had resigned, or had been struck off, leaving the numerical strength at the present time 109. Lastly, the Council announced the election of Mr. Chas. Symes, Ph.D., as President for the ensuing Session.

Moved by the President, seconded by Mr. Hocken, and unanimously resolved:—"That the report as read be adopted, and, together with an abstract of the proceedings and a list of the members, be printed and circulated amongst the members."

Proposed by Mr. Hocken, seconded by Mr. Bain, and unanimously resolved:—"That the best thanks of the meeting be given to the donors to the library and museum, and to the authors of papers during the past session."

The election of seven members of Council now took place, and the retiring members, Messrs. A. H. Samuel, T. F. Abraham, B. Dickins, C. Symes, J. R. Day, J. Hocken and W. Welling, were unanimously re-elected.

A discussion upon the advisability of forming a trade committee ensued, in which several of those present took part. The opinion of the meeting upon the subject was divided, and it was referred to the Council for consideration.

A discussion upon the relation existing between the Association and the Liverpool School of Pharmacy, and the advisability of forming a school committee followed, which resulted in referring the matter to the Council.

At a general meeting of the Association held on Thursday, February 13, Dr. C. Symes delivered the following

PRESIDENTIAL ADDRESS.

The notes for my remarks this evening were made before the publication of the draft Pharmacy Bill and the discussion thereon at Bloomsbury Square. I have deemed it better not to alter them in any way, so that they may be put before you as an epitome of my own thoughts on the subject treated of rather than a criticism on those of others. In the early years of my business career I not unfrequently, when the pharmacy was closed (say on Sundays), walked into the centre and took a survey from the opposite side of the counter to that on which I was accustomed to find myself with the object of looking at things from a customer's point of view. I saw, perhaps, certain bottles on the shelves which required filling, a vacant place in one of the glass cases which should have been replenished with stock, in another a state of confusion where there should have been order, and thus soon found work for all the spare time likely to be at our disposal for the coming week. Having found these periodic surveys of considerable advantage, I had almost decided to ask you to spend a little time this evening in endeavouring to "see ourselves as others see us;" but a little reflection showed that, although I assumed the customer position, I really did not, and possibly could not, look at things from his point of view. I was merely taking an all-round look at things as they actually stood, with a full sense of my personal interest in having them right. Now I believe if we take British Pharmacy as it really is for our consideration in the same spirit, and endeavour to find out what we have arrived at, where we are, and to what we are drifting, although the inquiry is sure to be imperfect we shall be better able to accept the responsibilities and discharge the duties which devolve upon us as an association and as individuals at what may be properly regarded as a critical period of our existence.

It will at once be observed that the subject is an exceedingly wide one, and that an attempt to deal with it fully would occupy much of your time and try severely your patience. I must therefore condense my remarks, and assume that as thoughtful men you have been watchful of events, and have, to some extent, reasoned out the probable results; that you have formed an opinion as to whether, either as a trade or profession, we are following a course calculated to lead to solid and lasting progress.

As an Association we have existed for a period of forty years. Although many of the founders have passed away, there are still with us some who can tell the tale of its infancy, its struggles and growth, its periods of depression and those of success.

My personal acquaintance with it and membership date back some twenty-five years, during which time it has passed through some trying ordeals; but it has still continued, and now demonstrates its fitness by its survival. It has done some good and useful work in the past, and the experiences of to-day will to-morrow be interwoven with its history. Thus going on month by month and year by year we are writing that history in which each one, as a member, takes his part, and, I trust, we shall leave our "footprints in the sands of time." Like most provincial associations, it owes its origin, in a great measure, to the Pharmaceutical ociety. As a common parent, that Society has done mething to foster good, healthy, and obedient chiln, but not always with satisfactory results. Some have ceased to exist, others do so chiefly in name, whilst some, left very much to their own resources, have assumed a somewhat independent existence. As a whole, provincial associations cannot be regarded as very successful. This may arise from many causes, but can be accounted for chiefly under two, viz., want of interest on the part of local members of the art, and lack of support on the part of the parent society. The former is undoubtedly the more serious of the two factors and carries the larger share of responsibility, for it is the duty of every man to do something for the general good of the craft to which he belongs. When local effort is not forthcoming the parent society has grounds for not aiding. It is not merely a question of pecuniary aid, valuable as that may be, but there are many other ways in which provincial associations may be assisted.

We can scarcely regard Edinburgh as standing in the same light as other centres, but there, no doubt, local interest is stimulated by the support accorded to it from Bloomsbury Square.

Quite recently the President in his speech on Mr. Leigh's motion:—"That prizes be offered to provincial students,"—argued against it on the ground that it would tend to centralization. Some eighteen months earlier I had in the same place argued that just as the general tendency of the Government of this country was towards decentralization, so must any efforts for the better government and the furtherance of the interests of our body be. But I further held that there should be support from, and a certain responsibility to, the central authority. This latter is an important part of the principle and should not have been ignored, as on seeking further legislation, if anything like good, substantial and permanent results are to be obtained, they must be the result, not of diplomacy, but of the joint efforts of the Pharmaceutical Society and provincial associations. Their interests being identical, their aim must be single, their effort strong and united.

We must recognize this joint responsibility in the pursuit of the subject which I have proposed for our consideration; for, although it is a common practice to blame the Pharmaceutical Society for all the evils which exist, it must be borne in mind that the said Society is just what its members and the trade generally make it. Hence we see that it is not only a question of duties performed or neglected on the part of an association, but on that of individual members of the art also. Whilst most chemists take some, and many an active interest in general politics, how few trouble themselves in the smallest degree about the politics of their own body! Now, could this be altered, could we get every man who looks to pharmacy for his livelihood to take some real interest, not merely in himself and his personal pecuniary gain in its narrowest sense, but in the good of the body corporate, our cause would be materially advanced.

There is one point, however, on which nearly all are agreed and are willing to do their share, viz., in condemning and complaining of the present state of British pharmacy. On the passing of the Pharmacy Act, 1868, great hopes were entertained of the results which were to accrue, and it is scarcely necessary to say that much disappointment has been expressed at these not being realized. That Act was passed in days when stores scarely existed, when branch shops were the exception, and it contemplated the individual pharmacist conducting his business personally or by the aid of assistants. It contemplated regulations which have never been complied with, restrictions which have never been enforced, and its intention has been wrongly interpreted by some of our judges, so that it is little to be wondered at if it is out of gear with the existing state of things. Two of these points have been so recently dealt with that I need not now enlarge upon them, but the non-enforcement of its requirements is a matter that deserves more attention than it has received. Section 16 of the Act provides that "nothing hereinbefore contained (mark the hereinbefore) shall interfere with the making or dealing in patent medicines." Then clause 17 provides that no poison contained in this schedule shall be sold unless labelled as such. Here, as a matter of course, the exemption does not apply, and every patent medicine containing a poison should bear a label to that effect. Now, the neglect of this provision, which is definite and clear, may be regarded by some as a trivial matter, but in reality it is not so. One of the chief objects of the Pharmacy Act was the protection of the public, and it is for that reason that restrictions are put on the sale of poisons. But what use are these when, by the non-administration of the law, any person may sell without the least precaution any quantity of such poisons as chlorodyne, etc.? Had the provisions of clause 17 been duly carried out, not only the public, but the trade, would have been benefited. The unregistered dealers in drugs began by selling patent medicines because it involved no responsibility and they were free from restrictions, and, where ruinous cutting exists, it usually begins with these for the same reasons. Had it been otherwise, it seems probable that we may have been relieved of much of this, as the public would scarcely care to have their groceries and poisons handed to them over the same counter. Of course, in large stores, where there is a separate drug department, or chemist's shop, as it were, within, this remark does not apply with equal force; but it seems clear that an amount of responsibility rests somewhere for unfulfilled duty both to the public and ourselves.

If, then, the Act has by want of adaptation and faulty administration failed to fulfil the purposes for which it was intended, by all means let us have a new one and endeavour to get that more perfect.

We have hitherto been told that the educational measure alone is calculated to do so much for us that it is worth trying for alone, subsequently going forward for what are regarded as less important matters. I cannot think, however, that piecemeal legislation is the kind to be of most benefit to us. It is like erecting a small building and adding thereto from time to time; it is never found to meet its intended purposes to the same extent as it would if built complete in the first instance. There is no probability of obtaining our every want, and we are liable to have something added which we would prefer to be without; therefore it is well to make reasonable requests, but as full as possible.

One anomalous position we hold is that, while we are the legally recognized compounders of medicine, any person can keep open shop for compounding so long as he does not dispense poisons.

I am far from supposing that in these days of free trade we can hope to monopolize the sale of every simple drug, but outside the rights reserved to the medical profession we ought certainly to do the whole of the dispensing. This state of things exists under the Irish Act, which is of more recent date than our own, and we can scarcely imagine that it is not admitted as a principle, but merely as "another injustice to Ireland." Next the stuntified growth and premature decay of the Pharmaceutical Society clearly show that there is something wrong, some reason why it embraces but a small section of our body. The fact is admitted, and remedies have long since been proposed, but up to the present none have been applied. The position seems difficult to realize. A voluntary society exercising legislative powers over double its own number of persons outside and unrepresented—persons who have a vested interest in a business which may be materially influenced by the action of this minority. We are naturally led to ask, has not the time come when this state of things should cease, and every person who passes the qualifying examination become a life member of the Society? This could easily be accomplished if the examination fees were so arranged that every candidate contributed a total sum of ten guineas for his examinations; the Journal, if required, being supplied by a small subscription. At present it is supplied free to members and associates, and is valued by many at what it costs; but let it exist on its own merits, and it would be read and appreciated by all who subscribe to it. There should still be an honours examination, with a fellowship attached, and some other privileges may be added, whilst the fee could well be reduced. One fails to see even now why the fee to be paid for the voluntary examination (although not considerable) should be higher than the others.

The question, too, of exemption from jury service claims our attention, and, although it may require a little perseverance to accomplish our object, there should be no difficulty in showing the necessity of exemption for every man on the register. At present those who are least likely to be supplied with efficient help are most liable to be called on to leave their business for this public service.

Then the poison schedule wants both amending and enlarging. There is some uncertainty about the position of various vermin-killers—as to whether they come under parts 1 or 2 of the schedule—and this should be made clear.

Ferrocyanide of potassium must, or ought to be, labelled "poison," although it is not so; this could be remedied. And there are several poisons, such as carbolic acid, which should be added.

Lastly, there is this word "person," concerning which we ought definitely to know to whom it applies. There are, admittedly, advantages and disadvantages connected with both the old and new readings, and there are differences of opinion about them, but I think that all will admit that ambiguity should cease. I have in no way changed my opinion as to the intention of the 1868 Act; but if the new reading has to be accepted, let the vested interests of those men of mature years, experience, and ability still unregistered be duly recognized and provided for.

Passing from the legal surroundings of our art, scant justice will be done to this review if we do not look at the matter of competition and of the changes which have been introduced into the business by the increased demand for specialities. I have already stated it as my opinion that some of the grocer competition would have been prevented by the enforcement of the labelling clause. The subject is too wide for me to attempt this evening to argue as to whether those who have met this competition in part, entirely, or not at all, have been the wiser men. Certain it is that much of the business in patents, infants' foods, fancy soaps and perfumery has left chemists for the draper, the grocer, and the stores. Were this all, it would perhaps not be so serious a matter; but when we find houses doing a large business in supplying these distributors with a great variety of drugs and preparations put up in an attractive style to sell at exceedingly low prices, and not always with the best regard to quality, we must certainly feel that our *bonâ fide* business is being assailed in a very serious manner. The large number of preparations and specialities from time to time introduced and advertised, more especially by our American brethren, has largely increased our vocabulary and our necessary stock, has made it essential that we should be well posted in the nature, properties, and uses of many medicinal agents which but a few years ago were practically unknown.

These, with others from Germany, tax our knowledge of materia medica and our chemistry, more particulary in reference to coal-tar; they constitute an essential part of our business, and those who would keep pace with the times must be prepared to supply them when required. Pharmacy is a progressive art, of which we have good evidence in the tendency to render our galenical preparations more uniform and definite in strength.

There is slowly growing up among us a better knowledge of the nature of the drugs we deal with, better means for determining their active constituents, and of learning the most suitable menstrua for their extraction and of standardizing the products. For many years the Conference has done useful work in this direction; and more recently the work of the research laboratory has helped to some extent, but in my opinion more rapid progress would be made if the Council of the Pharmaceutical Society would give practical pharmacy and materia medica a better position in their school. Nearly half a century ago there were at Bloomsbury Square distinct professors of chemistry, botany, materia medica, and pharmacy. To-day there are two professors of chemistry, one of botany, but none of the other two subjects. Truly there is teaching of these in an excellent manner, so far as they are gone into; but there should be endowed chairs and more complete training given in both subjects and neither should have an inferior position to the other two. The final object of the teaching there, or at any other schools of the kind, the object of our meeting here from time to time, of my remarks to-night and of any discussion thereon should be the better practice of pharmacy.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The usual fortnightly meeting of the Society was held on Thursday, the 6th inst., the Vice-President, Mr. I. R. Johnson, in the chair. The Hon. Treasurer, Mr. B. C. Robinson, presented his annual statement of accounts, which proved to be very satisfactory. Mr. Robinson, who is leaving Liverpool, was accorded a hearty vote of thanks for his services to the Society since its commencement. Mr. H. Wyatt drew attention to several dispensing queries, and Mr. F. Walker showed specimens of *Carum Ajowan*, both of which give rise to considerable discussion. Papers were to have been read by Mr. Shaw and Mr. Mitchell, but owing to the lateness of the hour when they were reached it was decided to postpone them until the meeting of the 20th inst. Dr. George Tate has promised to deliver his lecture on "The Chemistry of the Yeast Plant," on Monday, the 24th inst.

NEWCASTLE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The usual fortnightly meeting of this Association was held on Wednesday, the 5th inst., in the Mosley Street Café. The chair was taken by Mr. Park, Vice-President, and there was a large attendance. After some preliminary business, the President, Mr. J. Pike, read a short paper and gave a demonstration on Photomicrography, which was very well appreciated. The proceedings closed with a vote of thanks to Mr. Pike.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

At the usual meeting of this Association on Wednesday evening, the 5th inst., Mr. John Currie read a short essay on "Hygiene: clothing, exercise, etc."

A discussion followed, in which Mr. Watson expressed the opinion that if the essay was note exhaustive it was suggestive, and gave, for that reason, opportunity to the members to supplement from their own experience what had been said.

On the motion of the president the essayist, after ving replied, received a cordial vote of thanks.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The eighth meeting of this Association was held in the Silver St. Hall on Friday evening, February 7, the President in the chair. The minutes of the previous meeting being read and approved of the President called on Mr. Clark to read the magazine papers.

Four papers in all had been sent in, and the first one read was entitled "The Curriculum."

The writer maintained that the Curriculum was necessary, and strongly upheld the action of the Pharmaceutical Council in endeavouring to make it legal. The advantages to be derived from such a course of training were discussed, and it was pointed out that a very satisfactory training is to be had at Gordon's College in such subjects as are taught there suitable for chemists.

The next paper, which was a very short one, was on the Pharmaceutical Society. A sketch of the Society and its work was given, and the benefits arising from being connected with it were forcibly set forth.

"Homœopathic Pharmacy" was the subject of the next communication. Some of the homœopathic theories were mentioned, and minute directions were given for the preparation of solutions, triturations, attenuations, and the medication of pilules and globules.

The last paper was entitled "Medicine in Heathendom," and humorously described the art of healing as practised in various uncivilized countries.

A vote of thanks was passed to Mr. Clark for his services as Editor, after which the meeting closed.

At the next meeting, to be held on February 21, Mr. A. Craig, junr., will read a paper on "Toleration."

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The Association met in the rooms, 74, Commercial Street, on Thursday evening, February 6, at 9.15 p.m. There was a good attendance. The President, Mr. John Forsyth, occupied the chair, and after the minutes of the previous meeting had been disposed of, he called on Mr. James Petrie to read his paper on "Water."

At the conclusion several of the members spoke, and the paper was pretty freely criticized, one member remarking that the important subject of mineral waters had, he thought, been unadvisedly left out, in which several others concurred. A hearty vote of thanks to Mr. Petrie and the chairman concluded the meeting.

Obituary.

Notice has been received of the death of the following:—

On the 18th of January, Mr. Robert Speight, Chemist and Druggist, late of Circus Road, St. John's Wood, N.W. Aged 42 years. Mr. Speight had been an Associate of the Pharmaceutical Society since 1872.

On the 26th of January, Mr. James Hammet Hill Howard, Chemist and Druggist, Forest Lane, Stratford. Aged 56 years. Mr. Howard had been a Member of the Pharmaceutical Society since 1869.

On the 30th of January, Mr. George Knaggs, Chemist and Druggist, late of Hunmanby, Yorkshire. Aged 69 years.

On the 6th of February, Mr. William Fox Chapman, Pharmaceutical Chemist, Witham, Hull. Aged 65 years. Mr. Chapman, who was an Alderman of the borough of Hull, was seized with paralysis whilst attending to his municipal duties, and died before he could be removed to his home. His funeral, which took place from the Town Hall, was attended by a large concourse of his fellow-townsmen. Mr. Chapman had been a member of the Pharmaceutical Society since 1853.

On the 6th of February, Mr. Benjamin Lawrence, Chemist and Druggist, Penkridge, Staffordshire. Aged 62 years.

On the 6th of February, Mr. Edward Ernest Morrall, Pharmaceutical Chemist, Quay House, Bridgnorth. Aged 25 years. Mr. Morrall was a Bell Scholar in 1884, and a Prizeman in the following year; and in 1886 gained the Silver Council Medal. He became a member of the Pharmaceutical Society in 1886.

On the 7th of February, Mr. George Exley, Chemist and Druggist, Hunslet Lane, Leeds. Aged 61 years. Mr. Exley had been a member of the Pharmaceutical Society since 1871.

On the 7th of February Mr. James Loadman, Chemist and Druggist, East Bank Street, Southport. Aged 37 years.

On the 8th of February, Mr. George Balls, Pharmaceutical Chemist, High Street, Deptford. Aged 66 years. Mr. Balls had been a member of the Pharmaceutical Society since 1850, and filled the office of Divisional Secretary for the borough of Deptford.

Parliamentary and Law Proceedings.

THE LABELLING OF PROPRIETARY PREPARATIONS CONTAINING POISONS.

At the Town Hall, Wandsworth, on Thursday the 13th inst., Mr. Braxton Hicks held an adjourned inquiry into the cause of the death of a child named Herbert Charles Myring, aged four years, which occurred on the 12th ult. On the last occasion the mother of the deceased deposed to the child being taken ill, and to subsequently finding on the floor of the room where the child was lying ill a bottle labelled "Compound syrup of camphor, or cough linctus," prepared and sold as a patent medicine by Mr. Matthias, a chemist carrying on business at 6, Railway Place, Fenchurch Street. Mrs. Myring, on making inquiries of her children, discovered that the deceased and his sister had taken the contents of the bottle between them, the deceased taking by far the largest quantity. Witness said if she had known that the bottle contained poison she would have kept it locked up in a cupboard.

Mr. Hibberd, who made a *post-mortem* examination of the deceased in the presence of Dr. Dodson, said the body was well nourished, but the general appearance appeared to be ricketty. The mucous membrane of the stomach and the intestines appeared to be healthy. In his opinion the immediate cause of death was asphyxia, consequent on the condition of the lungs. If the child had taken a fatal dose of morphine he should have expected death to have ensued sooner than it had. The symptoms in the present case pointed to a slow death.

Mr. Mortishead (assistant to Mr. Matthias) said the compound "syrup of camphor" was composed of honey, syrup of tolu, tincture of cardamoms, squills and morphine, each bottle containing 2 grains of morphine. It was sold as a patent medicine, each bottle being stamped. If it were labelled "poison" people would not buy it.

Dr. Dodson was then examined. He said he attended the deceased, and in his opinion the child exhibited symptoms of narcotic poisoning. He administered an emetic, and gave directions that the child should be kept awake. On the second occasion that he visited the child he administered a hypodermic injection of ammonia. He attended the post-mortem with Mr. Hibberd but did not quite agree with that gentleman. The injection and the general treatment of the deceased had no doubt prolonged life.

Dr. Thos. Stevenson, Lecturer on Medical Jurisprudence at St. Thomas's Hospital, had analysed the medicine in question, and in his report said morphine was its most potent ingredient, each fluid ounce containing ·476 of a grain of acetate of morphine. He had examined the various parts of the body submitted to him for analysis; the condition of the lungs was such as was usually found in cases of death from narcotic poisoning. When persons were suffering from incipient bronchitis or inflammation of the lungs they were extremely susceptible to small doses of opium or morphia.

Mr. John Jackson Matthias, vendor of the medicine in question, said it was compounded from a prescription used at the Bristol Infirmary, with the slight modification that he substituted morphine for syrup of opium. Each bottle contained 4 ounces, or thirty-two adult doses. The bottle was not labelled "poison," it not being compulsory on him to do so.

The Coroner: That is a question I have very grave doubts about. Morphine is one of the preparations of opium?—Quite so.

On what ground do you say it is not compulsory?—Simply from the custom.

The Witness then produced a bottle of Easton's Syrup which he said contained strychnine. He had that day sold it to a customer and labelled it "poison," but the customer had returned it, saying he must go to Allen and Hanbury's for it, as they never labelled it "poison" There was not enough morphine in one bottle of his compound to poison an adult if he took the whole bottle.

Do you think it is sufficiently labelled to comply with the 17th section of the Pharmacy Act?—I rely upon the custom. I sell this as a patent medicine.

Can you tell me what you consider a patent medicine? Do you call it a patent medicine because it has a Government stamp upon it?—Yes; that is one reason, but it is really a proprietary article.

Any medicine that comes under the second part of Schedule A has, under the 17th section, to be labelled "poison?"—Quite so.

The Coroner, in summing up the case to the jury, having gone in detail through the evidence, referred to the Pharmacy Act of 1868, which he said was passed to control the sale of poisons. By the 17th section it was provided that it should be unlawful to sell any poison, either by wholesale or retail, unless the box, bottle, etc., in which it was contained was labelled with the word "poison." By part 2 of the schedule to the Act it was defined what the poisons were, among them being all preparations of opium, of which morphia was one. In the present case the only suggestion that there was as to the dangerous nature of what was contained in the bottle was the following:—"To be kept out of the reach of children, as it is sweet, and they may take too much." There was no indication that it contained poison, but simply that it was sweet. From the evidence it was conclusive that if the bottle had been labelled poison Mrs. Myring would have done as she did with all poison bottles —have locked it up in a cupboard. In his opinion the present case exemplified the wisdom of the Legislature in the restrictions it had imposed, and it was because the preparation had not been labelled poison, and the person who had bought it therefore had no knowledge that it was dangerous to take in large quantities, that it seemed to him that death had been occasioned. The compound with which they were dealing had been called a patent medicine, but it seemed to him that the word had often been very much misused. There was no justification, according to the strict rendering of the law, for saying that because a person paid the Government stamp duty on a bottle of medicine that that made it a "patent medicine." He thought the attention of the Legislature ought to be drawn to the fact that an enormous number of articles containing poison were sold by unqualified persons; for instance, he would mention chlorodyne, which could be obtained at any grocer's shop. It had become the custom not to obey the 17th section of the Pharmacy Act by labelling proprietary articles which contained poison with a poison label, and he thought the attention of the Legislature ought to be drawn to this mixture also. He was not alone in this opinion. Coroners were constantly meeting with cases of poisoning which would not have happened if the ordinary precautions had been carried out in the spirit as well as the letter. Some check ought to be put upon the sale of medicines, whether patent or proprietary, when they were made in breach of the Act which was passed for that very good purpose, the protection of the public. Coroners had to deal with the mixture as representatives of the public; they could not deal with it as a trade question. It had been said if the Act were to be carried out as he suggested it ought to be, it would injure the trade. If the trade had read the Act of Parliament as he read it, he thought it would be found that if they had carried it out in the spirit as well as in the letter, it would have been an enormous protection to the trade, and therefore a protection to the public, because they would then have prevented unqualified people, simply for the sake of gain, sowing broadcast all over the land poisonous drugs. If the spirit of the Act were loyally acted upon by chemists and druggists, who got a large monopoly under it, there would not be so many cases of unfortunate misadventures, suicides and murders. If he was correct in the view he took of the law he thought the jury would agree with him that the Act would be the very thing the chemists as a body would desire; it would not only protect the public but it would protect the trade.

The Jury without retiring returned a verdict that the deceased met with his death by narcotic poisoning through misadventure. They expressed the opinion that all bottles containing poison should be so labelled.

The Coroner said he should write to the authorities and say that the jury agreed with him in thinking there should be greater restriction in the sale of poison. Addressing Mr. Matthias he said it was very possible that he should order proceedings to be taken against him under the 17th section. He should do this not from any feeling against Mr. Matthias personally, but simply because he thought it right that public notice should be taken of the matter by some authority

Correspondence.

The Pharmacy Acts Amendment Bill.

Sir,—Referring to the fifth clause, I cannot see what our Society has to do with the question whether a man, so long as he be a qualified man, be in business on his own account or not. Surely, sir, a man ought to be allowed to please himself in this respect without forfeiting the right to representation extended to others who hold the same pharmaceutical qualification, but who elect to trade on their own account.

We find some of our qualified men taking up the rôle of commercial travellers representing the drug houses: men in whose power it is to influence the Society's affairs to no small extent; others as managers or assistants holding responsible positions in our large and representative houses; others as managers of branch establishments, and in making a change at all it is inconsistent not to recognise the claims of these men equally with those who elect to trade on their own account, but who hold no other qualification pharmaceutically. The President in his remarks explains that the reason the Committee took the view they did of this particular question is, that a large number of young men prefer to remain as associates for a period anterior to going into business, say at twenty-five. This, sir, might still continue, but at twenty-five the opportunity should be provided for all qualified men to become members. Perhaps, sir, it is not too late even now to make a suggestion. It is this: that after the words "in business on his own account" the following be inserted: "or shall have attained the age of twenty-five." Clause 5 would then read, every person who has obtained, or who shall obtain, registration as a chemist and druggist, and being in business on his own account, or shall have attained the age of twenty-five, shall be eligible to be elected a member of the Pharmaceutical Society of Great Britain, according to the bye-laws thereof, etc., etc.

JUSTITIA.

Sir,—On reading the new Pharmacy Bill in the Journal of this week I was surprised to see that the Council do not intend to insert that important clause framed by Lord Milltown. I think it but fair and just and what the public demand. But as regards qualification by incorporation that will have to be attempted with caution. When the last Bill was before the House I was in correspondence with several active members, who stated that they would not support anything but for the benefit of the general public.

ALBERT GOWAN.

Sir—What is wanted is that every chemist's shop shall be conducted by a duly qualified man, one man to one shop only, unqualified assistants and apprentices to be employed only under the direct supervision of the qualified person in charge. All persons having the Minor qualification to be exempt from jury service. No doubt some will say, if they want exemption, let them pass the Major. But it is not every one that has the cash to spare to go through the Major. In the medical profession it is not requisite for a man to be either an M.D. or a F.R.C.S.; if he has a single qualification, from L.S.A. upwards, he is exempt. I consider a person who has passed the Minor is more entitled to exemption than either an unexamined pharmaceutical chemist, an unexamined dentist, or an unexamined veterinary surgeon, and if the Council wants to have more support from the trade it should include an exemption clause in the proposed new Act.

VERACITY.

Lin. Saponis Co.

Sir,—If Mr. Findlay will refer to Phillips' translation of the P.L., 1836, under the head of Lin. saponis he will find that in the P.L. for 1824 and 1809 and in one edition of P.L., 1788, the official name of soap liniment is linimentum saponis compositum.

W. WILKINSON.

Sir,—Soap liniment was called lin. sapon. co. in the London Pharmacopœia from 1788 to 1836, at which date "compositum" was omitted.

NEMO.

NOTICES.

Chemical Society.—A meeting of this Society will be held on Thursday, February 20, at 8 p.m., when papers will be read on—"The Behaviour of the more Stable Oxides at High Temperatures" by Messrs. G. H. Bailey and W. B. Hopkins, and "The Influence of Different Oxides on the Decomposition of Potassium Chlorate," by Messrs. G. J. Fowler and J. Grant.

The Glasgow Chemists' Assistants and Apprentices' Association will hold a Conversazione in Rosemount Academy, Sauchiehall Street, on Friday evening, the 21st inst. Tickets may be obtained from the Secretary, Mr. A. K. Chalmers, 90, Sauchiehall Street.

Midland Counties Chemists' Association.—A meeting of this Association will be held at the Mason College, Edmund Street, Birmingham, on Tuesday, February 18, at 8.30 p.m., when a paper will be read by Mr. F. J. Liverseege on "Optical Illusions," illustrated by numerous experiments.

We have been compelled from want of space to defer the publication of several letters and reports.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hartness, F. Reynolds, Williams, Balkwill, Grierson, Learoyd, Johnston, Morecombe, Blunt, W. G. M., Birmingham Major.

THE PUBLIC TEACHING OF PHARMACY.

BY JOSEPH INCE.

Pharmacy is a branch of medicine; it has two sides; one which pertains to trade and another which is so far professional as it relates to science.

The closer the union of the two, the better the position of the pharmacist.

Let us accept these propositions frankly and adopt them not as sentiments but as rules of action. The spirit of the times runs strongly in that direction and the well-being of pharmacy depends upon their practical acceptance.

Pharmacy in the abstract can scarcely be defined; it is difficult, if not impossible, to draw a strict line which may separate it from the allied sciences on which it is based, or accurately to describe certain subjects as being purely chemical or pharmaceutical.

Facts relating to weights and measures, density and specific gravity, the laws of heat, the theory and practice of distillation, are the common property of both, though their applications are in the main distinct.

We must therefore take a broad view and say that while arbitrary divisions are untenable, there is a general and true sense in which pharmacy may be regarded as a distinct branch of knowledge.

Pharmacy is that art which concerns the business of a chemist and druggist; which treats of the medical value of drugs, their combinations, remedial applications and preparations; which includes the whole range of galenical information contained in an official pharmacopœia, and in such standard treatises or current literature as serve either as commentary, explanation or amplification of the text.

It includes the practical knowledge of apparatus and appliances specially designed for the production of medicaments. It may claim as more specifically its own an exhaustive study, practical and theoretical, of the processes of comminution, extraction and percolation, and the study of various other processes in their direct relation to pharmacy and medicine.

While it derives splendid advantage from other sciences, of which chemistry is chief, it yet has a province of its own. Pharmacy, as the ally of medicine, is the art by the aid of which the written formulæ of the physician are read and accurately dispensed; also as an ally it should be for ever on the watch against errors which arise either from haste, or from imperfect knowledge of the laws of combination. There is an idea rooted and grounded not in charity, but tradition, that pharmacy should be taught exclusively at home, and that all that is necessary to be learnt in connection with the art may be gained behind the counter.

It is a settled conviction in the minds of many that owing to defective arrangements between master and apprentice the School has risen as a regrettable necessity, but that in the good time coming, when masters are more competent to give instruction, and attendant circumstances are more favourable, the primitive order of things will be restored and the public teaching of pharmacy will be numbered with things of the past.

These sentiments seem founded on a misconception of the bearings of the subject, and an endeavour will be made to state the case in the fairest manner.

Let it be explained that by the word School no allusion to any particular institution is intended to be conveyed.

Every true pharmacist hails the establishment of a School of Pharmacy all over the British Empire.

There is no desire to suggest that existing masters are incompetent to teach or illiberal in their arrangements.

The view presented is based on daily experience of a fairly direct character and of ancient date.

What can the shop (let the word be forgiven) teach?

Something indispensable and of incalculable advantage. There only can an apprentice learn business habits, neatness, despatch, the love of order, trade values, and a knowledge of an infinity of minor details which are essential to his subsequent success.

There he forms a familiar acquaintance with the general appearance and physical characters of drugs.

The pharmacy is the real school in which he learns to distinguish one preparation from another and acquires the art of Recognition. The label ceases to be the sole guide to the contents of the bottle. Later on, with more experience, he may be trusted to compound, that is to put together many of the simpler forms of these drugs and preparations, until relying on further knowledge, which will be in direct ratio to his powers of observation, he may safely enter upon dispensing.

In all this he will gain immeasurably by a continuity of work which no public teaching can devote to pure pharmacy, owing to the varied subjects which an official course must of necessity embrace.

Home teaching moreover may supply a certain knowledge of the literature of pharmacy as contained in the British Pharmacopœia or other standard manual.

Now wait, while for the sake of an impartial survey some other matters are enumerated.

We must look to the provinces and a few exceptional pharmacies for such a preliminary training as that described above. Few great establishments will now take an apprentice or engage an assistant in order to teach him these things.

The masters of these first-class houses are most competent instructors, but they have to superintend important business and not to keep a school.

Then comes the answer over which we rejoice. The system of apprenticeship in Great Britain needs revision, and that mode of training which is now ideal should be made compulsory. Then, indeed, the Universal School of Pharmacy will be exalted to its right position, for it is a youth so fitted and prepared, and with this sound preliminary instruction, who is welcome to its curriculum. No school of pharmacy should have to teach the rudiments of Latin; a student who is no longer an apprentice should know his grammar, and be able to construe an ordinary prose sentence correctly and with ease.

Something, therefore, demands imperative alteration prior to the apprenticeship, and that is the removal of the too common want of a liberal education. Our youth are not fairly dealt with, for they are thrust into a semi-professional business without that average scholastic groundwork which in their case is a necessity and not a polite accomplishment.

The session opens; the students congregate, and the lecturer begins to explain pharmacy. The reading of autograph prescriptions must come first, for how can a man learn to dispense that which he cannot read?

A hindrance, in the shape of a large unhewn stone, blocks the threshold; the student is wearying over verbs, adjectives and construction when he should be making himself familiar with the endless variety of medical combinations, and the handwriting in which those combinations are expressed. Sorely is the lecturer embarrassed when he finds that he must put back this part of the subject for a month because, comparatively, few know sufficient Latin to understand the meaning of the words.

When this difficulty has been surmounted, one specific advantage of the public teaching of pharmacy appears. Excepting historic houses, which command the sweep of dispensing practice in their own circles, no private pharmacy can compete with the abundant illustrations of prescription formulæ, gathered from all sources, heterogeneous and characteristic, which a school can offer to its students. Trade interests are not at stake, and kindly pharmacists are ever ready to augment its stores.

Let none suppose that it is the intention of these remarks to run a comparison between home and public teaching to the exaltation of the latter. We consider that this is the unique origin of the misconceptions relative to the subject. Both are essential; the one is the complement of the other. Home training is indispensable to the future chemist and druggist; a public course is the continuation and indispensable development.

The School takes the student by the hand at the very point at which he wants substantial aid and enlarged experience. This is afforded by an immediate introduction to systematic dispensing, embracing every known method; selecting such as have stood the test of time, and explaining all. It cannot be too clearly understood that the dispensing of a crowd of miscellaneous formulæ, illustrating no principle, chemical or pharmaceutical, is totally without value in an educational point of view.

The School takes the student by the hand at the critical juncture when he begins cordially to dislike, because he fears never to grasp, the multifarious formulæ of the British Pharmacopœia. He is bewildered by the multitude of facts which he must learn; the similarity and yet the differences which exist in whole groups of preparations; the component quantities sometimes essential, sometimes arbitrary, which the formulæ contain; the tests, with the reason for their introduction, and the lessons which they teach. Nothing more monotonous or distasteful can be imagined than to attempt mechanically to commit to memory the disconnected series without cheerful guidance. We are far from disposed to overestimate what is termed the lecture system, but in this particular instance it is an effective method of instruction.

The whole subject is presented in a connected nd an intelligible shape, and the lecturer is not hful to his trust who does not to the utmost of his ability endeavour to render an otherwise disheartening study attractive to his hearers.

Let him link these disjointed elements together; illustrate his observations by diagrams, drawings, tabulations, and by actual specimens; let him demonstrate each test and speak to the students without note or manuscript. Then the dead bones will live, and will come to life all the sooner, as the student conceives the hope of recollecting their articulation.

The School takes the student by both hands when it opens for him a working laboratory in which all these preparations are to be individually made. That is the end which crowns the work, and without this personal manipulation, the best theoretical teaching is of sadly diminished use. A man may hold strong views (and he should) but he will do well also to cultivate a broad generosity of thought. The wise king had wisdom and largeness of heart, and it is in this spirit we should approach this and other questions.

The pure chemist is apt to despise pharmacy from its association with the till; the trade pharmacist is apt to despise technical education because he fears it may set a man above his business.

So, at the outset, it not infrequently does, just as an Oxford training upsets for a brief period the most spiritually minded curate when he exchanges the amenities of college life for the charge of a rural parish.

If there be anything in the man, and if he be worth his salt, this phase will pass; the curate will become the devoted servant of his flock, and the assistant will become the right hand of the most apprehensive master.

To this very point we would lead these reflections. Our youth are urged to enter upon a course of study, not to qualify for the professor's chair, nor to take high rank as scientific men, but that their possibilities of success in business may be infinitely extended. Viewed in this light, a compulsory examination which exacts systematic training is a benevolent institution. Who are the men who at this moment stand before the world as examples of trade prosperity? Those who in their own persons are the living illustrations of the value of acquired business habits and of systematic education. They will be succeeded by their sons, who are by no means deficient in a sound practical knowledge of pharmacy, who know its ins and outs, who can dispense fairly, and who are well posted in the routine of pharmaceutical details, and who yet are the most industrious, plodding and attentive members of a public class. They put to shame the race who consider themselves omniscient, which is an error.

The keen competition of the age has changed the aspect of affairs. Time was when the sage sat in his chamber, which was stuffy; above, in full swing, was his crocodile, which was stuffed; below, in full swing, was his science, which was stuff. But he passed for a learned man.

Time was when the pharmacist smiled behind the counter and held converse with an ancient dame about her internal organization and that sweet sermon on Corinthians. But he passed for a learned man.

Pretension, like the poor, will be always with us; but we must make pharmacy a serious study if we hope to maintain our ground. We advocate with whatever power we may possess the direct union and complete understanding between the pharmacy and the school.

The public teaching of pharmacy will not do everything. It will not inevitably change the character of the student. Some will come to escape the tedium of business, some for amusement, many more to pass an examination content to learn so much and not an atom more.

There will always remain a chosen number who love work for its own sake. The better they have been prepared at home, the better will they succeed; and to them specially will be the advantage of the Public Teaching of Pharmacy.

LESSONS FROM FIELDS AND LANES.

FEBRUARY.

To the student of field botany an early start is half the battle; the plants to be found in flower early in the year are few, and are therefore more easily named. The profuse vegetation of the summer months is apt to confuse the beginner, from the enormous possibilities which it offers. The earlier the start the fewer the possibilities as spring wears on, and the clearer, therefore, the course. Just as an invading army is careful to secure all the enemy's outposts before advancing into his country, so must the student secure all the floral outposts which spring throws in his way before attacking the main body provided by summer. One year of steady determined field work will furnish the foundation of a life-time's pleasure. The present season is an exceptionally early one; plants which are in flower now would not, in an average season, be in the same condition for another six weeks or two months.

The present year's series of articles is intended to form a sequel to those of last year, and should, if possible, be read in conjunction with them. It is impossible in one article to do justice to all the plants to be found during the month in which it appears. It has, therefore, been thought advisable to spread the articles over two seasons; but even with this arrangement it will only be possible to refer to those plants which are most common, most striking, or most typical. It is hoped that thus the student will be able to follow them with greater interest and therefore with greater profit.

A country walk during the present, or, indeed, the latter part of last month, is sure to reward us with some catkins, or "lamb's tails," as the country children call them. The most conspicuous catkins at the present time are those of the hazel. This, like most of our wind-fertilized trees, does its best to secure fertilization by sending forth its flowers before its leaves, which would hinder the passage of the pollen from the staminate or male flowers to the pistils of the female. For the hazel has its male and female organs in different flowers, although on the same tree; indeed the name catkin or *amentum*, given to the inflorescence, tells us at once that the flowers are unisexual, a catkin being simply a spike of unisexual flowers with scaly bracts. This definition is sometimes qualified by the word deciduous, which conveys the idea that the inflorescence drops off after attaining maturity, thus distinguishing it from the cone, which is persistent and has woody bracts. The "lamb's tails" are the male catkins; they grow in twos or threes, and hanging downwards as they do against the bare black-looking branches they give a distinctive charm to the February landscape. If one of them be separated and examined it will be seen to consist of a number of tiny flowers, each having eight stamens; calyx and corolla are absent, but their place is taken by a bract, which, single and small as it is, effectively shelters from rain the eight little anther lobes; this it is enabled to do from the pendulous position of the catkins. The female catkins are much less conspicuous than the male, they are also fewer in number and much more choice in their selection of weather. They should be looked for on the side of the branches opposite to that on which the male catkins are, and if there has been a fair amount of sunshine the little red styles peeping out from among their protecting bracts will soon be discovered. A closer examination with the aid of a lens and forceps will show that each bract encloses two perfect female flowers, each consisting of an ovary with two red styles. An examination of these styles with a higher power will show that they are provided on their inner surface with a rough sticky stigma, well adapted for catching any pollen wafted to them by the wind. The male flowers also will well repay examination with a higher power; if one of them be mounted in a drop of water each of the anthers will be seen to be surmounted with a tuft of hairs, while the bracts will be found to possess a liberal supply of the same. There is no doubt that these hairs fulfil an important function in the protection of the reproductive organs. The pollen grains have a somewhat triangular shape, the corners of the triangle being rounded off and having in them a little space which probably has something to do with floating the grain in the air. The *fovilla*, or granular protoplasm, which fills the grain may also be seen, while a more condensed or nuclear portion in the centre is well marked. The hazel, as will have been noticed from the incomplete character of the flowers, is placed in the division of dicotyledons, known as *Incompletæ*. It belongs to the same order (*Cupuliferæ*) as the oak and the beech. This order, along with the willow, birch, and fir orders, belongs to the group known as *Amentaceæ*, or catkin bearers. The genus and species are expressed in the name *Corylus Avellana*. The genus is distinguished from the genera to which the oak and beech belong by the absence of a perianth and by the smaller number of cells in the ovary, and from its nearer relation, the hornbeam, by the smaller and less leafy character of the female catkin. The oak and beech flower later, and will be noticed in a succeeding article.

The dingy looking flowers of the elm are just beginning to open. So little do they differ in colour from the branches on which they grow that they are apt to escape notice. The elm, like the hazel, sends forth its flowers before its leaves. It was noticed in last season's articles that most of our early spring flowers were similar in their habits, and that they were enabled to flower so early by having stored up in thickened roots or rootstocks part of the food absorbed during the previous season. In the case of the elm and other trees this nutriment is stored up in the form of starch in the pith and medullary rays. If a transverse section of a twig of elm be made in winter or early spring these starch granules will be found in abundance, while later in the season they will be found to have disappeared, having been in fact converted into soluble sugar, and so escaped from the cells in which they were imprisoned and gone to help in the formation of the early flowers and leaf-buds. The elm also belongs to the division Incompletæ, the corolla being the missing organ. Stamens and pistil are present in the same flower, and when the flowers are expanded they may readily be seen with the aid of a lens. The flowers are arranged in fascicles, a fascicle being a kind of cyme in which the flowers are crowded together on short stalks, just as in the sweet-william. The order of expansion is therefore definite or centrifugal. There are two species of elm (each running into many varieties) indigenous—*Ulmus montana*, the wych or mountain elm, and *U. campestris*, the common elm. The first is more common in Scotland and the north of England, while the latter is more of an English species. It is the inner bark of *U. campestris* which is used in the preparation of the official decoction. *Ulmus fulva*, the slippery elm, of which the powdered bark is so popular for the preparation of demulcent poultices, is a North American species, the bark owing its virtues to the mucilage it contains.

There are two plants of direct pharmaceutical interest now to be found in flower. These are the spurge laurel (*Daphne Laureola*) and the mezereon (*Daphne Mezereum*). The latter is seldom found wild, but is common in gardens. The flowers appear before the leaves, are very fragrant and of a beautifully delicate pink colour; clustered as they are on the leafless branches they form the most conspicuous ornament in many cottage gardens during the months of February and March. The spurge laurel has coriaceous or leathery, lanceolate and somewhat obovate evergreen leaves; the little inconspicuous greenish-yellow flowers hang in fascicles from the axils of the upper leaves. The plant is fairly common in English woods, especially where the soil is heavy, but it is rare in Scotland. We have gathered it in the midst of a January snowstorm on the dolomite of south-west Yorkshire, and its stiff glossy leaves and small pendent flowers, nestling in their axils, looked so very much at home in it that they preached an excellent sermon on the influence of environment in the modification of structure. Plants which send forth their flowers, especially if the flowers are of a delicate nature, at a time when severe weather is prevalent, have generally undergone some structural modification to enable them to withstand it. We have already had an example in the hanging catkins of the hazel. We shall find more prominent examples in the snowdrop and daffodil, but the consideration of these must be reserved for next month. The flowers of the spurge laurel will be found to have a tubular calyx with eight stamens inserted on it; some of the flowers are devoid of pistil. A plant which, like this, has some of its flowers perfect and some unisexual, is said to be polygamous. The fruit of the spurge laurel is very poisonous and must not be confounded h the fruit of the true laurel (*Laurus nobilis*) or bay, known as bayberries. The order Thymelaceæ, to which the daphnes belong, approaches very nearly in character the true laurel order (*Lauraceæ*), the main distinction lying in the method of dehiscence of the anthers, which open longitudinally in the spurge laurels and by valves in the bay. The official mezereon bark is obtained from both species of daphne, and is more remarkable for its tenacity than for medicinal activity, although it does contain a small quantity of acrid resin and irritant volatile oil, the presence of which may easily be detected by chewing a little of the bark.

Those who are fortunate enough to live in districts where the soil is rich in lime may perchance in the course of a woodland ramble during the present month light on some of the hellebores. These belong to the buttercup order (*Ranunculaceæ*). The Christmas rose (*Helleborus niger*) has just got its flowering time past; it is a native of the mountainous parts of Europe, and is not found wild in England, although its large white petaloid sepals are familiar objects in most cottage gardens early in the new year. *H. viridis*, the green hellebore and *H. fœtidus*, the stinking hellebore, are, however, found wild, although rare enough to be considered good "finds" by the plant-hunter. They are generally stated to be more common in southern than in northern England, although we have gathered the former on the magnesian limestone of south-west Yorkshire as well as on the banks of the Gloucestershire Wye. In all the hellebores the leaves are of the pedate type (so called from their resemblance to a foot); in the two indigenous species the floral envelope consists of five large green sepals. The petals of all of them are abortive and will be found at the base of the sepals as little tubular bodies whose only function now seems to be that of secreting honey; they are, in fact, nectaries. The specific names of the hellebores can hardly be called examples of exactness in nomenclature, for one is derived from the colour of the root (*H. niger*), while another is derived from the colour of the flower (*H. viridis*).

OLEATES.*

BY G. M. BERINGER, PH.G.

The oleates as originally proposed were prepared by dissolving the oxides of the various bases in oleic acid, and the oleates recognized by the United States and British Pharmacopœias are thus prepared. Unfortunately, as thus prepared, they are not, as a rule, as permanent or as acceptable as those obtained by double decomposition. The oleates as now prepared by the manufacturing pharmacists are largely true oleates or oleo-palmitates or oleo-stearates of the bases, prepared by double decomposition, and it is hoped by the writer that in the next revision of the Pharmacopœia formulas for such will be introduced.

The oleates which have withstood the test of therapeutical experiments and are still prescribed are the oleates of zinc, mercury, copper, lead and bismuth, and the alkaloidal solutions, the so-called oleates of aconitine, cocaine, morphine, veratrine and quinine.

It is not the object of the present communication to present an entirely original line of thought, but to record a few observations on this subject and to furnish working formulas for those oleates which the pharmacist is called upon to dispense, and which will undoubtedly claim the attention of the Committee of Revision of the United States Pharmacopœia in 1890, and to call particular attention to a few points in manipulation which are essential to note in order to obtain good products.

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* Extract from a paper read at a Pharmaceutical Meeting of the Philadelphia College of Pharmacy. From the *American Journal of Pharmacy*.

First, it is to be observed that the character of the product is materially altered by the concentration of the solutions used and the temperature at which the precipitation is accomplished. The same strength of solutions will not answer for all of the oleates, nor can a uniform temperature be adopted for their precipitation.

Secondly, neutral solutions or only slightly acid solutions of the metallic salts can be used, a strongly acid solution decomposing the oleate of potassium or sodium used, with the liberation of oleic acid. On the other hand, an alkaline oleate solution will yield a product more or less contaminated with a hydrate of the base.

It was proposed by Dr. J. V. Shoemaker and also by H. B. Parsons to use a solution of Castile soap as a precipitant. The Castile soap of the market is of questionable composition, varying considerably, and usually yields a solution with water which clears or subsides but slowly, and is filtered with difficulty. It seems, therefore, to me advisable to replace this with a solution of oleate of potassium or sodium prepared by saponification of oleic acid with an alkali.

The preparation of a neutral soap with an aqueous solution of alkali is difficult, the attempt resulting in a decidedly alkaline solution. If an acid oleate of the alkali is produced it will produce a cloudy solution which will not filter readily (the acid oleates of the alkalies being insoluble). For these reasons hydro-alcoholic solutions of the alkaline hydrate are used, by which means a perfectly neutral soap can be procured, which can be easily diluted with water and the solution filters easily through paper. Experiments showed that the quantity of alcohol necessary can, with proper manipulation, be reduced to a comparatively small amount.

Acidum Oleicum is stated by the U. S. Pharmacopœia to have a specific gravity 0·800 to 0·810. The U. S. Dispensatory, page 89, states that this is an error, and should be 0·900 to 0·910. Gmelin (vol. xvii., p. 64) quotes Chevreul as authority for specific gravity 0·898. The British Pharmacopœia states ·860 to ·890. While Allen ('Commerc. Organic Analysis,' vol. ii., p. 233) states that the pure acid "has a density of ·897 at 19° C.," and calls attention to an error in Watts, who quotes Chevreul as ·808, and says "the same mistake is made by Wurtz and other industrious compilers and copyists." The oleic acid for pharmaceutical purposes need not be a chemically pure acid. In fact, for many oleates, notably for bismuth oleate, it is desirable to have present a small amount of stearic acid. Purified red oil answers admirably for all medicinal oleates. According to Chas. Rice (*Amer. Journ. Pharm.*, 1873, p. 1), such a purified acid exhibits a specific gravity of ·895 at 62°. E. C. Saunders (*New Remedies*, June, 1880) reports ·897, while Dr. Squibb (*Ephemeris*, 1882, p. 158) states the specific gravity at ·898. Several commercial samples recently examined showed specific gravities of 0·8991, 0·8992, 0·909 at 60° F. Another sample was semi-solid at 60° F., so the specific gravity was taken at 66° F. and found to be 0·8854. Another sample received from the manufacturer without subsequent purification had a gravity of ·8846 at 60° F. The first and second were light in colour and contained but small quantities of other acids. The third was very dark coloured, and the fourth, while of a paler colour, contained a large excess of solid acids. These figures indicate that the correct specific gravity should be ·0890 to 0.900. The first acid was the one used for the experiments here recorded.

Zinci Oleas.

Oleate of zinc, Zn $(C_{18}H_{33}O_2)_2$.

Take of—

Oleic acid	1000 grains.
Soda*	160 „ or q.s.
Alcohol	6 fluidrachms.
Zinc sulphate	550 grains.

Water, a sufficient quantity.

Warm the oleic acid in a capacious vessel on the water-bath to a temperature of 60° to 66° C. (140° to 150° F.), and having dissolved the soda in a mixture of the alcohol and two fluid ounces of water, slowly add the soda solution, stirring constantly until the acid is entirely neutralized, and a small portion of the resulting soap dissolved in alcohol yields but a faint pink tint on the addition of a few drops of alcoholic solution of phenolphthaleine. Dissolve the resulting soap in three (3) pints of warm water and filter if necessary. Dissolve the zinc sulphate in one (1) pint of water and filter. Warm the solutions to 43° C. (110° F.), and slowly add the zinc sulphate solution to the soap solution, stirring constantly. Collect the precipitate on a moist filter, wash thoroughly with distilled water, and finally dry on bibulous paper at a temperature not exceeding 38° C. (100° F.).

In the above formula there is ordered an excess of zinc sulphate, as this tends to more readily separate the oleate produced. It is important that the temperature of the solutions on precipitating should be maintained at 100°-110° F. At this temperature the oleate on drying is obtained in white friable masses to powder which it is only necessary to rub through a sieve. If a temperature much lower than this is used the resulting oleate is in curdy masses which are glutinous to the touch and almost impossible to pulverize. If precipitated at a higher temperature the result is a fused mass of oleate of a greasy nature, which can only be dried and pulverized with difficulty and the resulting powder is gritty. As thus obtained, oleate of zinc is a nearly white, impalpable, unctuous, slippery powder, fusing at 75° C., very soluble in ether, carbon bisulphide, chloroform, and benzol, somewhat less soluble in turpentine, petroleum ether and alcohol.

The yield was 1,122 grains, theoretical yield being 1,115 grains. The excess most likely being due to water retained at 100° F.

Plumbi Oleas.

Oleate of Lead, $Pb(C_{18}H_{33}O_2)_2$.

Take of—

Oleic acid	1,000 grains.
Soda	160 „ or q.s.
Alcohol	6 fluidrachms.
Lead acetate	675 grains.

Water, a sufficient quantity.

Saponify the oleic acid as directed in the formula for zinc oleate, and dissolve the resulting soap in three (3) pints of warm water and filter. Dissolve the lead acetate in two pints of water, adding a few drops of acetic acid if necessary to produce a clear solution and filter. Warm the solutions and add the lead acetate solution slowly to the soap solution, stirring constantly. Collect the mass on a strainer, wash and dry.

Oleate of lead thus prepared is a buff-coloured firm mass, fusing at 65° C., forming an entirely clear liquid at 68° C., and is very soluble in carbon bisulphide, chloroform, ether, petroleum ether and benzol, sparingly in turpentine and alcohol. There is but little use for this oleate, as the officinal lead plaster and diachylon ointment are practically preparations of lead oleate and sufficient for its exhibition.

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* The granular soda, known as Banner lye, containing about 90 per cent. of soda, was found to answer well for this purpose.

Cupri Oleas.

Oleate of Copper, $Cu(C_{18}H_{33}O_2)_2$.

Take of—

Oleic acid	1000 grains.	
Soda	160 „	or q.s.
Alcohol	6 fluidrachms.	
Copper sulphate	442 grains.	

Water, a sufficient quantity.

Saponify the oleic acid as directed in the formula for zinc oleate, and dissolve the resulting soap in three (3) pints of water. Dissolve the copper sulphate in one pint of warm water and filter. Warm the solutions to about 140° to 150° F., and slowly add the copper solution to the oleate of soda solution, stirring constantly; warm until the copper oleate fuses into a mass, decant the clear supernatant liquid, wash several times with warm water, and finally dry on the water-bath.

Yield, about 1,100 grains, theoretical yield, 1,108.

Oleate of copper, as thus produced, is a bright green waxy mass, fusing at 49° C., very soluble in carbon bisulphide, chloroform, benzol, ether, turpentine, petroleum ether, absolute alcohol, alcohol and fixed oils.

Hydrargyri Oleas.

Oleate of Mercury, $Hg(C_{18}H_{33}O_2)_2$.

The oleate of mercury is perhaps the oleate most frequently prescribed, and which, made in accordance with the U.S. Pharmacopœia, by dissolving the oxide in oleic acid, is a very unstable compound, the very excess of oleic acid being the prime factor in causing its decomposition. Several writers have proposed to make the officinal oleate a twenty per cent. solution of the oxide in oleic acid. This, while a more stable preparation than the present officinal ten per cent. solution, is more susceptible of change than a true oleate made by double decomposition. It seems to me to be far better to make the officinal a true oleate in composition as well as in name. Dr. J. V. Shoemaker proposed to make such an oleate of mercury by decomposing oleate of soda solution by means of mercuric chloride, the solutions being mixed and boiled until the resulting oleate furnished a mass. The long boiling always resulted in a partial decomposition of the oleate, more or less of the mercury being reduced. H. B. Parsons (*loc. cit.*) proposed the decomposition of potassium oleate by means of a solution of mercuric nitrate. Mr. Louis Dohme (*Amer. Journ. Pharm.*, 1873, p. 158) proposed a similar formula. With proper care this method will yield good results. The following is the formula I have used:—

Take of—

Oleic acid	1000 grains.	
Potassa	220 „	or q.s.
Red oxide of mercury .	383 „	
Nitric acid	323 „	or q.s.
Alcohol	6 fluid drachms.	

Water, a sufficient quantity.

Saponify the oleic acid with the potassa as directed in the formula for zinc oleate, and dissolve the resulting soap in 2 pints of warm water and filter. Mix the nitric acid with the 2 fluid ounces of water, heat to boiling and add the mercuric oxide previously reduced to powder. Boil until it is entirely dissolved, adding, if necessary, a few drops of nitric acid additional. Dilute the solution of mercuric nitrate with 4 fluid ounces of water. Warm both solutions to 66° C. (150° F.) and add the oleate of potassium solution to the mercury solution, stirring constantly. Decant the aqueous solution and wash the precipitate with warm water not exceeding 150° F. If precipitated at a much lower temperature it will be necessary to heat the mixture to near boiling in order to form a mass of the precipitate, which heating is almost certain to result in a partial decomposition of the oleate. The same is apt to result if the solutions are mixed at a higher temperature. In connection with this we recall the experiments of Chas Rice, who proved that as the temperature was advanced in preparing oleate of mercury the quantity of oxide reduced greatly increased (*Amer. Journ. Pharm.*, 1873, p. 1).

The yield by the above formula was 1329 grains, theoretical yield being 1350 grains. Oleate of mercury as thus prepared is about the colour of a pale citrine ointment and of somewhat softer consistency, fuses at 66° C. (150° F.), yielding an entirely clear fluid at 70° C. It is very soluble in carbon bisulphide, chloroform, ether and turpentine, and yields an opalescent solution in benzol and petroleum ether, and is slightly soluble in absolute alcohol and alcohol.

The aqueous solution decanted from the precipitate gave no indication of mercury with solution of potassa or potassic iodide, proving the complete precipitation of the metallic salt.

The sample shown, marked No. 1, was prepared over four months ago, and has been purposely kept in a warm part of the store in a flint vial, the stopper being occasionally removed. The surface exposed to the light now shows a reduction of the mercury, which was not very marked until three months of summer weather had elapsed since the preparation. The second sample was prepared about a week ago.

Bismuthi Oleas.

Oleate of Bismuthi, $Bi(C_{18}H_{33}O_2)_3$.

The most difficult oleate to prepare by double decomposition is the bismuth oleate. The tendency of bismuth solutions to precipitate oxy salts unless it decidedly acid solutions, and the decomposition of the oleate solution used by the acid solution renders in almost impossible to thus make this oleate. Mr. H. B. Parsons attempted to overcome this difficulty by using a solution of crystallized nitrate of bismuth in glycerin. Even this is apt to yield unsatisfactory results. I have obtained more satisfactory results by saponifying the acid with oxide of bismuth. On heating oxide of bismuth with oleic acid but a very small portion is dissolved; on boiling them together with water, however, saponification takes place. Owing to the variability of commercial subnitrate of bismuth (see *Amer. Journ. Pharm.*, 1888, p. 385) good results were not obtained by taking a definite weight of that salt and precipitating the hydrated oxide from its solution in nitric acid. The quantity of hydrate varied so much as to yield on boiling with the calculated quantity of oleic acid an oleate of too soft a consistence. For these reasons I prefer to use an oxide dried at 212° F.

The following is the formula I prefer:—

Take of—

Bismuth oxide dried at 100° C. (212° F.) until it ceases to lose water.	1 troy oz.
Oleic acid	3 troy ozs. and 295 grs.

Water, a sufficient quantity.

Rub the oxide of bismuth to a fine powder, and thoroughly mix it with the oleic acid in a capacious vessel, add two pints of water and boil the mixture, replacing the water as it evaporates, and stirring frequently until complete saponification has taken place and a small quantity of the mass dropped into cold water yields an ointment-like mass without any separation of oleic acid. Decant the water from the oleate and work the mass with a horn or wooden spatula to free it from retained water.

Bismuth oleate thus prepared is a cream coloured mass about the consistence of an ointment, softening at the temperature of the body and fusing at 58° C. It is easily decomposed by contact with metals, and is but very slightly soluble in the usual solvent for oleates.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 22, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE DRAFT PHARMACY BILL.

IN dealing with the new Pharmacy Bill last week we purposely confined our remarks to that feature of the Bill which would affect the constitution of the Pharmaceutical Society, and that course was adopted because the alteration contemplated is one calculated to furnish a basis for the co-operation of every individual belonging to the body, and for consolidating the interests of all concerned in its welfare. It may, without necessity for argument, be taken as certain that, whatever hardships are experienced, whatever desires are entertained by members of the pharmaceutical body, there cannot be any reasonable prospect of redress or amendment unless the demands put forward in that respect are supported by unanimity and the united efforts of the greater majority of those engaged in the business. The history of the past forty years has been too prolific in lessons as to the failure and disadvantage resulting from disunion and internal conflict, and we fail to perceive the probability of any better result being arrived at unless those obstacles to progress are removed. Above all it is essential that the pharmaceutical body shall be adequately represented, and that each individual member of it shall contribute his share towards the attempt to secure such representation. In any united effort of this kind by the members of a large body there must necessarily be a disposition to sacrifice individual opinions and wishes in deference to the will of the majority, and for the sake of ensuring the general benefit. For such co-operation opportunity would be offered by the proposed alteration in the constitution of the Pharmaceutical Society, which admits of every one connected with the business obtaining not only representation but also participation in the advantages appertaining to the position and reputation which the Society has now attained. These will be found more fully set forth at pages iv. and v. of the advertisement sheets of this week's Journal.

With these preliminary remarks on the benefits offered by the Society, and on what we conceive to be the duty of those to whom they are offered, we will proceed with the consideration of the remaining clauses of the new Pharmacy Bill. The provisions of clause six have perhaps excited the most lively interest and at the same time a certain degree of apprehension that is very well expressed in the letter from Mr. WHITE, of Clifton, which appears in this week's Journal. The subject referred to in that letter was also discussed at the late meeting of Council. The statements made by the President and other members of the Council on that occasion might have been accepted as indicating that there is no reason for assuming an intention on the part of the Council to prevent legally qualified pharmacists from being assisted in the execution of their work as they may require. Nevertheless, those statements, though definite, have not sufficed to do away with the idea that such interference is contemplated, or that it might be the consequence of a judicial construction of the sixth clause in a court of law. Mr. WHITE takes a very extreme view when he assumes that as a consequence of the sixth clause of the Bill an apprentice in course of instruction at his master's dispensing counter would be liable to prosecution if he filled the stock pill boxes or replenished a customer's ointment pot. The only condition under which we can conceive the possibility of apprehending such a contingency would be that the master, whose duty it is to train and instruct the apprentice in the art of dispensing and compounding medicines, abstained altogether from exercising the personal direction and control of those operations which constitute his peculiar function as a legally qualified dispenser and a competent instructor of apprentices. That such a condition could obtain in any well-conducted establishment we are unwilling to believe. Moreover it appears to be seriously opposed to the interests of pharmacy to contend, even in the remotest degree, for a right on the part of the legally qualified pharmacist to delegate his responsibility as a dispenser to persons who are not thus qualified. We would even go further than this and say that the importance of maintaining the principle of responsibility of the proprietor of a pharmacy makes it desirable to exercise supervision of the work of even legally qualified dispensers. The justice of this view of the matter becomes more evident when we remember that the demand for legal qualification and responsibility of proprietors was introduced into the Pharmacy Acts primarily as a means of protecting the public. Though legal qualification has hitherto been required only in regard to the sale of poison and the compounding or dispensing of medicine containing a scheduled poison, there cannot be any possible ground on which pharmacists could oppose or object to the extension of the same safeguard to the important work of dispensing physicians' prescriptions. And as regards the protection of their own interests, as well as those of the body to which they belong, which is only a secondary motive of the Pharmacy Acts, or its possible result in so far as its provisions are wisely applied to that end, it surely cannot be seriously meant that it would be a cause of "indignant opposition" if the safeguards now applying only to the case of scheduled poisons were extended to the compounding of all medical prescriptions. In our estimation such a step should rather be regarded as a rational amplification of the fifteenth Section of the Pharmacy Act, and hailed not only as a benefit to the public, but also as a most effectual and legitimate means of promoting the interests of the pharmacist.

Passing now to the consideration of the sixth clause of the new Bill in the light of the discussion that took place upon it at the Council, it must be remembered that the question raised as to the interpretation of the fifteenth section of the Pharmacy Act is still *sub judice*, and that pending the delivery of the judgment in this case there would be obvious danger in attempting to define precisely the significance to be assigned to the proposed provisions of the sixth clause of the new Pharmacy Bill. As the clause now stands it embodies a principle that is consistent with existing legislation, to the effect that adequate pharmaceutical skill shall be applied in the dispensing of medical prescriptions. That is a principle which pharmacists cannot logically dispute the propriety of, and if there be any need to alter or qualify the form in which it is expressed, ample opportunity for doing it would be afforded when the Bill is passing through Parliament. But to attempt to establish any distinction between persons who are registered and those qualified according to some other standard not generally applicable would be introducing a most dangerous precedent. The only evidence of pharmaceutical qualification is the fact of being on the register, and if such qualification be necessary for the proper conduct of dispensing medicines it ought always to be brought to bear in carrying out that work. The strict observance of this rule, so far from being an obstacle to the instruction of apprentices, appears more likely to be a condition favourable for their better instruction in the work. For just as it has been observed by Lord **Selborne** that in the case of the sale of poison, it is not always necessarily by the hand of the qualified person that the actual sale is to be made, provided the sale is duly conducted by a qualified person, so it would be with dispensing. Just as the conduct of a sale of poison by a qualified person through the hands of an assistant would be no infringement of the law, so the similar conduct of dispensing work, in the various operations of which assistants or apprentices were engaged, would not constitute a breach of hose provisions of the sixth clause of the new armacy Bill which seem to have given rise to much unfounded alarm. It only remains to refer to the hardship to which it has been assumed that a chemist would be subjected who did not keep a legally qualified assistant. In reply to that objection, there can perhaps be no better answer than that given by Mr. Justice **Hawkins** in a similar case, to the effect that the man who has the right to perform certain services must uphold that right by saying to any persons who require his services, that as he will not allow them to be rendered in his absence they must come at times when he is to be found in his business. If that line of action were generally adopted there would perhaps be more respect for the services of the chemist, and for the protection of public safety afforded by the provisions of the Pharmacy Acts.

EXEMPTION FROM JURY SERVICE.

A letter appears on p. 690 from Mr. **Reade**, of Wolverhampton, in which he calls attention to the subject of service on juries and urges that chemists and druggists, being engaged in the same responsible duties as pharmaceutical chemists, ought to be equally exempt from that liability. Our correspondent's argument is in this respect well founded, but we must take exception to the view he puts forward as to exemption from jury service being a reward for passing the Major examination. It is true that the draft Pharmacy Bill does not contain any provision as to jury service, but it must not, therefore, be supposed that the omission of a clause providing for the exemption of all registered persons from service upon juries is an oversight on the part of the Council, or that it indicates any want of sympathy with the claims for such a privilege being extended. The fact is that the Council has long been of opinion that this should be done, and it has also taken action when opportunity offered for obtaining the exemption. The only reason that the draft Pharmacy Bill does not contain a clause to that effect is the fact that there is a disinclination on the part of Parliament, as well as Government departments, to introduce into any Bill enactments affecting matters other than those which are the primary objects of the particular Bill. The exemption of pharmaceutical chemists from jury service is not secured by any provision in either of the Pharmacy Bills, but by a provision in the Juries Act, 1862, the Act of Parliament dealing especially with jury service. At the time that Act was passed chemists and druggists were not registered, and it was solely for that reason the exemption from jury service was not extended to them as well as to pharmaceutical chemists. In the discussion which then took place in Parliament it was urged that there was no means of recognizing and identifying a chemist and druggist, and that fact was accepted as a sufficient reason for limiting the exemption to pharmaceutical chemists, who could be identified, since they were a registered body. We call attention to this circumstance because it serves to illustrate the advantage arising from registration and to show what was really the cause of the privation which chemists and druggists now suffer from. At the present time we have reasons for expressing the opinion that no objection would be raised by the Council to the introduction of a clause to effect the desired object whenever the Pharmacy Bill reaches the committee stage, and indeed that it would be willing to assist in obtaining its insertion, when that opportunity arrives. This, however, would be a point to attain by the co-operation of those who desire it with the Council, but not by protesting against its draft Bill or by offering opposition to it.

As affording grounds for the opinion we have expressed, we may remind our readers that between 1872 and 1874, when there were three Juries Bills before Parliament, the Council endeavoured to obtain the exemption of chemists and druggists from jury service, and actually obtained the insertion in each of those Bills of words exempting all registered persons. Those Bills, however, were not passed, owing to pressure of more urgent legislation, and since that time no Juries Bill has been before the House of Commons, or the attempt made eighteen years ago to obtain this privilege would have been renewed and no doubt successfully. Reference may also be made to the proceedings at the Council meeting in April, 1872, when Mr. Bottle moved that a clause exempting chemists and druggists from jury service should be inserted in the Juries Bill. That motion was seconded by the late Mr. Williams; it was warmly supported by Mr. Sandford, and while the reasons of the failure of previous attempts were recognized, it was admitted to be the duty of the Council to assist as far as possible in placing chemists and druggists upon the same footing, in this respect, as pharmaceutical chemists. Mr. Sandford, especially, gave expression to the view that this should be the case, since exemption is not a reward or a privilege, but a provision for the benefit of the public, the principle on which it is to be claimed being that public safety is imperilled when the chemist is taken away from his business and prevented from exercising the personal control which it demands and for which his qualification fits him.

As the outcome of the resolution then passed by the Council a letter was addressed to the Attorney-General, representing the necessity for exempting chemists from serving on juries, because of the important relationship of the dispenser of medicine to physicians and the danger to the public arising from prescriptions falling into the hands of uneducated persons. The public utility of the Pharmacy Acts, in providing a remedy for such a state of things, was shown to be in a great degree dependent upon the presence of the legally qualified dispenser in his dispensary, and to be interfered with by his enforced absence to serve on a jury. It was also urged that this is especially the case with the great number of chemists who, being unable to employ qualified assistants, would, when thus compelled to absent themselves, leave the lives of the public entirely in the hands of apprentices or other unqualified persons, so far as the correct dispensing of medicine is concerned. It was further shown that the business of the chemist and druggist is not one of mere buying and selling, but a responsible personal duty, and that since the chemist's shop becomes a real source of danger to the public when left without a qualified person to superintend it, the Council relied upon that view of the matter for securing a legislative recognition of the urgent necessity for extending the exemption from jury service to all chemists and druggists registered under the Pharmacy Act of 1868.

Among the Bills already introduced into the House of Commons this session, and read a first time, is the Shops (Weekly Half-Holiday) Bill, which seems to be practically identical with the Bill introduced by Sir John Lubbock under the same title last year, having for its object to enable local authorities to establish a weekly half-holiday for shops. The Bill provides that the local authority of any district, upon receipt of an application signed by not less than two-thirds of any particular class or classes of resident shopkeepers, may issue an order requiring that all the shopkeepers belonging to such class or classes resident in the district shall close their shops, on one specified day in each week, at or before any hour not earlier than 2 o'clock in the afternoon, under liability to a fine of five pounds. Such an order could not, however, be made in respect to premises in which any intoxicating liquor is sold by retail for consumption on the premises, to refreshment houses, to tobacconists' shops or news agencies. There is also a provision that a chemist and druggist should not be liable to a fine under this law for supplying medicines, drugs or medical appliances after the hour appointed for closing, but the exemption does not go so far as to allow him to keep his shop open. A "shop" is defined as meaning any building or portion of a building, bookstall or place where goods are exposed or offered for sale by retail; and "closed" is to mean not open for the serving of any customer, except such as may be in the shop when the hour for closing arrives.

* * *

At the meeting of the North British Branch of the Pharmaceutical Society last Wednesday evening the chair was taken by Mr. Gilmour, and the papers announced last week were read, and gave rise to some discussion in each case. As usual, a full report of the proceedings will appear in the next number of this Journal.

* * *

We regret having to announce the death, at the age of 54, of Dr. George Kerner, who for many years held the position of director of Zimmer's quinine manufactory at Frankfort. Dr. Kerner will also be remembered by readers of this Journal as having published, in 1862, a process for the examination of commercial quinine sulphate as to purity, which was the first really efficient means of detecting the presence of other alkaloids besides quinine.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The last ordinary monthly meeting was held in the rooms of the Chemical Club, Victoria Hall, on Wednesday, February 12, Mr. W. Wilkinson, Vice-President, in the chair.

The minutes of the previous meeting having been read and confirmed, the following paper was read:—

FURTHER NOTE ON ARSENIC IN GLYCERINE.

BY L. SIEBOLD, F.I.C., F.C.S.

The object of this short communication is to supplement a note on the same subject which I had the pleasure of reading before the Newcastle Meeting of the British Pharmaceutical Conference. In that paper I promised to publish the result of experiments then in progress with regard to the question whether or not bottle-glass containing arsenic would yield that impurity, or part of it, to glycerine stored in such bottles. From that time up to the present I have kept various kinds of bottles made of arsenical glass filled with perfectly pure glycerine, and have tested their contents from month to month at regular intervals. No contamination has taken place in any instance, though the glycerine has now been in contact with the glass ever since the beginning of September, 1889. I feel satisfied, therefore, that glycerine does not extract arsenic from glass bottles. I have likewise convinced myself that the solder of the tins in which glycerine is stored is not answerable for this contamination, and have little doubt that the latter is wholly referable to the use of impure acids, sulphuric or hydrochloric, in the manufacture of commercial glycerines. As stated in my previous paper, there is no difficulty in obtaining glycerine entirely free from arsenic, the well-known steam distillation process yielding a thoroughly satisfactory preparation. I may add that certain brands of glycerine which formerly contained objectionable proportions of this impurity are now quite free from it, whilst in certain others the proportion of arsenic is now reduced to an insignificant trace.

With regard to the modification of Gutzeit's test for arsenic, which I recommend for the testing of glycerine, I wish to point out a precaution I found necessary to observe in connection with the use of iodine solution for the destruction of sulphur compounds. Any excess of iodine retards the reaction, and if this excess should amount to more than a trace it may seriously interfere with the proper working of the test and lead to erroneous conclusions. I would therefore suggest that a few drops of freshly-made mucilage of starch be added to the mixture of glycerine and dilute hydrochloric acid, and that an exceedingly weak solution of iodine (about 0·1 gram per litre) be then added drop by drop until the mixture shows a visible blue coloration. The mixture is then ready for the introduction of the zinc. In this way the destruction of sulphur compounds is completely attained without the risk attending the use of an appreciable excess of iodine, and the test, under these circumstances, is absolutely safe and trustworthy even in the hands of inexperienced manipulators. The purity of the reagents should, however, be ascertained by a blank experiment in every case. All further particulars with respect to this test will be found in the 'Year-Book of Pharmacy,' 1889, p. 417, and the *Pharmaceutical Journal*, vol. xx., p. 277.

In dealing with this subject before the British Pharmaceutical Conference I suggested that the test des[illegible]ibed might also be made the basis of a quantitative [illegible]ss. Since then I have had ample opportunities [illegible]sfying myself that this process is admirably [illegible] for this purpose, and that minute traces of arsenic may be estimated by it with greater ease and precision than by other methods. In a recent case in which there was a dispute as to whether or not a sample of glycerine sold as perfectly pure contained traces of arsenic, I was enabled by this process to demonstrate the presence of 1 part of arsenious acid in 48,000 to 50,000 parts of the sample, or 16 grains per cwt. of glycerine. I know of no other method equally applicable for the determination of such exceedingly minute proportions with anything like fair accuracy. I use a solution of 1 c.c. of liquor arsenici hydrochloricus B.P. in a litre of water; and of this I make additions of various proportions to definite weights of pure glycerine. All that is necessary is to ascertain which of these mixtures gives the same shade or depth of stain on the mercurial test-paper in exactly the same space of time and under exactly equal conditions, in all other respects, as the sample under examination. It is not advisable to work more than two tubes simultaneously, as otherwise it would be rather difficult to ensure absolute equality of conditions as to time. The treatment with iodine should be exactly the same as recommended above for qualitative purposes. Above all, it is necessary that the proportions of glycerine, dilute acid, and zinc, as well as the manner of preparing the test-paper, should be absolutely the same in both cases. With due attention to these details and a little practice the test will be found as serviceable for the quantitative determination of these traces of arsenic as it is for their detection.

A discussion followed, in which many of those present took part, at the close of which a hearty vote of thanks was accorded Mr. Siebold for his valuable communication.

The next meeting will be held in the above rooms on Wednesday, March 12, at 7·30 p.m., when Mr. W. Kirkby will read a paper on "The Purity of Drugs."

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The second students' night of the present session was held on Wednesday, February 12; the Vice-President, Mr. J. H. Bradwall, occupied the chair, in the unavoidable absence of the President, Mr. Fox.

The usual preliminary business having been transacted, the following paper was read:—

CONCENTRATED INFUSIONS AND DECOCTIONS.

BY CHARLES D. MOFFAT.

As some apology will perhaps be expected from me for bringing before you to-night such a well-worn subject as that of concentrated infusions and decoctions, I will, in commencement, briefly allude to the status which these preparations at present occupy in pharmacy. I am bound to confess at once that they are regarded unfavourably by many on account of their variable nature.

When first introduced, some years since, they were hailed with delight on account of their unquestionable convenience, especially so to chemists in a small way; but a reaction against them soon set in, for they were found to vary greatly in colour and taste, besides not possessing the aroma of the fresh preparations. In fact, as one writer on the subject puts it, "anything seemed good enough to do for a concentrated infusion." So naturally they fell into disrepute both with physician and pharmacist.

Hardly anyone had a good word for them, each having his special cause of complaint, but all agreeing in discountenancing their use. Some even went so far as to say that infusions should be banished from the Pharmacopœia altogether.

But during the last few years the concentrated preparations have been steadily coming to the front again, as the manufacture of them has been improved. Still much remains to be done.

There are several popular fallacies with regard to them which it will be well to note.

It is often said that it is impossible to get a concentrated infusion which will correspond, when diluted, with the B.P. article in colour, taste, and smell. This may be true, if it is prepared without due regard for the individual peculiarities of the drug; but, on the other hand, many lose sight of the fact that a carefully prepared concentrated infusion, when diluted with seven times its volume of water, is stronger than the corresponding official preparation, since the pharmacopœial method in many cases does not exhaust the drug.

It should be obvious that the same process is not applicable in all cases; still many seem to think that because a certain infusion is made by pouring boiling water over the drug and macerating, therefore the concentrated infusion corresponding to it is necessarily made by pouring boiling water over eight times the quantity of drug and evaporating down to the required volume. A little consideration will enable us to see that it is impossible to lay down one rule which is to be followed in all cases.

It is only by a knowledge of the drug and its active constituents that we can hit upon the right method of procedure.

Another mistake is to judge the strength of a concentrated infusion by its colour. We have a good example of this in belladonna. If a liniment were to be prepared with a menstruum containing 20 per cent. or 25 per cent. of spirit the colour would be almost black. We might thus be tempted to suppose that it was stronger than that prepared by the official method. As a matter of fact it is not nearly as strong, as the researches of Dunstan and Ransom go to prove.

As a rule, it will be found that an infusion prepared with evaporation is much darker in colour than if prepared by either pressure or repercolation. I shall have occasion to refer to this again in connection with senna.

For most infusions the Pharmacopœia directs the use of boiling water. It will, however, be found that in the majority of cases, cold water will answer all requirements as well, if not better, for the continued use of heat should be discountenanced as far as possible, as it not only spoils the aroma of the preparation, but also impairs its keeping properties.

Still there are several cases in which a preliminary maceration with boiling water, followed by treatment with cold, is advantageous. There are three methods which I have found to give the best results. They are:—

1. Exhaustion with hot or cold water and evaporation.
2. Extraction by pressure.
3. Repercolation.

I have selected three or four typical examples of each process, which I will now briefly allude to.

In each of my calculations I have allowed for the use of 20 per cent. of spirit, not that this is necessarily the right amount to use, but merely for convenience. Indeed, it will be found that some require more than others as a preservative. However I shall not enter into this question, as experience is the only reliable guide in such matters. The art of preserving infusions with a minimum of spirit is only known to a few wholesale houses, by whom it is naturally regarded as a strict trade secret.

As I have before remarked, in making a concentrated infusion the nature of the drug must be first carefully considered. For instance, extraction by pressure would not answer with calumba, on account of the starchy matter it contains causing it to clog. Again evaporation would obviously prove harmful to such aromatic drugs as cascarilla, matico and serpentary.

The first method is exhaustion with cold water and evaporation. Let us take calumba as a type of this. Half a pound of the sliced root is macerated in 30 ounces of cold water for twenty-four hours. It is then strained, and half a pint having been reserved and mixed with 4 ounces of rectified spirit, the remainder is evaporated in a water or steam bath. Meanwhile the marc is again treated with water, and after having macerated for a few hours is strained as before the product being evaporated. This is continued until the drug is exhausted. It is then evaporated down to about 6 ounces, and heated to the boiling point, which coagulates albuminous matter, thus causing the infusion to filter more easily, and also destroys traces of mould which may have formed during the process. Finally it is added to the mixture of spirit and reserved portion, and made up to a pint if necessary.

An infusion thus prepared, when diluted with seven times its volume of water, will compare favourably in every way to the fresh infusion. Most infusions should be heated to the boiling point as directed above; but I shall have occasion to refer to several exceptions. The reason why a portion is reserved after the first maceration is that the aroma of the drug is thus to a great extent preserved. Quassia is also well adapted for this process, but in its case the wood should not be by any means exhausted, or the infusion will be too bitter and dark in colour. It is best to boil the water before macerating the quassia in it, as it is one which is specially liable to go mouldy.

One maceration of about forty-eight hours duration will be found quite sufficient, and evaporation can usually be dispensed with altogether in this case, it being only necessary to strain off the infusion and boil, as in the case of calumba.

Under this heading it will be as well to consider the decoction of logwood, which contains cinnamon bark in addition to the active remedial agent.

In this case, as well as in all similar ones, the bruised aromatic must be macerated for a few days in the spirit. Meanwhile the logwood is boiled with successive portions of water until exhausted and the decoction evaporated in the ordinary way. When it has been reduced to the required volume (it will be sixteen ounces if a pint is being made), the tincture of cinnamon is thrown into a strainer and washed with it, water being added if necessary to make up to a pint.

It is not necessary to boil this decoction, as it is one of the best keeping preparations of the class.

It is well to note that in all cases where an aromatic is present in an infusion or decoction, the strength of the spirituous menstruum must be that calculated to extract the essential oil best.

Tinctura cinnamomi is prepared with rectified spirit, therefore we use the same menstruum in the case of the foregoing decoction.

We now come to consider the second method, extraction by pressure. Dr. Symes, in a paper read by him before the Conference in 1888, stated that the fluid extract of senna leaves, when prepared by this method, was much more active than that prepared by percolation and evaporation.

His menstruum consisted of spirit of water in equal proportions, but he did not state whether the leaves were whole or in powder. A great deal depends on the latter condition for the successful use of the process in the preparation of infusion of senna. It was found by experiment that if the powdered leaves were used, and a menstruum consisting wholly of water, or containing as much as 25 per cent. of spirit, the result was a failure, as far as pressure was concerned, by reason of the mucilage causing the press-bag to clog.

I have found the following process yield excellent results:—

Macerate 448 grains of powdered ginger in 4 ounces of rectified spirit, and mix 1 pound of senna leaves thoroughly with a pint of cold water. Allow this to macerate with occasional stirring for twenty-four hours, then press and set aside the product. Again mix the leaves with as much water as, if added to the first product, would yield 16 ounces, and macerate for twelve hours. Again press; mix the two liquids and wash the tincture of ginger with it, finally making up to a pint with water if necessary.

The advantages of this process are that prolonged heat, which is extremely injurious to senna, is avoided, and the product, although somewhat lighter in colour than the ordinary article of commerce, possesses an aroma and appearance which are too often sought for in vain.

Its therapeutic effects are also well marked.

No difficulty will be experienced in the pressure of the whole leaves, since there is no tendency to clog. Although the senna may not be thus completely exhausted; still I claim for the process that it yields a better article in appearance, smell and therapeutic activity than any other method which I am acquainted with. Complete exhaustion is not the only thing to be aimed at in making an infusion. The foregoing process may be with advantage adapted to syrup of senna.

My next example is the infusion of buchu, for which I recommend the following method:—In making 1 pint, pour a pint of boiling water over ½ a pound of the bruised leaves, macerating for twenty-four hours. Then press and set aside the product: macerate again, as in the case of senna, with boiling water for twelve hours, and again press and mix the two liquids.

The product will be thick and mucilaginous. There are now two alternatives.

If you think that this mucilaginous matter, from its demulcent action on the mucous membrane, is a desirable constituent in the infusion, there is nothing more to do but add the spirit and make up to quantity.

But on the other hand, if you are of opinion that the medicinal virtue of buchu lies solely in its essential oil, and that the mucilage should be got rid of, the infusion should now be boiled, which precipitates all the mucilaginous matter at once, and it can then be easily filtered through flannel. The finished product will then be a perfectly bright and elegant preparation.

Of course, in the first case the spirit would also precipitate the mucilaginous and albuminous matter, but only slowly and not so completely as boiling does.

My third example is rhubarb, one which gave me considerable trouble until I hit upon the extraction by pressure method. I had been accustomed to make it by infusing the roughly powdered root with boiling water, followed by evaporation; but the product was very unsatisfactory, as it was liable to go mouldy with 20 per cent. of spirit, and besides was very inelegant in appearance and practically impossible to filter, so I was led to try what pressure would do for it. It appeared to me that the heat it was subjected to during evaporation caused some decomposition in the infusion.

By this process 16 ounces of cold water is mixed with 4 ounces of the bruised root, and macerated for twenty-four hours; the remainder of the process is similar to that of senna, but it will be noticed that here a large quantity of menstruum is used in proportion to the quantity of drug. This is owing to the great power which rhubarb has of absorbing and retaining liquids.

From the 16 ounces used it is not likely that more than 8 will be recovered by pressure.

Of course with every drug the amount of menstruum to be used to start with varies, some absorbing twice or three times as much as others.

By the above method the root appears to be completely exhausted, and the product is as good an example of the utility of the process as one could wish for, since it possesses in a marked degree the peculiar odour of the root, and can be readily filtered after a few days standing; indeed the greater portion can be poured off bright without filtration being necessary. Amongst others which are specially adapted to this process, are digitalis, matico, hop, roses, and bearberry. I mention digitalis because heat is injurious to it, and therefore "extraction by pressure," with cold water, is preferable to other methods.

Matico should be in coarse powder, whilst bearberry leaves, being very leathery, should be bruised to allow the water to penetrate them.

Infusion of roses made by this process gives excellent results, evaporation being entirely unnecessary.

Very great care must be taken never to leave the drug long in contact with an iron vessel, as all the infusions except calumba and quassia and several of the decoctions contain tannin.

Under this heading also I have a word to say about the decoction of broom. The tops should be finely chopped and then infused with boiling water; afterwards the method is similar to that of buchu. The drug yields very well to pressure, which is hardly what one would expect, judging from its hardness.

Before adding the spirit it should be boiled, and the addition of a few drops of liquor potassæ has been recommended to prevent the deposit of scoparin.

My last process is repercolation.

The apparatus for this need not be at all expensive, being simply furnished by four or five round glass bottles, the bottoms of which have been cut off. Of course the size will depend upon the quantity of drug to be operated on. It is as well to have a wooden stand so constructed that the bottles can be arranged tier over tier to allow the menstruum to percolate through them successively.

My first example of this is the compound infusion of gentian, which cannot be prepared by any better process.

It is best done as follows:—

Grate 4 ounces of lemon peel and macerate in 5 ounces of a mixture of spirit and water in the proportions of three of spirit to one of water, this strength of menstruum being the best for extracting the essential oil.

Macerate 2 ounces each of gentian root—which should be in coarse powder about the size of peas—and orange peel with sufficient water to moisten them for twelve hours.

Then pack equal quantities of them firmly in the percolators and pour an ounce or two of cold water into the first one. Wait till this has been all absorbed or percolated through into the next, and then add more water, proceeding in the same manner until 15 ounces of liquid (which has passed through the whole series) has been obtained.

The tincture of lemon is then pressed and mixed with the percolate, the whole being made up to a pint, if necessary. Boiling must be omitted, since heat has a very injurious effect on this infusion. Infusion of orange is best made after this plan. It should be ground to a "no. 20" powder, and after being moistened with water for twelve hours, should be packed in the percolators rather loosely, as it has a slight tendency to clog.

Its exhaustion is very easily accomplished, and it is very curious to note the different stages of exhaustion in the percolators, the marc in the first being white and almost tasteless by the time the menstruum has reached the last.

My third example is cascarilla. In this case a quarter of the drug, which must be in "no. 20" powder, should be converted into a rectified spirit tincture, the remainder being proceeded with on the same lines as orange; but [illegible] marc should be packed as tightly as possible, and the infusion must not be boiled, since so doing would cause it to lose part of its essential oil, and thus impair its keeping properties, indeed, buchu is almost the only case in which an essential oil being a constituent of a drug it is advisable to boil the infusion prepared from it. Serpentary and jaborandi are two other infusions with which repercolation answers very well. In both cases they should be in the form of coarse powder. Obviously there are several drugs to which two processes are applicable, for example, cascarilla, matico, jaborandi and serpentary can all be prepared either by pressure or repercolation.

Senega gives very good results from the first process of all. Cold water exhausts it equally as well as hot, still though I have not tried it I am inclined to think that this drug in coarse powder would answer very well with either pressure or repercolation. On the filtration of these preparations I need not dwell, save to say that gentian, calumba, senega, senna and broom filter best through flannel, the first two with the aid of a little magnesia, whilst the remainder mostly filter easily through paper; but quassia will not come bright without the aid of magnesia, and even then it sometimes proves obstinate, only yielding to the persuasions of Chinese clay.

Cascarilla must not be filtered through magnesia; Chinese clay is the most suitable medium.

Although senega filters best through flannel if in quantity, still it will generally be found better to pour off as much bright as possible, and filter the remainder only; the addition of a few drops of ammonia works wonders in clearing it quickly, and is said to have a preservative action on it as well.

In bringing these long and disjointed remarks to a close, I have only to express my regret that I have been unable, through press of other work, to do such justice to the subject as it deserves. I think I can say without fear of contradiction that of all the branches of pharmacy it is the most neglected, and undeservedly so, for there is hardly another where there is more scope for skill and thought.

In spite of what many have to say against them, it is my firm belief that so far from the time being near when infusions and decoctions as a class will have to take a "back seat," so to speak, they have a long existence before them; and the best way out of the difficulty is to try and perfect the manufacture of the concentrated preparations, which are manifestly, when properly prepared, more convenient to physician, pharmacist and patient alike, than the fresh ones.

It seems a great absurdity that their existence should have been ignored by the compilers of the Pharmacopœia, for in the present state of things five-sixths of the chemists use them, although the method of making them is in a great number of cases largely at fault, thus causing much dissatisfaction, and naturally tending to bring them into disrepute.

This was followed by a short paper on the "Source, Origin and Adulteration of Pepper," by C. H. Twelves.

The papers gave rise to considerable discussion, in which the Chairman and Messrs. Newsholme, Grierson, Humphrey and Morrison took part. Votes of thanks were given to the essayists, after which the meeting terminated.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the Midland Counties Chemist' Association was held on Wednesday at the Mason College, Birmingham, under the presidency of Mr. Arblaster. Mr. F. J. Liverseege, A.I.C., read a paper entitled "Optical Illusions." The paper, which was illustrated by experiments, will be published in a future number.

At the conclusion a vote of thanks was passed to Mr. Liverseege, on the motion of the Chairman, seconded by Mr. A. Southall.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The usual weekly meeting of the Association was held on Thursday, July 13, Mr. John Forsyth, President, in the chair. There was a large attendance.

The meeting was an open one, and the work selected was the reading of the apprentices' prize essays. It was also intended that the successful essay on "Progress in Pharmacy" should be read, but the Secretary read an intimation from Mr. J. R. Hill, Edinburgh (who was deciding the question), stating that he would be unable to forward his decision in time for the meeting.

After the minutes had been disposed of, the President called on the Secretary to read the essay of Mr. Chas. T. Duncan (who was present) on "How to Improve one's Time during Apprenticeship," this having gained the first prize. Mr. Fred David then read the second essay, his subject being "How I Spent my Half-Holidays." Mr. Fernie, who gained the third prize, thereafter read one on the same subject as the first.

At the conclusion a very hearty vote of thanks was awarded to the authors on the motion of the President, who, along with several members, congratulated the successful apprentices on their productions.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Smokeless Explosives.

A lecture on this subject was given on Friday, January 31, by Sir Frederick Abel, who reminded the audience that his first Friday evening discourse on Explosives was given at that Institution thirty-four years ago. Since that time very great changes had been made in the use of explosives, an example of recent developments in artillery being furnished by a comparison between the guns used in the Crimean war in the earlier days of the lecturer's official connection with the subject and those in use at the present day. At that time practically only two kinds of powder were in use, viz., "fine grain," for small arms and sporting purposes, and "large grain," for cannon and for blasting. The necessity of having various kinds of powder of different properties for small and large guns led to various modifications. At first these modifications were almost entirely in the physical or mechanical structure of the powder; the proportions and nature of the chemical constituents being thought to be already those best suited for producing the maximum of energy. The mechanically modified powders were of two types: one, known as pebble powder, was made by breaking up solid cakes of the powder into pieces of roughly the same size, and smoothing them by attrition into pebbles or boulders; the other type, which might be called pellet powder, was made on the theoretically admirable method of submitting each particle of the mass to the same conditions of pressure, drying, etc., so as to insure perfect uniformity. This, however, was not so successful as was expected, although a "prismatic" powder made in America on the same lines gave very good results. So far the modifications were not in the direction of smokelessness, but simply to spread the burning of the powder over a longer time, and so make the pressure developed in big guns more uniform throughout the whole length instead of being nearly all in the chase before the projectile had moved far. The lecturer and Captain

Noble had investigated the effects of the composition and action of powders, and obtained some very useful results; Captain Noble had constructed vessels of great strength in which he could explode as much as 28 pounds of gunpowder, or 5 pounds of gun-cotton, at a time, the vessel being entirely closed; he could then draw off and examine the gases produced. It was found that the volume of gas produced was inversely as the heat evolved, and that with respect to the wear of the gun, the powder which produced most gas and least heat also produced least erosion. A powder possessing some advantages over the ordinary form was the result of a modification in the chemical nature, and was known from its colour as brown or cocoa powder; its chief difference lay in the employment of a more easily combustible charcoal, prepared with less heat than the ordinary, by which means the proportion of sulphur could be very much lessened. This powder produced a good deal of smoke, but it disappeared much more rapidly than the smoke from ordinary powder, possibly because the carbonate of potassium forming the greater part of the solid products of combustion was quickly dissolved by the water also produced; it was also a slow burning powder, but the erosive action was serious. The introduction of machine and quick-firing guns had shown the great desirability of using a smokeless powder, and chemists began to experiment with substances which would yield no solid products on combustion. The products of explosion of ordinary black pebble powder consist of from 55 to 58 per cent. of solid matter, the permanent gases being only from 42 to 45 per cent. This solid matter consists of 56 per cent. of K_2CO_3, 12 per cent. of K_2SO_4, and 25 per cent. of K_2S and $K_2S_2O_3$, with some free sulphur and traces of carbon, ammonium carbonate, nitrate, and sulphocyanate of potassium; the gaseous products contained 50 per cent. of CO_2, 13 per cent. of CO and 32 per cent. of N, with a little H_2S, CH_4 and free hydrogen. An attempt was made to produce a powder that would yield no solid products of combustion by substituting ammonium nitrate for the potassium salt, but the hygroscopic nature of nitrate of ammonium was a great drawback to the use of this. A German engineer, however, made a powder from a mixture of the nitrates of potassium and ammonium, in the belief that a volatile amide of potassium would be formed, and this powder after some improvements was developed into a very serviceable variety known as "amide powder;." its smoke soon disappears and it produces a great velocity with a steady gradual pressure, being very serviceable for use in the tightly closed cartridges of quick-firing guns, where its hygroscopic tendency will be prevented. It deteriorates, however, and becomes less uniform after long storage at high temperatures, as in the magazines of ships. The next important improvement was made by the French, who produced a powder for their new Le Bel rifle, of which most marvellous accounts were given. The composition of this powder was kept a profound secret, but after a time a few pellets were procured and examined, both in England and in Germany, with the result that its composition is now pretty well known, its chief difference from other smokeless powders being that it contains picric acid. The basis of the modern smokeless powders consists of gun-cotton, either of the highly nitrated kind or of the slower burning pyroxylin variety. Many years ago this substance had been experimented with by the lecturer and others, but with unsatisfactory results, the action not being at all uniform, and sometimes disastrous. Great improvements were made in Austria by the expedient of twisting the gun-cotton into threads, plaits and ropes, by which means (as shown at the lecture) its action could be modified to any extent in the open air; still, when discharged in a gun it would not always be relied upon under varying conditions. Another expedient tried by the lecturer was to compress the cotton into solid cakes with suitable air spaces, and this also gave sometimes good results, but occasionally it exploded with much more violence than was expected. After describing the Schultze powder, which consists of little wooden dice or granules nitrated, and the E. C. powder, prepared from the lower kinds of gun-cotton, mixed with oxidizers and solidified, the lecturer proceeded to demonstrate how gun-cotton could be dissolved in such solvents as ether or acetone, and dried in perfectly homogeneous films, which could be cut into shreds, or the jelly could be passed through dies and the solid produced in any desired form. To Nobel, whose name is so well known in connection with nitroglycerine and dynamite, was due the discovery that nitroglycerine also possesses the power of dissolving or gelatinizing gun-cotton, and a powerful combination of this character has been introduced by him under the name of blasting gelatine. He has also produced by this means a very good powder, one of whose great advantages is that it is perfectly unaffected by prolonged soaking in water. In order to render it less sensitive to shocks and so increase its safety, a little camphor is incorporated with it, and the volatility of this ingredient is the only fault of the powder. A perfectly smokeless powder of this description can be rendered very manageable by producing it in fine threads or comparatively thick rods, according to the requirements of the gun, the rod being very slow burning and producing a gradual pressure. The very perfection of the powder, however, is the cause of another difficulty, for there being absolutely no solids deposited in the bore of the gun, the friction of metal on metal is found to be very great, and the greater the energy produced the greater the heat and erosive action. The lecturer was confident, however, that these difficulties would be overcome, and had no doubt as to the ultimate adoption of these smokeless explosives, which would effect a great change in military and naval tactics. The following figures show the composition of the entirely gaseous products of the explosion in a confined space of gun-cotton and of smokeless powder:—

	Gun-Cotton.		Smokeless Powder.	
CO_2 . . .	25·63	32·23	30·0	32·45
CO . . .	39·51	30·65	34·1	31·78
H. . . .	18·78	20·36	16·1	16·87
CH_4 . . .	0·11	0·31	——	0·43
N. . . .	15·97	16·45	19·8	18·47

CHEMISTS' ASSISTANTS' ASSOCIATION.

At the Chemists' Assistants' Association meeting, held on Feb. 5, a paper was read on—

The Blowpipe.

BY J. CASTELL EVANS, F.I.C.

Lecturer on General and Analytical Chemistry, Finsbury Technical College.

In England there always has been, among so-called practical chemists and analysts, a strong tendency to ignore, if not actually to condemn, the use of the dry method of testing, either for qualitative or quantitative work. In nearly all cases this has arisen from utter ignorance of the general principles as well as of the beautiful details of blowpipe chemistry; for very few of our chemical training institutions give any facilities and still fewer offer any encouragement for its practice. Of late years it is true some beggarly references are made to "dry reactions" in most of our works on qualitative analysis, but these are given in such a way that they always impress one as being given rather for the purpose of hoodwinking the critics than for that of helping the students. In nearly all cases they are so meagre and vague as to be practically useless, while in many they are positively misleading. Even in our best works the dry method is totally or almost totally confined to qualitative work, giving the students the impression that it is worthless for quantitative determinations. This error I want to combat at the very start, for in many cases I have found it far easier to teach a student how to obtain correct results by the dry way than by the ordinary wet method. In even such a simple matter as the determination of the percentage of silver in an alloy, I have found beginners at their first attempt get by the dry process results within 0·2 per cent. of the truth far oftener than they have succeeded in obtaining results within 2 per cent. of the right amount by the wet way; and the time taken in the dry assay by beginners is rarely a third of that taken for the other method. Blowpipe methods effect, especially in qualitative testing, an enormous saving of time, trouble and expense. If a man wanted to carry enough chemicals, apparatus, etc., to analyse by the wet way all the minerals that he may meet with in say a long vacation among the mountains extending over seven or eight weeks, he would require a horse and van to take them about; but an expert blowpipist can put his whole laboratory into a small handbag,—almost into a fair sized sandwich case, and do better work in the shelter of a boulder than the slop worker can do in his luxuriously fitted laboratory. For the pharmacist, who may frequently require to make an almost instantaneous examination of a preparation for certain ingredients or adulterants, the dry way presents very many and great advantages; it is rapid and reliable, and can be carried on anywhere, and in my very rapid and incomplete review of blowpipe chemistry to-night I desire to say just what may direct your attention to the merits and advantages of the method rather than to give you special instructions on any one point, and in order to do that, I will at once pass on to notice, in the first place,

I. *The Apparatus.*

1. *The Blowpipe.*—The best form of blowpipe I have found to be the one represented by this battered veteran in my hand; the only fault I have to find with it is that the disc on the stem is somewhat near the flame for comfort during a long blast. It pulls asunder, as you see, into three parts, which pack compactly into one another. It has no screws to wear out and no soldered joints to melt, neither has it the usual mouthpiece to go between the lips, but a good trumpet mouthpiece to be pressed against the lips, and so save the muscles of the cheeks all unnecessary strain.

2. *Blowers.*—A great deal has been written from time to time about contrivances for producing the blast for blowpipe work, but I have not yet found anything more reliable and so thoroughly under control as a pair of Adam's bellows. These are easily carried about, and whenever required are found to be in fair working order. One requires a certain amount of training in their use, and I must caution all against the foolish and injurious habit of blowing from the lungs.

3. *The Fuel.*—Gas may be used where available, but one has to remember that it nearly always contains traces of sulphur, and in testing for small quantities of that element we must employ other fuel. Lamps in which oil is burnt (rapeseed or olive oil) are also made, and are very useful on a tour; alcohol does not do for actual blowpipe work, but it does well for nearly all heating purposes. A good, honest, old-fashioned, tallow candle has often done good service in my hands; it can be procured almost anywhere, and is far cleaner to carry about than oil lamps, which have always a knack of leaking or coming unstoppered. For pharmacists, however, gas will nearly always be available, and as they rarely have need to test for mere traces of S there can be no objection to its use.

4. *The Charcoal Support.*—The discussion of this is so complex that it would be out of place to enter upon it in this place. If good compact charcoal from light woods can be procured, so well charred that it neither crackles nor smokes, there is nothing better to be desired. If artificial blocks of charcoal have to be used, see that they are porous and free from any appreciable amount of mineral substances; especially see that they are free from sulphur.

5. *Aluminium Plate.*—This about 6 inches long, 2 inches broad, and bent into a ledge about ¼th inch wide along one of its short edges, does excellently well as an adjunct to the charcoal, which must then be cut into blocks ¼th inch square by ½ inch thick, or in some cases the metal may be used as a direct support.

6. Silver plate. To be used in testing for S, Se, etc.

7. Platinum foil or spoon for fusions.

8. Platinum wire for beads, etc.

9. Asbestos fibre for flame coloration.

10. A short length of gold wire to test for traces of Hg.

11. A good supply of glass matrasses, open tubes, etc.

12. A good lens.

13. Coloured glasses, etc., or if possible a pocket spectroscope.

14. A few basins, crucibles, etc.

II. *The Reagents.*

These to be as dry as possible, in well-fitting boxes or wide mouthed glass bottles.

1. *Borax.*—Get it as pure as possible by recrystallization, then dry and powder.

2. *Microcosmic Salt* ($NaHNH_4PO_4+4H_2O$).—By ignition this is converted into $NaPO_3$, and I have found that form even preferable in many instances.

Alkaline carbonates, Na_2CO_3, or mixed with K_2CO_3, dehydrated, powdered, and kept from moisture in a well stoppered bottle.

4. *Reducing Agents.*—Black flux, $K_2C_2O_4+2H_2O$, Fe_2SO_4, and KCN.

5. *Oxidizing Agents.*—KNO_3, $KClO_3$.

6. *Sulphurizing Agents.*—$Na_2S_2O_3$, H_2S solution in special wash bottle, or $(NH_4)_2S_2$.

7. *Iodizing Agents.*—KI, to be applied by means of capillary tubes, or HI in special bottle.

8. *Fluxes.*—CaF_2, B_2O_3, SiO_2.

9. Acid potassium sulphate, $KHSO_4$.

10. *Liquid Reagents.*—(*a*) H_2SO_4 concentrated, (*b*) HCl concentrated, (*c*) HNO_3 concentrated, (*d*) HNO_3 sp. gr. 1·15, (*e*) liquor am. fort., (*f*) cobalt nitrate solution, (*g*) K_2CrO_4 solution, (*h*) $K_4Fe(CN)_6$, (*i*) $K_6Fe_2(CN)_{12}$.

11. *Metallic Oxides.*—CaO, CuO, MnO_2, PbO.

12. *Metals.*—(*a*) Mg to test for phosphorus, (*b*) Pb powder obtained by precipitating Pb from its acetate by Zn, washing thoroughly and drying, (*c*) Zn, (*d*) Fe powder, (*e*) Au grains for separation of Co and Ni.

13. Test papers, etc.

III. *Operations.*

A. Heating in glass matrass. This must be done very cautiously over a non-luminous, entirely smokeless flame, and the very slightest changes in the assay must be noticed. Note approximately the temperature at which any of the following take place: (*a*) change of colouring, (*b*) carbonization, (*c*) fusion, (*d*) decrepitation, (*e*) phosphorescence, (*f*) evolution of gases or vapours, (*g*) sublimation; see whether your sublimate is a true one, *i.e.*, whether you can drive it further by heating.

B. Heating in the open tube. This, again, requires great care in regulating the temperature and the draught. This latter is regulated by the inclination given to the tube. Watch especially for evolution of gases or sublimates.

C. Heating in the flame directly on charcoal, etc. Here a word must be said about the two kinds of flame, oxidizing and reducing. To produce a good oxidizing flame thrust the nozzle of the blowpipe well into the flame and keep up a good strong blast; remember that you have to trust to the oxidizing effects of heated atmospheric air dragged along with the flame cone, and not on those of the air supplied by your blowing. A good test whether you can produce a pure oxidizing flame is to take a small quantity of molybdic acid on a borax bead and get the bead perfectly colourless; the slightest defect in oxidizing power will give a brown tint to the bead.

To produce a reducing flame is harder. You here blow down the flame without destroying its luminosity and see that the assay is completely enveloped by the flame. Cu is a good test for a reducing flame.

Note when any of the following changes take place:—(*a*) Fusion. (*b*) Change of colour. (*c*) Deflagration. (*d*) Flame coloration. (*e*) Evolution of odours. (*f*) Reduction of metal. (*g*) Incrustation.

D. Heating on charcoal, moistening with Co solution and strongly heating again. Note colour of residue.

E. Heating in matrass with dehydrated $Na_2S_2O_3$. This gives the sulphides of the metals.

F. Testing on borax bead. Note changes on saturating and flaming.

G. Testing on microcosmic bead. Note as in F.

H. Testing with fluxes and deoxidizers.

I. Testing for volatile acid radicles in matrass with $KHSO_4$.

K. Testing solubility, behaviour with dilute HCl and Zn.

L. Flame coloration.

M. Bunsen's flame and film tests.

The paper was fully illustrated with apparatus, typical beads and practical demonstrations.

At its conclusion,

Mr. T. A. Ellwood (the President) said the members of the Association were to be congratulated upon hearing so admirable a lecture delivered by a pastmaster in the art of blowpipe analysis. As one who was concerned in the teaching of practical chemistry he could endorse every word that had fallen from Mr. Evans respecting the inattention in England to blowpipe analysis. Men who took the trouble to make a few preliminary examinations in the dry way were invariably more successful than those who blindly confided to wet methods only. He had been much struck by several novelties alluded to by Mr. Evans; the asbestos fibre, in particular, he thought was a valuable suggestion.

Mr. Blackham said that in his student days he had paid a good deal of attention to blowpipe reactions, but was compelled to abandon it, as he discovered that he was partially colour blind; he supposed Mr. Evans could not suggest any remedy in such a case.

Mr. Pearmain called attention to the fact that rape oil invariably contained sulphur.

Mr. W. L. Williams said no one could possibly feel more indebted to Mr. Evans in connection with the subject of his admirable lecture than he did himself, for his remarks were not based simply upon that evening's lecture, but upon the experience that came from his acquaintance with Mr. Evans in his teaching capacity at the Finsbury Technical College. Did any pharmacist wish to spend his evenings in a closer acquaintance with either this or any other department in chemistry, there was no more admirable place for the purpose than the City Guilds Institute, and no one who would more willingly and unreservedly place his stores of knowledge at the disposal of the student than the lecturer.

Mr. E. Richards proposed a cordial vote of thanks, and also alluded to the benefit he had derived from the instruction at Finsbury.

Mr. Blackham, in seconding the same, mentioned that the standard works on pharmaceutical chemistry took all too little notice of this important subject; what was seen there might well be said to be introduced rather for the sake of conciliating the critics than of assisting the student.

Mr. Evans, in returning thanks, alluded to his partiality, if he had any preference at all, for pharmacists; they were men whose minds were constantly on the strain in their daily work, and yet saw the advantage of combining in such associations as the one he was addressing, for the purpose of stimulating mutual improvement. It had given him much pleasure to tell them something about a subject which he regarded as a recreation, and as one address was far too little to adequately treat the subject he would be pleased to extend his remarks, did they so wish, upon some future occasion.

Obituary.

Notice has been received of the death of the following:—

On the 15th of February, Mr. Thomas Stone, Chemist and Druggist, formerly of Coombe Road, New Malden. Aged 69 years. Mr. Stone was a Member of the Pharmaceutical Society from 1849 to 1886. In December, 1886, he was elected an Annuitant on the Benevolent Fund, to which he had been a subscriber for many years.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Claims of the Pharmaceutical Society.

Sir,—It has always appeared to me that no sort of business on the face of the earth affords such facilities for the interchange of good fellowship and mutual benignity as ours does. It seems a wonder that prior to the establishment of the Pharmaceutical Society scarcely fifty years ago, no effort had been attempted amongst us to foster and consolidate these desirable ends. No marvel that the endeavour once put into practical shape became a plant of vigorous growth, able by its exuberant vitality to brush aside excrescences that would impair its development, and to resist with success the various forms of antagonism which every good and far-reaching inception seems bound to call forth.

Benevolence in the truest and in the widest sense of the term was the impulse that urged on those few brave men who in the year 1841 planted the sapling, and who for the rest of their lives tended it with the most devoted and self-denying care. These, though but a handful, were the representatives of British pharmacy, and in that capacity they managed to set on foot an institution for the benefit of their fellow-craftsmen, the protection of the public, and the advance of pharmaceutical knowledge, unique in its character. The solidity of the foundations on which they built is proclaimed with increasing emphasis, as the superstructure rises and extends, until to-day it is our privilege to look back upon fifty years of as good and solid work—all round—as was ever accomplished in the world's history. The average "chemist," instead of being confounded with the meanest of "doctors" or the best of "quacks," is looked up to with respect by his neighbours, who treat him with becoming deference; the vendor ignorant of his wares, and so the prey of little dishonest wholesale traders, is almost no more; instead of opposition and envy there is—with little exception—general goodwill between the medical practitioner and the chemist; and if the worst comes to the worst there is a benevolent fund to be proud of, available for everyone on the Register, whether he has subscribed to it or not, friend or foe. "Fifty annuitants, receiving £1710 per annum. Last year £2060 distributed," tells no mean tale. In case of vexatious prosecution, again, we have a recognised representative body, a chartered institution, to see that we are ~~not unfairly~~ treated, and we await at the present moment a judicial decision, which may be expected to confirm the pharmacist in the position he already holds as the legal custodian of the public safety with respect to the sale of poisons and the dispensing of medicines. Put against this all the objections that have ever been urged against the continuous policy of the Society and its successive Councils and Presidents, and where are we? Not dead, nor asleep. "Si monumentum requireris, circumspice."

The Council election will soon be round again, and it behoves all the members and associates of the Society who wish to be loyal to the cause of pharmacy in Great Britain to be on the alert to see that straying, ungracious and unthankful folk throw not into our ointment dead flies with impunity.

Last year we were inflicted with as mean an outburst of petty spite as was ever flung at a distinguished man intent upon his work and his duty. This went straight to the mark—its only condonation—and became extinct. Then there was a side blast coming from a society of people who are so tenderly disposed as to seem as if they forget the sufferings of their fellow creatures in an inordinate desire for the comfort of the brute creation. This was designed, as the event showed, to overthrow our President and his most intimate colleagues, and a sort of war-dance celebrated partial success.

Now, sir, we who carry on business in London have a great advantage—would that it could be extended to all—the advantage of seeing with our own eyes what is going on at Bloomsbury Square, and of coming into direct contact with the men who are responsible for the conduct of affairs. We do know a little how much they value, how much they deserve, for our own sake, our support and encouragement, and we are able to appraise at its true figure the obstructive behaviour to which I have just referred. But large numbers of our associates and members in the country are very much influenced by travelling newsbags who bear an evil report of the good land they know nothing about, who ignore the existence of any good at all, it seems, except it be in connection with the worship, the exclusive worship, of Trade—that great divinity of the time. These have one big trade journal, and yet they want another; they want, I hear, to turn the *Pharmaceutical Journal* into a little trade journal and the Pharmaceutical Society into a little trades union. The pursuit of these ends causes them, it seems, to sacrifice at one fling their English dictionary and their English amenities. Confusion of the terms "representative" and "delegate" leads them to think that all should have a "turn" at Council business, and that one individual, however capable and full of life and of life's earnestness he may be, and however much his influence with the crew, must not be allowed to steer the vessel too long, even when the termination of a long and perilous voyage is near at hand.

Perhaps the issue of the Benevolent Fund number of the *Pharmaceutical Journal* to everyone on the Register may become the beneficent means of dispelling some of these delusions, so that on the eve of such an important crisis voting papers may come in in greater numbers to tell of more lively interest arising for the near realization of the great ideal of our founders, "The incorporation of the Chemists and Druggists of Great Britain into one ostensible, recognized and independent body."

West Marylebone. J. C. HYSLOP.

THE DRAFT PHARMACY BILL.

Sir,—On reading the Draft Pharmacy Bill, and the Council discussion thereon reported in the *Pharmaceutical Journal*, I feel impelled to express my regret that the acquisition of powers generally acknowledged to be desirable for the advancement of our calling should be endangered by proposals that will certainly arouse indignant opposition from a large proportion of the trade.

The sixth clause of the Bill provides that it shall become unlawful for any unqualified person to "compound." Among other astonishing consequences it follows that an apprentice who is being instructed in due course at his master's dispensing counter will be liable to prosecution when he essays to fill the stock pill-boxes, or to replenish a customer's ointment pot!

Whatever may be the direction in which it is wished to use them, or the limits within which they are intended to apply, I consider it unsafe for any Council to be entrusted with such powers, and unwise of the constituency to assent to their acquirement.

Clifton. JAMES W. WHITE.

Sir,—I have read with the greatest interest the draft Pharmacy Bill and the discussion thereon in Council, as published in the Journal for the 8th inst., and as discussion will no doubt be welcomed I would like to contribute a few remarks on certain of the sections. Regarding section 2, few qualified chemists will seek to cavil with the powers asked for by the Council, but there is one point which I would like to draw the attention of chemists to—viz., the wording of that part of the section which deals with the evidence to be produced by candidates before presenting themselves for examination, of 'having for not less than three years in the whole served in the open shop.' Now why do the Council stop here? Why do they not include that part of the bye-laws (section 10, clause 23) which says, "or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions?" Is it in view of the first line of section 6 of the new Bill that the above words are omitted? The President asserted that he would not attempt to throw dust in the eyes of the members, but, if so, why was he so obscure when tackled by Mr. Schacht on the interpretation of the first line of section 6? I shall, however, treat of section 6 presently. I trust that the powers asked for in section 2 will allow of the Society demanding that the Preliminary examination be passed prior to entering on apprenticeship, and also that the scope of the examination be widened, so as to include an elementary knowledge of mathematics and of at least one modern language.

The latter part of section 2 apparently opens the door to all foreigners, and should be carefully thought over by all chemists who are not desirous of having another disturbing element added to the various forms of competition with which they are beset. Regarding section 5, I am of opinion that the Council has gone to the utmost limits with regard to chemists and druggists in business. If they had gone the least step further they would have brought down on their heads the righteous indignation of those who by their ability and determination have undergone the trouble and expense of securing the higher qualification of pharmaceutical chemists with the few—very few—material privileges pertaining thereto. They should see that the privileges left them are strictly conserved. I cannot understand why Mr. Evans should seek to deprive them of an equal share in the representation on the Council. Although numerically weaker, it must be remembered that the pharmaceutical chemists are in great measure the intellectual strength of the Society, and are consequently fully entitled to an equal share of representatives on the Council. It ought to be remembered that it is principally the pharmaceutical chemists that give the Society a standing and obtain recognition for it among scientific bodies, an object which should always be kept steadfastly in view. I now come to section 6, and may at once say that I feel convinced that if the first line, "It shall be unlawful for any person to compound," is not materially modified, the Bill will never pass the House of Commons. Mr. Schacht deserves the best thanks of all chemists in business for his persistent exposure of the defects of this part of the section, but I cannot congratulate him on his attempt to improve it. He does not go far enough. Mr. Allen's proposal was much nearer the point, and I very much regret he did not insist on it. I am certain that some modifying clause will have to be added before there is the least chance of the Bill passing. Why should any reasonable being object to an apprentice or unqualified assistant compounding a prescription who is "directly employed by and under the immediate and personal supervision" of a pharmaceutical chemist or chemist and druggist. How on earth are apprentices and junior assistants to learn their business if they are precluded from practising the most essential parts of that business? Wherefore the use of examining them in a subject in which they are compulsorily deprived of the privilege of obtaining any practical experience? The idea is preposterous. The addition of some such qualifying clause would, I am sure, be of very great value to apprentices and junior assistants, as it would ensure them a careful and thorough training in that part of their business from some one fully qualified, instead of being left in many cases wholly or almost wholly in the charge of unqualified "senior" assistants. It would also be of special service to the many apprentices in branch shops, many of which, as is well known, are managed by unqualified men. I trust that in the forthcoming Bill it will also be made perfectly clear that an apprentice or unqualified assistant may conduct the sale of a poison under the personal supervision of and in the presence of a duly qualified chemist. I sincerely hope that the Bill will be thoroughly discussed by all who take an interest in the future of our calling.

Edinburgh. W. G. M.

Sir,—On behalf of the dispensers engaged in the poor law service, hospitals, dispensaries, and public institutions, many of whom have no intention of going into business on their own account, I trust the Council will make some such alteration in the fifth clause as suggested by "Justitia" in last week's Journal.

W. E. MILLER.

EXEMPTION FROM JURY SERVICE.

A Copy of the following letter, addressed to the President of the Pharmaceutical Society, has been forwarded to us by the writer, with a request for its publication:—

"Sir,—I venture to point out to the Council of the Pharmaceutical Society, through you as its President, what I think is an important omission in the Draft Pharmacy Bill, viz., that no provision is there made for exempting all chemists and druggists from serving on juries.

"Surely the time has arrived when this exemption should be secured for all engaged in the responsible duties of a chemist and druggist (whether pharmaceutical chemists or otherwise), and, if so, a place should be provided for it in the proposed Pharmacy Bill.

"I urge this on the broad ground that the safety of the public demands it in the case of the whole body of registered chemists equally as in that of pharmaceutical chemists.

"It cannot be denied that a very large amount of dispensing, and by far the largest part of the sale of drugs in the country, is conducted by men having the Minor qualification only, who, as is well known, far outnumber those having the Major, and it is as necessary for the safety of the public that the Minor men should not be obliged to leave their business as it is in the case of Major men.

"The views of the Council as to the illegality of the sale of poisons by unregistered assistants make it essential to the position of those chemists who are unable to employ qualified men that they should be exempt from such public service as would call them away from their establishments and necessitate an apprentice or unqualified assistant being left in charge.

"The present state of the law, which grants the exemption as a kind of reward for passing the Major, is utterly indefensible from the point of view of safety to the public, and of the interests and credit of the trade. Having regard to the responsible nature of a chemist's duties, it cannot be doubted that Parliament will approve of the public interests being safeguarded by an extension of the exemption to all registered chemists. Possibly some few pharmaceutical chemists may consider the exemption from jury service a privilege they should monopolize, but these will be very few, and the great majority will, I believe, regard the matter from a higher and broader level, viz., that of the welfare of the public, and the credit of the profession as a whole, which is involved in the prevention of mistakes by all possible means, at all possible times.

"*Wolverhampton.* THOS. READE."

UNIVERSITY DEGREES FOR PHARMACISTS.

Sir,—Will you allow me to give expression to a few thoughts in the rough on this latest development of pharmaceutic aspiration. Number one is that I heartily approve of the idea so far as its intrinsic desirability is concerned. Number two, however, is at variance with that view: I cannot get rid of the feeling that the proposed multiplication of qualifications would be extremely bad policy. What would be the result of a general or even partial issue of degrees or diplomas by universities? Just this, I believe; the Pharmaceutical Society would soon be very considerably weakened through loss of examination fees, and woe betide the corporation that gets debilitated in the sinews of war! It inevitably becomes limp and halting as a power for good. Now, is it advisable, Mr. Davis and all whom it may concern, that for the sake of a little extra honour we should risk injuring for life the only Society we pill-builders have with any political influence or executive power? My impression is that it is not advisable. I know I may be told that the proposed degrees need not necessarily be of the nature of licences. But would not that be rather illogical? and is it not likely that in a few years we should hear a loud outcry, amongst students and their friends, something like this: "We call it a cruel shame that we who have matriculated and 'curriculated' at London or Edinburgh University, and obtained our 'Master in Pharmacy' degree, are not allowed to practice pharmacy till we go to Bloomsbury Square or York House and pass that pottering 'Minor'"! (*Nota bene*: That is not my estimate of our qualifying examination.) Then there would be an expedition to Westminster, and the academically aggrieved would lift up their voices and elongate their faces in the lobbies of Saint Stephen's; and the senators would pacify them and say, "Yes, yes, be good boys and do not fret, and we will give you all you want, for you have reason on your side"! Nor would it mend matters much to make the Minor a Preliminary to the "Bach. Pharm." The degrees would soon be wanted to stand on their own legs, and be full legal qualifications, like other university degrees; and that is where the subtle danger of the proposition comes in.

Let us all who have the permanent good of the Society at heart (and I am sure I may include nine-tenths of the members of the Chemists' Assistants' Association in that category) advocate those things only which tend to consolidate and fortify the Society, rather than support schemes (no matter how much in accordance with our inclinations), which would tend to weaken and disintegrate it; in short, let us be pharmaceutical "unionists." It will be time enough to talk of degrees in pharmacy when pharmacists can bring with them another fifty years of history and culture to back up their demands. As yet we are, comparatively speaking, only in our boyhood as a body. Anyhow the scheme can very well wait till next century; and meantime there are many other matters of much more pressing importance which call for our attention. I cannot refrain from taking this opportunity to indicate the heads of a programme which would be far more worth our while to aim at carrying through. First, get the curriculum; next, reconstruct the Society where necessary, strengthening points that may have been found to be weak; and finally, "go in for" dispensing for the qualified chemist alone, and the practice of medicine for the qualified medico alone. The Society might be rearranged on these lines:—The Council to consist of not more than half its number of pharmaceutical chemists and the remainder of chemists and druggists; all future Minor men, and all present ones not in business, who wish to be elected "associates," at an annual subscription of 5s., and to have a vote in the election of councillors, but no vote at business meetings; all future Minors on entering business, and all present chemists and druggists in business, who desire it, to be elected fully enfranchised "members" of the Society on payment of an annual guinea, or, by option, to remain associates—also with full voting power—at 10*s.* 6*d.* a year; and all future Major men, and all present ones who choose, to be elected to a fellowship of the Society—price, one guinea per annum. The Council to be composed of nine or twelve Fellows and nine or twelve Members; and the President, etc., to be "electable" from either party.

Now for a little closer inspection of the third plank in the platform. By the limitation of dispensing to registered chemists, I mean as far as that is attainable and by a gradual process; for we could never expect present dispensing doctors to give up their chartered rights, and sacrifice their vested interests at our bidding. It seems more feasible, however, to attack the problem on the legislate-for-posterity system. Our own Council and the Medical Council might advantageously lay their heads together and see whether the latter could be induced to promote a measure, making it binding on all candidates for their licences to sign a declaration debarring themselves from dispensing, under a penalty of say £5 for each offence. I fully admit that the *vice versâ* side, viz., that all candidates for the pharmaceutical diplomas should bind themselves, under penalties, to do no prescribing, bristles with difficulties; but I would fain believe that they are not insurmountable ones. As soon as I can find time I will try to work out the idea more fully.

Before stopping, let me say that I hope the Council will take steps to have our school included amongst the constituent colleges of the soon-to-be-reconstructed London University. That, of course, has nothing to do with the question of degrees in pharmacy, but seems advisable for other evident reasons.

By the way, what does Mr. Davis mean by "degrees in sanitary science for pharmacists only?" The *Daily News*, in its leaderette on his paper (Feb. 8, p. 5, col. 6) evidently misunderstands his wishes, though I must confess I do not quite see his drift myself. We could not become medical officers of health, because we have not had a medical education; and what use, otherwise, the qualification would be to us is difficult to see, unless he thinks we might then get appointed sanitary inspectors and inspectors of nuisances (posts which do not seem much in our line). I am afraid Mr. Davis is trying to fit a "square" man into a round hole somehow; but perhaps he will kindly explain, as I am anxious to know what he is going to set us to do.

WILLIAM JOHNSTON, PH.C., M.P.S.

69, Loughborough Road, S.W.

LIN. SAPONIS CO.

Sir,—In answer to Mr. John Findlay, we beg to say that on reference to the Edinburgh New Dispensatory, 1803, we find the following formula:

"Linimentum Saponis Compositum, Lond.

"Compound Soap Liniment.

"Take of—

Soap	Three ounces.
Camphor	One ounce.
Spirit of rosemary	One pint.

"Digest the soap in the spirit of rosemary until it be dissolved, and add to it the camphor."

Dr. Paris's 'Pharmacologia,' 1833, gives the following formula:

"Liniment Saponis Compositum, L.

Hard soap	iij.
Camphor	j.
Spirit of rosemary	xvj. parts.

"It is a stimulant and anodyne application, and in local pains opium may advantageously be added to it. It is commonly used under the name of opodeldoc."

The Pharmacopœia Collegii Regalis Medicorum, Londinensis, 1836, gives the formula—

"Linimentum Saponis.

"℞ Saponis uncias tres.
Camphoræ unciam,
Spiritus Rosmarini fluiduncias sedecim;

"Liqua camphoram in spiritu; dein saponem adjice, et macera leni colore, donec liquetur."

This Pharmacopœia gives no "synonyms," and it is here we should have thought the name "linimentum saponis compositum" would have come in as a "synonym," the liniment assuredly being a compound, or composed of different ingredients, as in the Formulas of 1803 and 1833, when it was given as "Linimentum Saponis Co."

The Pharmacopœia Londinensis, 1851, gives:—

"℞ Saponis uncias duas cum semisse.
Camphoræ drachmas decem.
Spiritus Rosmarini fluiduncias octodecim.
Aquæ destillatæ fluiduncias duas.

"Aquam spiritu misce; dein adjice saponem et camphoram, et macera, subinde agitans donec liquentur."

This Pharmacopœia gives no "synonym."

I think we have clearly demonstrated from the above that the name "lin. saponis co." is only the great, great, great, grandfather of our own acquaintance, "lin. saponis," B.P., or, as the old folks still call it, and ask for, opodeldoc, *i.e.*, with the slight alterations in the quantities of the ingredients.

Peckham. F. G. BALDWIN AND Co.

Sir,—I sympathize with Mr. Findlay in his desire to have pharmacy "up to date," but cannot agree with his intolerance of its old traditions. If we would have true advancement we must first be willing to be taught by our subject. It would never stoop to us, and its adaptation to a limited experience (as Mr. Findlay would have it) would be no advancement.

The name "lin. saponis co." is essentially English, and seldom used by Scotch prescribers. Most of the prescriptions I have met with in which it occurred were those of medical men who had been trained in England. I therefore fail to see that Mr. Findlay's theory about its origin is worth anything.

Some years ago I searched all the books within my reach for the name, but to no purpose. I have, however, come across it since in more than one old manuscript receipt book, applied to a preparation in every respect resembling the B.P. lin. saponis.

My last note was not written in a spirit of controversy, but with the object of arriving at the truth, if possible, by provoking a free expression of opinion. If Mr. Findlay, or his Edinburgh friends, can prove lin. saponis co. to be lin. opii, I shall be pleased. Until then I shall continue as before to supply lin. saponis B.P. for lin. saponis co.

LANARKSHIRE.

[*** We think no advantage can result from the further prolongation of this discussion.—ED., *P.J.*]

NOTICES.

Chemists' Assistants' Association.—The next meeting of this Association will be held on Thursday evening, the 27th inst, when a paper on "The Polariscope and its Application to Pharmacy" will be read by W. L. Williams.

School of Pharmacy Students' Association.—The next meeting of this Association will be held on Thursday, February 27, when papers will be read on "Suppositories," by Messrs. F. A. Hocking and E. Brooke, and on "Coal Gas," by Mr. J. P. Barnes.

Sheffield Pharmaceutical and Chemical Society.—A general meeting of the registered chemists of Sheffield and district will be held in the Society's rooms on Friday, February 28, at 8.30 p. m., to discuss the Pharmacy Acts Amendment Bill. A resolution will be moved by Mr. G. T. W. Newsholme.

Associate.—The article in question was the subject of a patent. We are not aware that any information as to its manufacture has been published, beyond that disclosed in the specification.

J. A. Foster.—Some of the preparations of poisons mentioned by you are not included in the poison schedule, but such of them as are will of course come within the terms of the decision of the judges in the case now under appeal.

W. Gledhill.—S. F. Hodsoll, 5, Rupert Street, E.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Soubeiran, Learoyd, Rogers, Zimmermann, Davis, Inquirer, Satisfied, M.P.S.

BENEVOLENT FUND.

STATEMENT OF RELIEF GRANTED DURING 1889.

ANNUITANTS.

				£	s.	d.	£	s.	d.
39 Annuitants	@ £35 per annum ...		... ...	1365	0	0			
8 do.	@ £30	„	... ...	240	0	0			
1 { do.	@ £30	„	(three quarters)	22	10	0			
do.	@ £35	„	(one quarter)	8	15	0			
1 do.	@ £35	„	(three quarters)	26	5	0			
2 do.	@ £35	„	(one quarter)	17	10	0			
1 Annuitant	@ £35	„	(two quarters)	17	10	0			
							1697	10	0

Total number of Annuitants during the year ... 52

TEMPORARY GRANTS.

	£	s.	d.
Amount granted in **45** cases after investigation by the Committee... ...	**384**	**0**	**0**
Total amount of Relief granted during 1889 ...	**£2081**	**10**	**0**

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of—

Half-a-crown are entitled at each election of Annuitants to	ONE Vote.
Five Shillings	TWO Votes.
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And to increase in the same proportion.

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Five Guineas are entitled to	FIVE Votes for life.
Ten Guineas	TEN Votes for life.

And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or, in the case of a widow, her husband) may have contributed.

BENEVOLENT FUND.

LOCAL LIST OF SUBSCRIPTIONS & DONATIONS

RECEIVED DURING 1889.

Aberdare.

	£	s.	d.
Jones, D. W.	0	5	0
Smith, Morgan	0	2	6

Aberdeen.

Coutts, C.	0	5	0
Cruickshank, Geo. P.	0	5	0
Davidson, Charles	1	1	0
Giles, William	0	5	0
Glover, W. K.	0	5	0
Gordon, William	0	5	0
Johnston, John	0	5	0
Kay, James P.	0	10	6
Kemp, James	0	2	6
Paterson and Sons	0	10	6
Strachan, Alexander	0	5	0

Aberfeldy.

Macnaughton, H. B.	1	1	0

Abergavenny.

Pryer, Henry	0	5	0

Abergele.

Hannah, John	0	2	6

Aberystwith.

Davies, David J.	0	2	6
Ellis, Robert	0	2	6
Thomas, John	0	2	6
Wynne, Edward P.	0	10	6

Abingdon.

Lacey, R.	0	5	0
Osborne, Geo. C.	0	5	0
Smith, William	0	5	0
Smith, William F.	0	5	0

Aboyne.

Petrie, James J.	0	5	0

Accrington.

Stanley, Thomas	0	2	6

Addiscombe.

Townsend, Charles	0	10	6

Alcester.

Adcock, H. D.	0	5	0
Heath, Josiah W.	0	5	0
Overbury, Henry	0	5	0

Aldershot.

Williams, James	0	10	6

Alexandria (N.B.).

McFarlane, Peter	0	5	0

Alford (Lincs).

Brown, J.	0	2	6

Alfreton.

Evison, Alfred	0	2	6
Robinson, Joseph S.	0	10	6

Alnwick.

Newbigin, James L.	0	10	6
Newbigin, Lesslie	0	5	0

Alresford.

Richardson, J. H.	0	2	6
Willis, William	0	5	0

Alton (Hants).

Monk, F. A.	0	5	0

Altrincham.

	£	s.	d.
Clarke, J. T.	0	5	0
Unsworth, J. W.	0	5	0

Ambleside.

Herd, Henry W.	0	2	6

Amersham.

King, E. T.	0	2	6

Ammanford (Carmarthenshire).

Evans, Evan	0	10	6

Ampthill.

Allen, George	1	1	0

Andover.

Bienvenu, John	0	10	6
Gradidge, W. T.	0	5	0

Angmering.

Freeland, H. W.	0	2	6

Arbroath.

Burn, David H.	0	5	0
Naysmith, Andrew	0	5	0
Robertson, John	0	5	0
Shield, Mill and Jack	0	5	0

Ashbourne.

Bradley, Edwin Sylvester	0	10	6
Greaves, Frederick W.	0	5	0
Osborne, James	0	5	0
Reckless, A. H.	0	5	0

Ashby-de-la-Zouch.

Bullen, George W.	1	1	0

Ashford (Kent).

Brothers, John	1	1	0
Forth, W. P.	0	5	0
Ingall, Joseph	1	1	0
Stedman, F. W.	0	5	0
White, Charles Thomas	0	5	0

Ashton-under-Lyne.

Belfield, William	0	5	0
Bostock, J. W.	0	5	0
Bostock, William	0	5	0
Phillips, J. J.	0	5	0
Waterhouse, Jabez	0	10	6

Atherstone.

Orme, William	0	10	6

Atherton.

Fletcher, Ellis	0	5	0
Heywood, John H.	0	10	6

Auckland (New Zealand).

Robinson, R.	0	10	0

Aylesbury.

Dickins, Rowland	0	10	6
Palmer, Edwin T.	0	5	0

Bakewell.

Carrington, Edward G.	0	5	0

Baldock.

Bally, Edward F.	0	5	0
Kent, T. W. (Arlesey)	0	5	0

Banbury.

	£	s.	d.
Ball, George V.	0	10	6
Bartlett, H.	0	5	0
Gilkes, Fredk. G.	0	5	0
Griffin, J. W.	0	2	6
Watts, W.	0	5	0

Banchory.

Lunan, Alexander	0	5	0

Banff.

Alexander, W.	0	5	0

Bangor.

Jones, Owen	0	5	0
Webster, Thomas	0	5	0

Barnsley.

Mitchell, J. S.	0	5	0

Barnstaple.

Britton, Wm. B.	0	5	0
Goss, Samuel	0	5	0
Partridge, James	0	5	0
Pratt, Edward	0	5	0

Barton-on-Humber.

Smith, Richard F.	0	5	0

Bath.

Alcock, Henry	0	5	0
Appleby, E. J.	0	10	6
Boutelle, H.	0	2	6
Bright, W.	0	5	0
Capper, Edmund	0	5	0
Clarke, B. G.	0	2	6
Collis, C. B.	0	5	0
Commans, Robert D.	1	1	0
Dunn, Richard	0	10	6
Goodman, D. H.	0	5	0
Griffin, Alfred W.	0	5	0
Hall, Reuben	0	4	0
Hutton, Harry	0	2	6
Loveless, E. W. (Twerton-on-Avon)	0	2	6
Marsh, John H.	0	10	0
Masters, Henry James	0	5	0
Merrikin, John B.	0	10	6
Partington, J. J.	0	5	0
Pinch, James E.	0	10	6
Potts and Co.	0	10	6
Sharp, Benjamin	2	2	0
Snow, A. L.	0	2	6
Thomas, Henry J.	0	10	6
Thring, E. J. H. (Monkton Combe)	0	10	6
Tilsley, George	0	10	6
Toone, Joseph V.	0	10	6
Whiston and Co.	0	10	6
Williams, Mrs. Sophia	0	10	6
Wilson, Joseph	0	10	6

Beaumaris.

Slater, John	1	1	0

Beccles.

Flower, William	0	5	0
Plumbly, W.	0	2	6

Beckenham (Kent).

Bright, Frederick	0	5	0
Waring, A. W.	0	5	0

Bedale.

Pratt, William (West Burton)	0	5	0
Swinbank, J.	0	5	0

	£	s.	d.
Bedford.			
Anthony and Biss	0	10	0
Cameron, William Alexander	0	5	0
Corrie, A. A.	0	2	6
Corrie, Isabella A.	0	5	0
Cubitt, Charles	0	5	0
Ekins, John	0	10	6
Hester, Charles	0	5	0
Mountford, Maurice	0	2	6
Norman, Joseph S.	0	5	0
Taylor, J. B.	0	5	0
Thompson, H.	0	5	0
Bedlington.			
Foggan, George	0	10	0
Belfast.			
Green, Thomas	0	5	0
Yoxall, Henry	0	5	0
Belper.			
Calvert, James	0	5	0
Berkhamsted.			
Bosher, Alexander	0	2	6
Bexhill.			
Brisley, George	0	5	0
Bexley Heath.			
Mason, Alfred J.	0	5	0
Bexley (Kent).			
Hodder, G. W.	0	5	0
Bicester.			
Bates, John	0	5	0
Coleman, T.	0	10	6
Sandiland, R. B.	0	10	6
Bideford.			
Betty, S. C. (Bowood)	0	10	0
Griffits, John A.	0	5	0
Hogg, Mrs. Mary	0	5	0
Hogg, U. H.	0	5	0
Biggleswade.			
Evans, John	0	5	0
Spong, D. M.	0	5	0
Bilston.			
Gray, Charles	0	5	0
Kearnes, Robert H.	0	5	0
Bingley.			
Skirrow, William E.	0	10	6
Birkenhead.			
Barber, George	0	10	6
Dutton, John	0	10	0
Field, H. E.	0	5	0
Haywood, W. H.	0	5	0
Kemp, W. C.	0	5	0
Knapp, C. R.	0	5	0
Stewart, J.	1	1	0
Birmingham.			
Adam, Frederick	0	2	6
Asten, W.	0	2	6
Barker, Thomas	0	10	6
Bayley, R.	0	5	0
Bellamy and Wakefield	1	1	0
Bird, Alfred	1	1	0
Brady, B. F.	0	10	6
Chase, Thomas, jun.	1	1	0
Clark, T. P.	0	10	0
Clayton, Francis Corder	1	1	0
Cornforth, Edwin	0	2	6
Cripps, R. A.	0	10	0
Foster, Alfred H.	0	5	0
Foster, James Alfred	0	5	0
Frobisher, F.	0	5	0
Gibson, F.	0	10	6
Lowther, T. W.	0	2	6
Mantell, Charles	0	10	6
Mantell, Charles, jun.	0	10	6
Mott, John C.	0	5	0
Naish, C. E.	0	10	6
Page, C	0	5	0
Pegg, Herbert	1	1	0
Perry, George E.	0	5	0
Perry, William Henry	0	5	0
Prosser, Frank H.	0	10	6
Radford, J. A.	0	2	6
Smith, E.	0	2	6
Southall Bros. and Barclay	1	1	0
Thompson, Charles	0	5	0
Thompson, William	0	5	0
Wilcox, George	0	5	0

	£	s.	d.
Bishop Auckland.			
Dobinson, Thomas	0	5	0
Harburn, Alfred	0	5	0
Townend, Thomas F.	0	5	0
Bishops Stortford.			
Hardy, John	0	5	0
Speechly, George	0	10	6
Turner, C.	0	5	0
Bishop's Castle.			
Bills, Martha Cam	0	10	6
Blackburn.			
Ainsworth, Clayton and Jowett	0	10	6
Butterfield, William	0	5	0
Critchley, T.	0	5	0
Farnworth, William	1	1	0
Garland, A. P.	0	5	0
Harrison, J.	0	2	6
Higson, J.	0	5	0
Hindle, H.	0	5	0
Hindle, James	0	2	6
Hindle, Joseph	0	5	0
Paffard, Frank	0	10	0
Pickup, W.	0	2	6
Blackpool.			
Jackson, Joseph	0	5	0
Laurie, John	0	5	0
Blagdon.			
Dudden, R. M.	0	5	0
Blandford.			
Groves, Richard H.	1	1	0
Humby, L. W.	0	5	0
Bognor.			
Long, Alfred T.	0	10	6
Bolton.			
Blain, William	0	10	6
Blain, W. R.	0	5	0
Fawthorp, Josh	0	5	0
Forbes, James W.	0	10	6
Hart, James	0	10	6
Liddell, Mrs. H.	0	1	0
Mather, James	0	10	6
Phillips, Sidney (Horwich)	0	5	0
Varley, W. M. (Horwich)	0	10	6
Bombay (India).			
Prebble, John G.	0	5	0
Bonnyrigg.			
Hutcheon, W.	0	5	0
Boston (Lincs.).			
Grimble, Albert	0	5	0
Haller, F. W.	0	5	0
Kent, B. J.	0	5	0
Maxey, W. H.	0	5	0
Wright, Rev. A. J. P.	0	5	0
Boulogne-sur-Mer.			
Parsons, J. Vincett	0	5	0
Bourne (Lincs.).			
Mills, Robert M.	0	10	6
Bournemouth.			
Beale, J. H. T.	0	5	0
Bilson, F. E.	0	10	6
Bridge, G. E.	1	1	0
Duncan, Alexander	1	1	0
Endle, Frederick	0	10	6
Gibbs, Sydney	0	5	0
Hardwick, Stewart	0	10	6
Haynes, J. A.	0	2	6
Hazard, James D.	0	5	0
Jones, William	0	10	6
Shipman, John J.	0	5	0
Spinney, Frank	0	10	6
Taylor, George	0	5	0
Toone, J. A.	0	10	6
Worth, Edwin	1	1	0
Bourton-on-the-Water.			
Miles, George	0	2	6
Bovey Tracey.			
Smith, E.	0	10	6
Bowness-on-Windermere.			
Birkett, Charles	0	5	0

	£	s.	d.
Bracknell.			
Sandwith, W. H.	0	5	0
Bradford (Lancs.).			
Lambert, Thomas	0	5	0
Bradford (Yorks.).			
Blackburn, Bailey	1	1	0
Cocker, Justus J.	0	5	0
Harrison, Parkinson and Co.	2	2	0
Houfe, R. W.	0	5	0
Ingle, George	0	5	0
Lister, Simeon (Great Horton)	0	10	6
Stephenson, Robert	0	5	0
Watts, John	0	10	6
Bradford-on-Avon.			
Cooper, Albert H.	0	10	6
Brading (I.W.).			
Bonn, J. E. J.	0	5	0
Braintree.			
Row, George C.	0	5	0
Branscombe.			
Cooper, George	0	10	6
Braughing.			
Franklyn, Thomas	0	5	0
Brecon.			
Meredith, John	0	5	0
Morris, J. C. B.	0	5	0
Tudor, W. T.	0	10	6
Brentwood (Essex).			
Guest, George R.	0	5	0
Bridgend.			
Davies, Rees	0	2	6
Jenkins, D.	0	5	0
Bridgnorth.			
Cooper, H. S.	0	2	6
Hughes, Hubert	0	5	0
Bridgwater.			
Basker, J. A	0	5	0
Woodward, John L. L.	0	5	0
Bridlington.			
Dewing, J. E.	0	5	0
Gatenby, Robert	0	5	0
Wrack, F. G.	0	2	6
Bridlington Quay.			
Dickins, Mary	0	5	0
Jackson, Henry J.	0	5	0
Bridport.			
Beach and Barnicott	1	1	0
Beach, James	0	10	6
Beach, Thomas E.	0	5	0
Beach, W. B.	0	2	6
Brightlingsea.			
Cooper, George B.	0	5	0
Brighton.			
Adams, George	1	1	0
Arnold, J.	0	2	6
Barton, Charles	0	10	6
Barton, Henry	0	10	6
Chambers, Herbert	0	5	0
Chapman, F.	0	10	6
Colby, Mrs. G.	1	1	0
Cox, Arthur H.	1	1	0
Damant, Arthur A.	0	5	0
Edwards, J.	0	5	0
Else, William	0	10	6
Gibson, W. H.	0	5	0
Glaisyer, E.	0	10	6
Glaisyer, Thomas	0	10	6
Guy, Frederick	0	10	6
Gwatkin, James Ross	0	10	6
Hardcastle, S. B.	0	10	6
Harris, E. R.	0	5	
Hickley, G.	0	10	
Histed, E.	0	10	
Hornsby, George G.	0	10	
Jeeves, Thomas	0	10	
Kemp, John	0	10	
Leigh, Marshall	1	1	
Levett, H.	0	5	
Llewellyn, Peter H.	0	5	
Metherell, K.	1	1	

Brighton—continued.

	£	s.	d.
Muston, G. G.	0	5	0
Norton, A. J.	0	2	6
Padwick, John	0	10	6
Parris, T. W.	0	5	0
Perress, J. C.	0	5	0
Robson, Thomas	0	10	6
Salmon, F. W.	0	10	6
Savage and Son	1	1	0
Smith, Walter Henry	1	1	0
Smithson, J.	0	10	6
Stableforth, J. W.	0	5	0
Thomas, H.	1	1	0
Vizer, Edwin B.	0	10	6
Walton, F. M.	0	5	0
Ward, Charles T. (Southwick)	0	2	6
Watts and Co.	1	1	0
Williamson, J.	0	5	0

Brill (Bucks).

	£	s.	d.
Tottenham and Holmes	0	10	6

Bristol.

	£	s.	d.
Ackerman, Theophilus	0	5	0
Allen, Benjamin	0	10	6
Barton, J. B. (Kingswood)	0	5	0
Bennett, Joseph	0	5	0
Berry, William	0	10	6
Boucher, John	1	1	0
Bramald, F. D.	0	5	0
Butler, Samuel	1	1	0
Cuff, Robert C.	0	5	0
Dibble, J. W.	0	10	6
Freestone, R. H.	0	5	0
Freestone, Thomas M.	0	10	6
Hemmons, John	0	5	0
Hodder, Henry	0	5	0
Howell, H.	0	5	0
Humpage, Miss Amelia	1	1	0
Isaac, G. W.	0	10	6
Jeffery, Henry	0	10	6
Jones, William W.	1	1	0
Keen, Benjamin	0	10	6
La Trobe, Henry	0	5	0
Llewellyn, David	0	2	6
Long, John T.	0	10	6
Newman, Robert	0	10	6
Pitchford, William	0	10	6
Pitman, John	1	1	0
Plumley, James G.	0	5	0
Presley, Edward	0	5	0
Schacht, G. F.	1	1	0
Smith, Sidney	0	2	6
Spill, Thomas	0	10	6
Stroud, John	1	1	0
Towerzey, Alexander	0	10	6
Townsend, Charles	1	1	0
Townsend, Henry H.	0	10	6
Troake, R. J.	0	10	6
Turner, George T.	0	10	6
Wade, Thomas T.	0	2	6
Warren, Algernon	1	1	0
Watson, E. M.	1	1	0
Whineray, Edward	0	5	0
White, James W.	0	10	0
Woolliscroft, H.	0	5	0

Briton Ferry.

	£	s.	d.
Olive, W. T.	0	5	0

Bromley (Kent).

	£	s.	d.
Goulden, Herbert	0	5	0
Skinner, Richard	0	10	6

Bromyard.

	£	s.	d.
Jones, Charles	0	5	0

Broughty Ferry.

	£	s.	d.
Fleming, E.	0	5	0
Park, William	0	5	0

Brynmawr.

	£	s.	d.
Evans, Alfred E.	0	5	0
Jones, Alfred M.	0	10	6

Buckingham.

	£	s.	d.
Kingerlee, George	1	1	0

Burnham (Bucks).

	£	s.	d.
Heald, Alfred J.	0	10	6

Burnham Market.

	£	s.	d.
Spencer, William Henry	0	5	0

Burnley.

	£	s.	d.
Barlow, Joseph A.	0	2	6
Cowgill, Brian H.	0	10	6
Evans, Thomas	0	5	0
Francis, Mrs.	0	5	0
Heaton, Martha	0	2	6
Hitchin, Robert	0	5	0
Holden, John	0	5	0
Munn, Robert	0	10	0
Parkinson, I.	0	5	0
Parkinson, William	0	5	0
Walker, Sandford	0	5	0
Wilks, Maurice	0	2	6
Wright, John W.	0	2	6

Burntisland.

	£	s.	d.
Bisset, James	0	2	6

Burry Port.

	£	s.	d.
Thomas, T. Rees	0	5	0

Burslem.

	£	s.	d.
Blackshaw, Thomas	0	10	6
Leicester, Thomas	0	10	6
Oldham, William	0	10	6
Wardle, Thomas	0	2	6

Burton-on-Trent.

	£	s.	d.
Ottey, Thomas	0	5	0
Street, J. W.	0	2	6
Wright, George	0	10	6

Bury.

	£	s.	d.
Crompton, Alfred	0	5	0
Crompton, H.	0	10	6

Bury St. Edmunds.

	£	s.	d.
Allen, Henry	0	5	0
Brain, F. S.	0	5	0
Clark, Owen A.	0	5	0
Crassweller, W. E.	0	5	0
Floyd, James	0	5	0
Hardwicke, J. E.	0	5	0
Kirkham, Thomas	0	2	6
Last, A. J.	0	2	6
Portway, John	0	2	6
Summers, Frank	0	5	0
Summers, Thos. D.	0	5	0
Youngman, Edward	0	5	0

Buxton (Derbyshire).

	£	s.	d.
Ashton, Charles S.	0	5	0
Thresh, Arthur	0	5	0
Wright, Robert	0	5	0

Camborne.

	£	s.	d.
Noble, James	0	5	0

Cambridge.

	£	s.	d.
Beall, George	0	5	0
Beall, Samuel S.	0	5	0
Church, H. J.	1	1	0
Cook, H. F.	0	2	6
Deck, Arthur	0	10	6
Field, Ebenezer	0	5	0
Gillett, C.	0	5	0
Greenwood, D.	0	5	0
Ivatt, Albert	0	5	0
Pain, Percy	0	5	0
Pain, Walter E.	0	5	0
Sturton, Richard	1	1	0
Yeomans, John	0	5	0

Cannes (France).

	£	s.	d.
Dyson, A.	0	5	0
Patey, W. J.	0	7	6

Canterbury.

	£	s.	d.
Amos, Daniel	0	10	6
Biggleston, E. R.	0	5	0
Bing, Charles	0	5	0
Bing, Edwin	0	10	6
Harris, F. R.	0	10	6

Cape Town.

	£	s.	d.
Tebb, Henry	1	1	0

Cardiff.

	£	s.	d.
Anthony, David	0	10	6
Bennett, Mrs.	0	5	0
Clark, C.	0	2	6
Coleman, Alfred	0	10	6
Coleman, E. J.	0	10	6
Coleman, J. D.	0	2	6
Drane, Robert	1	1	0
Duck, W. G.	0	5	0
Evans, A. J.	0	2	6

Cardiff—continued.

	£	s.	d.
Furnival, William	0	5	0
Gerhold, H. A.	0	2	6
Greaves, John	0	5	0
Hagon, Albert	0	5	0
Harries, D.	0	5	0
Hicks, W. T.	0	5	0
Hopkins, W. R.	0	2	6
Howell, Thomas	0	5	0
Hughes, J.	0	5	0
Jones, J. A.	0	5	0
Jones, John T.	0	5	0
Jones, R. T.	0	2	6
Kernick and Son	0	10	6
Lewis, James	0	5	0
Lloyd, David	0	5	0
Mumford, Richard	0	5	0
Munday, John	0	10	6
Phillips, John	0	2	6
Prosser, H. H.	0	2	6
Prust, Richard	0	2	6
Rees, John	0	5	0
Robb, John	0	5	0
Sanders, W. J.	0	5	0
Walklate, J. T.	0	5	0
Williams, G. W.	0	2	6
Williams, R. E.	0	5	0
Williams, W. Jesse	0	5	0
Williams, Thomas	0	10	6
Williamson, Mrs.	0	5	0
Yorath, T. V.	0	5	0

Carlisle.

	£	s.	d.
Bell, John	0	5	0
Fisher, Catherine Hodgson	0	5	0
Foster, James	0	5	0
Hallaway, John	0	5	0
Nichol, A.	1	1	0
Parker, Edward J.	0	5	0
Parker, William	0	5	0
Penny, John (Great Broughton)	0	10	6
Robson, John	0	5	0
Thompson, Andrew	0	10	6
Todd, Joe	0	5	0

Carluke.

	£	s.	d.
Hinksman, John	0	5	0

Carmarthen.

	£	s.	d.
Davies, C. E.	0	5	0
Lloyd, Walter	0	5	0
Smith, J. H.	0	10	0
Williams, J. E.	0	5	0

Carnarvon.

	£	s.	d.
Francis, James	0	2	6
Jones, David	0	5	0
Jones, John	0	5	0
Lloyd, William	0	5	0
Owen, G. C. R.	0	2	6

Carshalton.

	£	s.	d.
Carter, Francis	0	10	6

Castle Cary.

	£	s.	d.
Moore, Francis S.	0	10	6

Castle Douglas.

	£	s.	d.
Veitch, A.	0	5	0

Chapel Allerton.

	£	s.	d.
Saville, William	0	5	0

Chard.

	£	s.	d.
Churchouse, W. B.	0	5	0

Charlestown-of-Aberlour.

	£	s.	d.
Smith, John	0	2	6

Chatham.

	£	s.	d.
Crofts, Holmes C.	0	10	6
French, Miss E.	0	5	0
Lamb, Thomas C.	0	5	0
Morgan, Alfred W.	0	5	0

Cheddar.

	£	s.	d.
Allen, Samuel	0	5	0

Chelmsford.

	£	s.	d.
Baker and Wright	0	10	6
Metcalfe, Wilson	0	10	6
Thresh, Dr. J. C.	1	1	0
Tomlinson, James	0	10	6
Warren, F.	0	7	6

Cheltenham.

	£	s.	d.
Balcomb, John	1	1	0
Barron, William	0	10	6
Beetham and Son	1	1	0

Cheltenham—continued.

	£	s.	d.
Butcher, Thomas	1	1	0
Clarke, David	0	2	6
Davies, R. E.	0	2	6
Down, F. W.	0	2	6
Finch, Henry	0	2	6
Fletcher and Palmer	1	1	0
Fletcher, John	1	1	0
Glover, T. I.	0	5	0
Hall, L.	0	5	0
Hands, William	0	5	0
Hill, Arthur	0	5	0
Hodgkins, H.	0	3	0
Hodgkinson, T.	0	2	6
James, Joseph	0	5	0
Jeffrey, Thomas A.	0	10	6
Joyner, E. E.	0	2	6
Loxley, C. H.	0	2	6
Macdonald, E.	0	5	0
Morris, D. A.	0	2	6
Mowatt, J. R.	0	5	0
Oram, F.	0	2	6
Organ, E.	0	5	0
Pattison, Thomas	1	1	0
Perry, H. W.	0	2	6
Power, J. H.	0	5	0
Prockter and Forth	1	1	0
Robinson, C. E.	0	5	0
Saxby, A. C.	0	5	0
Smith, Nathaniel and Co.	1	1	0
Stewart, James	1	1	0
Thomas, J. A. and J. P.	0	10	6
Turney, J. D.	0	2	6
Vinden, F.	0	2	6
Walters, John	0	10	6
Williams, W.	0	5	0
Wood, Frederick	0	10	6

Chertsey.

Ashton, Frederick William	0	5	0
Boyce, George	0	5	0
Flintan, F. R.	0	5	0

Chester.

Baker, W. H.	0	10	0
Baxter, George	0	10	6
Bowers, James D.	0	5	0
Caldecott, Clement G.	0	5	0
Davidson, W.	0	2	6
Donald, A.	0	2	6
Hincks, J. W.	0	5	0
Hodges, W.	0	5	0
Huke, James W.	0	5	0
Mills, John	0	5	0
Prince, B.	0	5	0
Roberts, R. M.	0	5	0
Sanderson, William	0	2	6
Shrubsole, G. W.	0	5	0
Spencer, J. H.	0	5	0
Thomas, J. H.	0	5	0
Wilkinson, C.	0	5	0
Williams, Thomas	0	5	0
Williams, W. L.	0	2	6

Chesterfield.

Barfoot, J. R. D.	0	5	0
Booth, George	0	10	6
Elliott, Thomas	0	5	0
Furness, Thomas	0	5	0
Greaves, A. W.	0	5	0
Lancaster, Wm. G.	0	5	0
Lowe, A.	0	5	0
Sampson, George	0	5	0
Windle, John T.	0	5	0
Wright, G.	0	5	0

Chester-le-Street.

Greenwell, Richard Henry	0	5	0

Chew-Magna.

Milton, Thomas	0	5	0

Chichester.

Baker and Son	0	10	6
Everard, A. G.	0	5	0

Chippenham.

Coles, John C.	0	10	6
Turpin, A. B.	0	5	0

Chipping Ongar.

Ward, David	0	10	6

Chipping Sodbury.

Jones, Richard	0	10	6

Chorley.

	£	s.	d.
Dorning, H. R.	0	2	6
Hill, William	0	5	0
Jackson, Thos.	0	5	0
Oakes, G.	0	5	0

Christchurch.

Green, John	0	5	0

Chulmleigh.

Joint, Robert James	0	6	0

Cincinnati (U.S.A.).

Lloyd, J. N.	0	14	4

Cirencester.

Griffiths, Waldron	0	10	6
Kinch, Edward	0	10	6
Paternoster, J.	0	5	0

Clacton-on-Sea.

Mann, William	0	2	6

Claycross.

Lloyd, Robert	0	10	6
Smith, John	0	5	0

Clevedon.

Trickey, R. H.	0	5	0

Clun.

Darroll, William	1	1	0

Cobham.

Redfern, John	1	1	0

Cockermouth.

Bowerbank, Joseph	1	1	0
Cooper, F. A.	0	2	6
Douglass, J.	0	2	6
Robinson, William	0	5	0
Straughton, Joseph	0	2	6

Codnor (near Derby).

Farnsworth, Thomas	0	5	0

Colchester.

Barritt and Son	0	10	6
Bates, Thomas W.	0	5	0
Cordley, W. B.	0	5	0
Davies, Rees	0	5	0
Dewing, Chas.	0	5	0
Everitt, W. E.	0	5	0
Hammerton, Edward	0	5	0
Prosser, Mrs.	0	5	0
Shenstone, J. C.	0	5	0
Simpson, Hales	0	5	0
Weddell, Arthur	0	5	0

Collumpton (Devon).

Foster, M. T.	0	2	6

Coningsby.

Brown, Leonard H.	0	5	0
Heathcotte, Miss	0	2	6
Wright, Mrs.	0	2	6

Constantinople.

Bateman, J. M.	1	1	0

Cork.

Selkirk, James	0	10	6

Corwen.

Jones, William	0	10	6

Coventry.

Axford, J. W.	0	5	0
Bampton, G. F.	0	2	6
Bird, Frederick	0	5	0
Brown, John	0	5	0
Clarke, William	0	2	6
Evans, E. M.	0	5	0
Glover, Henry	0	2	6
Hinds, James	0	10	6
Jelly, George William	0	5	0
Mason, D.	0	2	6
Morris, John	0	2	6
Newton, Alfred H.	0	2	6
Sellors, Thomas	0	2	6
Wyleys and Co.	1	1	0

Cowbridge.

Thomas, John	0	5	0

Cowes (Isle of Wight).

Beaven, George A.	0	10	0
Fennings, Alfred	1	1	0
ditto (donation)	5	5	0

Cranbrook.

	£	s.	d.
Turner, John	0	5	0

Crawley.

Leach, John	0	5	0
Webb, W. J.	0	5	0
Weedon, Joseph	0	5	0

Crediton.

Jackson and Sons	1	1	0

Crewe.

Bayley, William	0	10	6

Crewkerne.

Catford, O. W.	0	5	0

Criccieth.

Bowen, Joseph W.	0	2	6

Cromer.

Hoare, W. P.	0	5	0

Croydon.

Barritt, George	0	10	6
Chapman, J.	0	2	6
Clarke, Josiah	1	1	0
Culverwell, John S.	0	5	0
Dixon, W. R.	0	5	0
Faraday, George	0	2	6
Grimwade, E. H.	0	10	6
Long, Henry	0	10	6
Nichols, A.	0	5	0
Padwick, W. G.	0	5	0
Roberts, D. P.	0	10	6

Cullen (N.B.).

Buchanan, John	0	2	6
Seivwright, George	0	10	6

Dalton-in-Furness.

Preston, William L.	0	5	0

Darlington.

Cranston, John	0	5	0
Hudson, T.	0	2	6
Nicholson, Richard	0	5	0
Raw, James H.	0	5	0
Robinson, James	0	5	0
Swenden, James	0	10	6
Walton, Frederick G.	0	2	6

Dartford.

Cann, James	0	2	6
Horrell, A. E.	0	5	0

Dartmouth.

Hadfield, H. M.	0	5	0
Rees, Colin A.	0	5	0
Rees, William H.	0	10	0

Darwen.

Shorrock, R.	0	5	0

Deal.

Dunn, George S.	0	5	0
Fitt, F. E.	0	10	6
Green, John	0	10	6

Denton (Lancs.).

Arrandale, William	0	10	6

Derby.

Ashley, William	0	5	0
Blunt, Walter B.	0	2	6
Clifton, Frederick	0	5	0
Cope, J. A.	0	10	6
Frost, George	0	10	6
Hefford, Charles	0	2	6
Hoare, C. F.	0	2	6
Hughes, John S.	0	2	6
Machon, Edward	0	5	0
Monkhouse, Henry	0	5	0
Nicklinson, Thomas	0	5	0
Ordish, Thomas	0	2	6
Scholes, J. S.	0	5	0
Sherwin, Samuel	0	2	6
Stevenson, Richard W.	0	5	0
Wilson, Joseph	0	5	0

Devizes.

Cripps, E. H.	0	2	6
Edwards, T. R.	0	2	6

Devonport.

Breeze, A. D.	0	2	6
Breeze, George	0	5	0
Codd, Francis	0	5	0
Lamble, John A.	0	2	6
Rendle, R. H.	0	5	0

Didsbury.	£	s.	d.
Bates, John F.	0	5	0
Richardson, Allen	0	5	0
Diss.			
Cupiss, Mrs. E.	0	10	6
Gostling, T. P.	0	10	6
Whitrod, H. F.	0	5	0
Doncaster.			
Atkinson, Stephen (Arksey)	0	10	6
Connor, Thomas H.	0	10	6
Hasselby, T. J.	0	5	0
Howorth, James	0	10	6
Jaques, George	0	10	6
Parkin, Charles	0	5	0
Parkinson, —	0	2	6
Stiles, M. H.	0	10	6
Dorchester.			
Durden, H.	0	5	0
Pearce, William L.	0	5	0
Dorking.			
Doubleday, F. W.	0	10	6
Douglas (Isle of Man).			
Aspell, J. S.	0	5	0
Bowman, E. J.	0	5	0
Brearey, A. W.	1	1	0
Gore, J. R. A.	0	5	0
Greensill and Son	1	0	0
Halton, W.	0	2	6
Radcliffe, J. C.	0	5	0
Richardson, J. W.	0	5	0
Wilson, I.	0	2	6
Young, John	0	5	0
Dover.			
Adams, R. W.	0	5	0
Barnes, William James	0	5	0
Bottle, Alexander	1	1	0
Brown, Joseph Fred.	1	1	0
Clarke, Herbert	0	10	6
Dickeson, Sir Richard	1	1	0
Ewell, Richard M.	0	5	0
Forster, Robert Henry	0	10	6
Hambrook, E. O.	0	5	0
Hambrook, John Barber	0	5	0
Leigh, H. M.	0	2	6
Peake, Henry	1	1	0
Thompson, Edward	0	10	6
Wyles, William	1	1	0
Driffield.			
Bordass, James	0	5	0
Parkinson, Thomas	0	5	0
Droitwich.			
Noak, W. F.	0	2	6
Dublin.			
Bowles, Charles A.	0	10	6
Dudley.			
Thompson, John W. (Sedgeley)	0	10	6
Dufftown (N.B.).			
MacPherson, W.	0	5	0
Sangster, William	0	5	0
Dumbarton.			
Babtie, John	0	5	0
Campbell, Colin	0	5	0
Dumfries.			
Allan, William	0	5	0
Dundee.			
Hardie, James	0	10	6
Hardie, James M.	0	10	6
McMillan, James	0	10	6
Dunfermline.			
Fisher, J. H.	0	5	0
Gilmour, David	0	5	0
Seath, Alexander	0	10	6
Tocher, J.	0	5	0
Dunkeld.			
McDonald, Kenneth	0	10	0
Dunse.			
Veitch, James	0	10	6
Dunstable.			
Herington, J. H.	0	5	0

Durham.	£	s.	d.
Burdon, John	1	1	0
Leighton, Mrs.	0	5	0
Longbotham, Joseph (Sacriston)	0	5	0
Palmer, John G.	0	2	6
Rollin, John G.	0	10	6
Sarsfield, John	0	2	6
Sarsfield, William	0	10	6
Scawin and Burn	0	10	6
Wise, Joseph N.	0	5	0
Ealing.			
Curtis, Fred. G.	0	10	6
Hayles Brothers	1	1	0
Jacks, D. R.	0	5	0
Phillips, J. E.	0	10	6
Thomas, Richard	0	10	6
Earlstown.			
Peake, Arthur	0	5	0
Eastbourne.			
Andrews, H. T.	0	10	6
Andrews, J. F.	0	10	6
Bayley, E. G.	0	5	0
Brown, Henry R.	1	1	0
Crook, Herbert	1	1	0
Earnshaw, B. K.	0	10	6
Franklin, J. W.	0	5	0
Gibbs, Joseph	1	1	0
Greenhill, S. O.	0	5	0
Hall, Samuel	1	1	0
Neve, Miss Mary E. B.	0	5	0
Price, W.	0	5	0
Routly, J.	0	2	6
Senior, J.	0	5	0
Tearle, W.	0	5	0
Wilkes, T. J.	0	2	6
East Dereham.			
Peck, Edward	0	10	6
East Grinstead.			
Dixon, W. H.	0	2	6
Tully, John	0	2	6
East Molesey.			
Kent, F. W.	0	10	6
Parrott, John	0	10	6
Eccles.			
Blackburn, A. E. H.	0	2	6
Bomford, A. C.	0	5	0
Bowden, W.	0	5	0
Howie, W. L.	0	10	6
Oldfield, F.	0	5	0
Scholes, W. I.	0	2	6
Eccleshall.			
Smith, Edgar R.	0	10	6
Edinburgh.			
Ainslie, Wm. W.	0	2	0
Aitken, James	0	5	6
Aitken, William	0	5	0
Arthur, Charles	0	5	0
Baildon, H. C. and Son	1	1	0
Baker, W. C.	0	5	0
Blenkiron, J.	0	2	6
Boa, Peter	0	5	0
Bowman, Edmund	0	2	6
Brindle, E.	0	2	6
Bruce, Alexander G.	0	5	0
Buchanan, James	1	1	0
Burley, William	0	5	0
Center, J. A.	0	5	0
Chemists' Assistants and Apprentices' Association	1	1	0
Clark, Andrew	0	5	0
Clark, Dr. William Inglis	0	10	6
Coats, J. T.	0	7	6
Cowie, George	0	5	0
Dick, Robert	1	1	0
Dott, David B.	0	10	6
Duncan, Adam	0	5	0
Duncan, William	0	5	0
Ewing, James L.	0	10	6
Forret, John A.	0	5	0
Fraser, Alexander	0	5	0
Fraser, J. I.	0	5	0
Gamley, David	0	5	0
Gardner and Ainslie	1	1	0
Gibson, Adam	0	10	6
Gilmour, William	1	1	0
Grant, J. M.	0	5	0
Hendry, R. L.	0	5	0

Edinburgh—continued.	£	s.	d.
Henry, C. F.	0	5	0
Heron, James	1	1	0
Hill, John R.	0	5	0
Hutchinson, M. H.	0	5	0
Keith, Sydney	0	5	0
Laurie, J. M.	0	5	0
Lockerbie, James	0	5	0
MacAlley, Robert	0	5	0
Macdonald, John	0	5	0
Macfarlan and Co.	2	2	0
McGlashan, J.	0	5	0
MacLaren, David	0	10	0
Macnair, R. H.	0	2	6
McPherson, Colin A.	0	5	0
Mitchell, W. K.	0	2	6
Morison, John	0	10	6
Noble, Alexander	1	1	0
Pinkerton, William	0	10	6
Pottage, J. C.	0	10	6
Prentice, John	0	5	0
Purves, Samuel	0	5	0
Raimes, Clark and Co.	2	2	0
Robertson, G.	0	5	0
Robertson, John	0	5	0
Robertson, James and Co.	1	1	0
Rowland, E. E.	0	10	6
Scobie, James	0	5	0
Scott, James	0	10	6
Smiles, J.	0	10	0
Smith, Thomas	1	1	0
Smith, William	0	5	0
Spence, William	0	5	0
Stephenson, J. B.	1	1	0
Stewart, A. K.	0	5	0
Symington, Thomas	0	10	6
Thomson, Isaac W.	0	5	0
Wilson, J. M.	0	5	0
Wylie, David N.	0	5	0
Egham.			
Bartholomew, William	0	10	6
Elgin.			
Robertson, William	0	5	0
Thomson, Robert	0	5	0
Eltham (Kent).			
Rawlinson, Ralph	1	1	0
Ely.			
Ellis, H. A.	0	2	6
Evans, J. C.	0	2	6
Gulliver, G. E.	0	5	0
Lincoln, William	0	10	6
Enfield.			
Gange, George	0	5	0
Epping.			
Rowland, Thos.	0	10	6
Rowland, T. W.	0	5	0
Epsom.			
Oxley, Frederic	0	5	0
Tottle, Henry John	0	5	0
Evesham.			
Dingley, R. L.	0	5	0
Pumphrey, J. H.	0	5	0
Exeter.			
Bard, Jane	0	2	6
Bartlett, John	0	5	0
Botting, Charles	0	5	0
Broom, W. W.	0	5	0
Bulley, William H.	0	2	6
Fouraker, Thomas E.	0	5	0
Gadd, Henry	0	10	6
Lake, John H.	1	1	0
Lemmon, Eric	0	5	0
Milton, Thomas C.	0	10	6
Napier, George L.	0	5	0
Newbury, Frank	0	5	0
Pasmore, George	0	5	0
Stocker, George	0	10	6
Tighe, Henry W.	0	10	6
Wearing, W. H.	0	5	0
Wright, Robert F.	0	5	0
Eye.			
Bishop, Robert	0	10	6
Eynsham.			
Howe, Henry A.	0	5	0
Fakenham.			
Searle, Mrs. M.	0	10	0

Falkirk.

	£	s.	d.
Lyon, Thomas	0	5	0
Murdoch, David	0	10	6

Falmouth.

Newman, Walter F.	0	5	0
Solomon, W. H.	0	10	6

Fareham.

Batchelor, Alfred E.	0	5	0
Batchelor, Charles	0	5	0
Franklin, Alfred	0	10	6

Faringdon.

Davis, G. A.	0	2	6

Farnham.

Cullingford, L. J.	1	1	0
Griffith, J.	0	10	6

Felixstowe.

Squirrell, Miss C. O.	2	2	0

Fenton.

Knight, Jesse	0	5	0
Massey, Stephen	0	5	0

Ferry Hill.

Hunter, H.	0	2	6

Flint.

Jones, O. W.	0	5	0

Folkestone.

Bishop, E. J.	0	10	6
Goodliffe, George	0	10	6
Harwood, Charles	0	5	0
Lea, Frederick J.	0	5	0
Lea, John	0	10	6
Stainer, John	0	10	6

Folkingham.

Carter, Mrs.	0	2	6

Fordingbridge.

Haydon, Frederick W.	0	5	0

Forfar.

Fowler, G. R.	0	5	0
Ranken, James A.	0	5	0
Ranken, John	0	5	0

Fortune's Well.

Grant, Donald	0	5	0

Foulsham.

Maddison, Mary	0	5	0

Fraserburgh.

Burnett, Robert	0	5	0

Gainsborough.

Forrest, Richard Wm.	0	10	6

Garstang.

Thomas, J. J.	0	5	0

Gateshead-on-Tyne.

Elliott, Robert	0	10	6
Greenwell, William C.	0	5	0
Weddle, W.	0	10	6

Glasgow.

Brodie, Robert	0	5	0
Clarke, Joseph A.	0	5	0
Currie, John (Eglinton Street)	0	5	0
Currie, John (Sauchiehall Street)	0	5	0
Currie, W. L.	0	5	0
Dickie, James	0	5	0
Dunlop, Thomas	0	5	0
Fenwick, John	0	5	0
Foster, John	0	10	6
Frazer, Daniel	1	1	0
Garry, George	0	2	6
Glasgow Apothecaries' Co.	1	1	0
Glen, Robert	0	5	0
Greig, William	0	10	6
Harrower, Peter	0	5	0
Henderson, John	0	5	0
Jaap, John	0	10	6
Kinninmont, Alexander	1	1	0
Lambie, Hugh	0	5	0
Laurence, John	0	10	6
McMillan, John	1	1	0
Neil, J.	0	5	0
Paterson, A.	0	5	0
Rose, Alexander	0	10	6
Thomson, William	0	5	0
Whitelaw, James	1	1	0

Gloucester.

	£	s.	d.
Foulkes, W. H.	0	10	6
Franklin, James	0	5	0
Hughes, Evan G.	0	5	0
Jenkins, Henry	0	5	0
Meadows, Henry	0	10	6
Sadleir, John	0	10	6
Stafford, William	0	10	6
Trigg, James W.	0	5	0
Ward, Joseph	0	10	6

Godalming.

Mather, J. H.	0	10	0

Gorton.

Plant, Frank G. L.	0	5	0

Gosforth.

Gaitskell, James	0	5	0

Gosport.

French, Benjamin	0	5	0

Govan.

Skinner, John	0	5	0

Graaff Reinet (Cape Colony).

Rivett, A. J.	0	10	6

Grantham.

Bishop, William	0	2	6
Fisher, F. D.	0	5	0
Gamble, Arthur	0	5	0
Hall, R. Arnold	0	10	6
Hunt, Thomas	0	5	0
Welborn, George	0	2	6
Whysall, William	0	10	6

Gravesend.

Clarke, Richard F.	1	1	0
Reid, C. Stuart	0	2	6
Sharp, S.	0	5	0
Wiseman, E.	0	2	6

Grays (Essex).

Kirby, Samuel John	0	5	0

Great Bedwyn.

Gerard, George R.	0	10	6

Great Grimsby.

Barker, William	0	5	0
Cook, Robert, jun.	0	5	0
Mason, William D.	0	2	6
Robinson, Jonathan Scott	0	2	6
White, J. C.	0	2	6
Willey, W.	0	5	0

Guernsey.

Nickolls, J. B.	0	5	0

Guildford.

Beck, J. W.	0	5	0
Jeffries, Henry	1	1	0
Martin, Edward W.	0	10	6
Thompson, Thomas	0	5	0
Wheeler, Frederick	0	5	0

Guisborough.

Fairburn, Robert W.	0	5	0

Haddington.

Gardiner, D.	0	5	0
Watt, James and J.	0	10	6

Halesworth.

Gostling, John H.	0	5	0

Halifax.

Brook, Robert	0	10	6
Dyer, William	0	5	0
Jessop, Jonathan	0	5	0
Seely, H. W.	0	2	6
Swire, Jabez	0	5	0

Halstead.

Marlar, John F.	0	2	6

Hampton Wick.

Miller, C. S.	0	5	0

Hanley.

Cornwell, T. C.	0	5	0
Furnival, John D.	0	10	6
Moore, John William	0	5	0

Hanwell.

	£	s.	d.
Kirkham, Frank	0	2	6

Harleston.

Fisher, W. H.	0	10	6
Woods, Charles	0	5	0

Harrogate.

Davis, Richard H.	0	10	6
Greenwood, Charles	0	10	6
Greenwood, John	0	10	6
Potter, Charles	0	5	0
Reynolds, Freshfield	0	10	6
Wilson and Son	1	1	0
Wood, A. W.	0	5	0

Harwich.

Bevan, Charles F.	0	10	6
Harding, Joseph	0	10	6
Worts, Augustine	0	5	0

Haslingden.

Blayney, Joseph J.	0	5	0

Hastings and St. Leonards.

Bathe, R. S.	0	10	6
Beck, Albert N.	0	5	0
Bolton, Thomas	0	5	0
Brooker, Algernon	0	5	0
Brooks, Frederick	0	5	0
Crisford, F. J.	0	2	6
Croasdale, J. C.	0	2	6
Feaver, John	0	10	6
Hasselby, E. H.	0	5	0
Jameson, W. E.	1	1	0
Jenner, H. A.	0	5	0
Keyworth, G. A.	0	10	6
Lemmon, G. F.	0	2	6
MacKenzie, C. A.	0	2	6
Maggs, F. W.	0	5	0
Maggs, Samuel B.	0	10	0
Neve, Francis C.	0	10	6
Rossiter, Frederick	0	10	6
Snowdon, Robert	0	5	0
Tharle, C. A.	0	10	6
Tree, Frederick	0	2	6
Tully, John	0	5	0
Vint, Thomas D.	0	5	0

Haverfordwest.

Jenkins, Jabez (Lysyfrân)	0	5	0
Saunders, Charles P.	0	5	0
Saunders, David P.	0	10	6

Hawick.

Craig, John	0	5	0
Kennedy, D.	0	10	0
Maben, Thomas	1	1	0
Turnbull, W. S.	0	5	0

Hay.

Davies, John Lutwyche	0	5	0

Hayle.

Williams, J. H.	0	5	0

Heaton Chapel.

Thorp, John	1	1	0

Hebden Bridge.

Hey, David	0	10	6
Hey, Thomas K.	0	10	6

Heckington.

Sumners, Michael Cole	0	5	0

Heckmondwike.

Booth, John	1	1	0
Stead, Walter	0	5	0

Helensburgh.

Harvie, George	0	5	0
McMurray, J.	0	5	0
Smith, Walter	0	5	0

Helmsley.

Allenby, W.	0	5	0

Helston.

Wakeham, Charles	0	5	0

Hemel Hempstead.

Argue, James	0	5	0
Ellis, C. J.	0	2	6

Henley-on-Thames.

Batchelor, C. J. H.	0	5	0

Hereford.

	£	s.	d.
Guy, E.	0	5	0
Haines, W. E.	0	5	0
Jackson, J. J.	0	10	6
Pearmund, H. S.	0	5	0
Walker, John	0	10	6
Williams, W. and H. B.	0	10	6

Hertford.

	£	s.	d.
Durrant, G. R.	0	10	6

Hexham.

	£	s.	d.
Gibson, J. P.	1	1	0
Richardson, George	0	5	0
Riddle, W. R.	0	5	0

Heywood.

	£	s.	d.
Beckett, William	0	10	6

Highworth (Wilts).

	£	s.	d.
Ballard, Edwin	0	5	0

Hitchin.

	£	s.	d.
Perks and Llewellyn	1	1	0
Ransom and Son	1	1	0

Hong Kong (China).

	£	s.	d.
Crow, W. E.	1	1	0
Watson, W. M.	0	5	0
Lucas, E. W.	0	5	0

Honley.

	£	s.	d.
Broadbent, John B.	0	10	6

Horncastle.

	£	s.	d.
Betts, William	0	5	0

Horsforth.

	£	s.	d.
Wynn, Frederick	0	5	0

Houghton-le-Spring.

	£	s.	d.
Rowell, R. H.	0	5	0

Hounslow.

	£	s.	d.
Bowering, I.	0	5	0
Cull, Joseph	0	10	6

Howden (Yorks.).

	£	s.	d.
Loam, J. G.	0	5	0

Huddersfield.

	£	s.	d.
Bygott, W. T.	0	2	6
Dickinson, J. H.	0	5	0
Fitton, Robert	0	10	6
King, William	1	10	6
Needham, —	0	5	0
Piggott, W. F.	0	2	6
Swift, C. H.	0	5	0
Sykes, H.	0	5	0
Wheatley, Charles	0	10	0

Hull.

	£	s.	d.
Allison, E. and H.	1	1	0
Bell, Charles B.	1	1	0
Bousfield, W. M.	0	5	0
Campbell, Charles	0	5	0
Chapman, E. J.	0	5	0
Chapman, Joseph	0	2	6
Creasser, Matthew	0	5	0
Desforge, J. H.	0	5	0
Dobson, J. B.	0	5	0
Dolling, Alfred	0	5	0
Dunlop, John	0	5	0
Dyson, George	0	5	0
Gibson, C. P. (Trustees of)	0	5	0
Grindell, John	0	10	6
Hall, Henry R. F.	0	5	0
Hammond, William H.	0	5	0
Hart, George William	0	10	6
Hebblethwaite, G. A.	0	2	6
Hollingsworth, James	0	5	0
Hoyles, George	0	2	6
Kenny, Thomas	0	5	0
Linford, John S.	1	1	0
Lofthouse and Saltmer	1	1	0
Oldham, James	0	5	0
Parsons, H. J.	0	2	6
Raynor, A.	0	5	0
Shaw, Ward	0	5	0
Sheffield, A. J.	0	5	0
Souter, Jas. S.	0	10	6
Staning, Walter	0	5	0
Stoakes, Benjamin M.	0	5	0

Hunstanton.

	£	s.	d.
Twiss, Wm.	0	10	6

Huntingdon.

	£	s.	d.
Baxter, Robert	0	10	6
Cooper, A.	0	2	6

Huntly (N.B.).

	£	s.	d.
Chalmers, G.	0	2	6

Hurstpierpoint.

	£	s.	d.
Hudson, Alfred W.	0	2	6

Hyde.

	£	s.	d.
Oldfield, Henry	0	10	6

Hyères (France).

	£	s.	d.
Powell, Walter A.	0	5	0

Hythe.

	£	s.	d.
Lemmon, R. A.	1	1	0

Ilford.

	£	s.	d.
Beal, E. J.	1	1	0

Ilfracombe.

	£	s.	d.
Affleck, T. S.	0	2	6
Crang, Walter	0	10	6
Wheeler, James	0	5	0

Ilkeston.

	£	s.	d.
Potts, Charles	1	1	0

Ilkley.

	£	s.	d.
Worfolk, G. W.	0	10	6

Ingatestone.

	£	s.	d.
Stuart, Henry James	0	5	0

Inverness.

	£	s.	d.
Allan, Alexander	0	5	0
Bethune, W. J.	0	2	6
Fraser, John	0	5	0
Galloway and Son	0	5	0
MacRitchie, D.	0	2	6
Mitchell, H.	0	5	0

Ipswich.

	£	s.	d.
Anness, Samuel R.	0	10	6
Chapman and Pain	1	1	0
Clifton, F. S.	0	5	0
Cornell, William	1	1	0
Cossey, James D.	0	10	6
Crassweller, W. E.	0	5	0
Eyre, H. R.	0	5	0
Grimwade, Ridley and Co.	0	10	6
Matcham, Edward	0	5	0
Miller, T. T.	0	5	0
Nunn, C. G.	0	5	0
Spurgeon, Fredk. J.	0	5	0
Wigg, L. N.	0	5	0
Wiggin, J. C.	0	10	6
Younger, Robert E.	0	5	0

Irvine.

	£	s.	d.
Gillespie, James	0	5	0

Isleworth.

	£	s.	d.
Reece, James	0	5	0

Jarrow-on-Tyne.

	£	s.	d.
Hooper, Richard	0	2	6

Jedburgh.

	£	s.	d.
Walker, A.	0	5	0

Jersey.

	£	s.	d.
Baker, John T.	0	5	0
Cole, George	1	1	0
Ereaut, John	1	1	0
Millais, Mrs.	1	1	0
Miller, Henry	0	5	0
Poingdestre, C. R.	0	10	6

Keighley.

	£	s.	d.
Midgley, Walter	0	5	0
Riddiough, F.	0	5	0

Kendal.

	£	s.	d.
Bateson, Thomas	1	1	0
Burton, Matthew	1	1	0
Hind, Thomas W. L.	1	1	0
Rigg, G. F.	0	10	6
Severs, Joseph	1	1	0

Kenilworth.

	£	s.	d.
Barton, Henry Emlyn	0	10	6

Keswick.

	£	s.	d.
Townley, Thomas W.	0	10	6

Kettering.

	£	s.	d.
Gray, A. U.	0	2	6
Thursfield, John F.	0	10	0

Kew.

	£	s.	d.
Edwards, J. E.	0	10	6

Kidsgrove.

	£	s.	d.
Griffiths, Edwin H.	0	10	6

Kilmarnock.

	£	s.	d.
Borland, John	1	1	0
Borland, John, jun.	0	10	6

King's Lynn.

	£	s.	d.
Atmore, George	0	5	0
Cocher, John A.	0	5	0
Count, Sidney	0	5	0

Kingston-on-Thames.

	£	s.	d.
Bond, C. R.	0	10	6
Brewster, William	0	10	6
Higgs, Alfred	0	5	0
Walmsley, Samuel	0	5	0
Whaley, Edward	0	10	6

Kirby Lonsdale.

	£	s.	d.
Birkett, John	0	5	0

Kirkcaldy.

	£	s.	d.
Storrar, David	0	10	6

Knaresborough.

	£	s.	d.
Lawrence, W. P.	0	5	0
Thompson, George	0	10	6

Knutsford.

	£	s.	d.
Silvester, Henry T.	0	5	0

Lancaster.

	£	s.	d.
Arkle, William	0	5	0
Briggs, W.	0	5	0
Fell, James J.	0	5	0
Holmes, E.	0	5	0
Troughton, Henry	0	5	0
Vince, James	0	5	0

Landport.

	£	s.	d.
Gall, Frederic	0	2	6
Perfect, George	0	5	0

Langholm.

	£	s.	d.
Beattie, Thomas	0	5	0

Largs (N.B.).

	£	s.	d.
Barr, Bryce	0	5	0

Launceston.

	£	s.	d.
Downing, Frederick	0	5	0
Wise, William	0	5	0

Leamington.

	£	s.	d.
Barnitt, John	0	10	6
Barrett, Josephus T.	1	1	0
Davis, Benjamin	0	10	6
Davis, C.	0	2	6
Eynon, D. J.	0	10	6
Holloway, E. A.	0	2	6
Pullin, William H.	1	1	0
Robinson, J. J.	0	5	0
Sansom, Henry	0	2	6
Smith, Samuel A.	1	1	0
Smith, Samuel H.	0	10	6
Stanley, Herbert	0	10	6

Ledbury.

	£	s.	d.
Freeman, Ernest	0	10	6

Lee (Kent).

	£	s.	d.
Heath, F. D.	0	5	0

Leeds.

	£	s.	d.
Archer, Joseph S.	0	2	6
Beacock, J. H.	0	5	0
Bilbrough, A.	1	1	0
Branson, F. W.	0	10	6
Briggs, George	0	5	0
Brown, Edward	0	5	0
Brown, E. O.	0	5	0
Cole, E. H.	1	1	0
Exley, George	0	5	0
Fawthorp, James	0	5	0
Fourness and Son	0	10	6
Fox, W. A.	0	2	6
Goodall, Backhouse and Co.	2	2	0
Greasley, M. F.	0	10	6

Leeds—continued.	£	s.	d.
Harvey, William (Headingley)	1	1	0
Hirst, Brooke and Hirst	2	2	0
Hirst, David	0	10	0
Holmes, Francis	0	5	0
Holmes, Joseph	0	10	6
Horsfield, E.	0	5	0
Jefferson, P.	0	5	0
Reynolds, Richard	1	1	0
Reynolds, Richard F.	0	5	0
Robinson, W.	0	5	0
Schoon, G.	0	1	0
Smeeton, William	0	10	6
Taylor and Fletcher	1	1	0
Taylor, Samuel	1	1	0
Leek.			
Blades, Josiah B.	0	2	6
Johnson, William	0	5	0
Leicester.			
Berridge, Alfred	0	5	0
Broof, R.	0	10	6
Burford, S. F.	0	10	6
Butler, T. E.	0	5	0
Cadoux, S. H.	0	5	0
Carr, William	0	10	6
Clark, John W.	2	2	0
Clark, Walter B.	0	10	6
Cleaver, Samuel	0	5	0
Cox, S. G.	0	10	6
Ellis, George	0	5	0
Esam, Richard	0	10	6
Freeland, A. J. (Kibworth)	0	2	6
Harvey, William R.	1	1	0
Lloyd, T. H.	1	1	0
Pickering, Henry	0	5	0
Rowe, W.	0	5	0
Sharp, Edward K.	0	5	0
Wand, Stephen	0	10	6
West, J. L.	1	1	0
Wilby, Frederick W.	0	10	6
Woolley, G. J. B.	0	5	0
Leighton Buzzard.			
Herington, H. E.	0	5	0
Herington, Joseph	1	1	0
Leith.			
Crichton, Alexander	0	5	0
Duncan, Flockhart Powell and Co.	0	10	6
Duncan, Wm.	0	2	6
Finlayson, Thomas	0	5	0
McDougall, R. I.	0	5	0
Mair, Alexander	0	5	0
Robertson, R.	0	2	6
Lenton.			
Wilson, Thomas	0	5	0
Lenzie (N.B.).			
Pettigrew, J. W.	0	4	0
Leominster.			
Davis, David F.	1	1	0
Ellwood, M. J.	0	5	0
Sandiland, Robert B., jun.	0	5	0
Lerwick.			
Porteous, Arthur A.	0	2	6
Leven.			
Hogg, A.	0	2	6
Lewes.			
Briscoe, Charles (West Firle)	0	5	0
Head, John	0	10	6
Head, John T.	0	10	6
Leytonstone.			
Bennett, C.	0	2	6
Wilson, J.	0	5	0
Lincoln.			
Battle, Son and Maltby	0	10	6
Tomlinson, Charles K.	0	10	6
Littleborough.			
Hall, Samuel	0	5	0
Little Chishill.			
Jefferson, Thomas	0	10	6
Littlehampton.			
Longman, J. H.	0	2	6
Smart, C. F.	1	1	0
Liverpool.			
Abraham, Alfred Clay	1	1	0
Abraham, Thomas Fell	1	1	0
Adams, Thomas E.	0	10	0

Liverpool—continued.	£	s.	d.
Adams, T. E., jun.	0	5	0
Albright, Henry	0	10	6
Alexander, George	0	5	0
Alexander, John	0	10	6
Allan, James H.	1	1	0
Aris, G. H.	0	5	0
Ayrton and Saunders	0	10	6
Bain, John	0	5	0
Barrett, A. A.	0	5	0
Blabey, J. J. (Woolton)	1	1	0
Blabey, J. R. (Woolton)	0	2	6
Blood, Charles (Formby)	0	5	0
Blundell, John	0	10	6
Brown, Edwin	0	2	6
Brown, Joseph	0	2	6
Buck, Richard C.	0	5	0
Clay, Dod and Co.	1	1	0
Coley, James	0	5	0
Dickins, B.	0	5	0
Drawbridge, Joseph G.	0	10	6
Drawbridge, T. F.	0	5	0
Ellams, George	0	10	0
Elliott, Robert John	0	10	6
Ellithorne, A. H.	0	5	0
Evans, Sons and Co.	5	5	0
Fergusson, W. and J.	0	10	6
Field, C.	0	10	6
Fleming, Mrs. Agnes	0	5	0
Fowler, George	0	5	0
Fraser, Alexander	0	5	0
Furniss, Thomas	0	5	0
Galloway, J. B.	0	5	0
Greenall, Alfred	1	1	0
Hackett, Thomas	0	10	0
Hawood, Charles	0	5	0
Hocken, Joshua	0	10	6
Hodges, E. G.	0	5	0
Hodgson, T. S.	0	5	0
Jackson, H.	0	10	6
James, John	0	5	0
Johnson, J. H. and S.	2	2	0
Jones, R. H.	0	5	0
Jordan, J. A.	0	5	0
Kirk, W. P.	0	5	0
Lee, Samuel W.	1	1	0
Lett, Arthur J.	0	5	0
McGuffie and Co.	1	1	0
Midgley, John E.	0	2	6
Morgan, H. B.	0	5	0
Parkinson, Richard	0	10	6
Parry, R.	0	5	0
Pheysey, Richard (Waterloo)	0	10	6
Richardson, Richard T.	0	10	6
Ridgway, T. E.	0	5	0
Sawden, Alfred	0	10	6
Smith, J. J. (Walton-on-the-Hill)	0	10	6
Smith, R. G.	0	5	0
Symes, Charles	2	2	0
Thomas, Robert	0	10	6
Thompson, John	1	1	0
Thompson and Capper	1	1	0
Tollitt, W.	0	2	6
Troughton, Christopher	0	10	6
Ward, J. S.	0	5	0
Warhurst, Mrs. A.	2	2	0
Williams, William	0	5	0
Wokes, T. S.	0	5	0
Woodhead, H. C.	0	10	6
Wright, William	0	5	0
Llanbyther.			
Jones, J.	0	2	6
Llandilo.			
Williams, W. J.	0	2	6
Llandudno.			
Burton, Joseph	1	1	0
Sinclair, Mrs. M. A.	0	10	6
Llanelly.			
Evans, Gwilym	1	1	0
Llangollen.			
Jones, Humphrey	0	5	0
Llanidloes.			
Jones, Thomas Pryce	0	2	6
Llanrwst.			
Jones, Owen	0	2	6
Loddon.			
Ellis, T. W.	0	10	6
London.			
Adam, Miss A. M.	1	1	0
Adam, Miss J. S.	0	5	0
Adam, Miss L.	1	1	0

London—continued.	£	s.	d.
Allden, John	1	1	0
Allen, Charles B.	3	3	0
Amoore, Lewis P.	0	10	6
Andrews, Frederick	0	10	6
Applegate, Edwin	0	10	6
Arkinstall, William	1	1	0
Ashford, H. S.	0	5	0
Atkinson, James	0	5	0
Atkinson, John G.	1	1	0
Attwood, Henry E.	1	1	0
Austin, Henry Felix	1	1	0
Babb, James	0	5	0
Bacon, Henry J.	0	2	6
Baines, Wm. H.	0	10	6
Baker, Alfred P.	0	10	6
Baker, H. W.	0	10	6
Ball, The Chemists', per Mr. W. H. Francis	15	15	0
Ball, The Junior Pharmacy, per Mr. W. H. Kerr	10	10	0
Balls, George	0	10	6
Banbury, Richard	0	5	0
Barnard, A. P.	0	5	0
Barnard, John	1	1	0
Barnes, James Benjamin	1	1	0
Barnes, James Burden	0	5	0
Barret, Edward Louis	1	1	0
Barry, Frederic	0	5	0
Bartle, W. F.	0	5	0
Bartlett, G. F. H.	0	5	0
Bartley, George A.	0	10	6
Bascombe, Frederick	0	10	6
Bascombe, William	0	5	0
Bate, Henry	1	1	0
Bateman, T. H.	1	1	0
Beasley, Frederick	0	5	0
Beddard, John	1	1	0
Bedford, C.	0	10	6
Bell, Matthew W.	1	1	0
Bell, William H.	1	1	0
Bennett, George	0	5	0
Bennett, Thomas	0	5	0
Bently, William Jas.	0	10	6
Bessell, J. W.	0	5	0
Best, James	0	10	6
Bevan, William	0	10	6
Bigg, Thomas	1	1	0
Bindloss, G. F.	0	10	6
Bingley, Richard	0	10	6
Birch, Henry C.	1	1	0
Bird, Augustus	2	2	0
Bird and Storey	1	1	0
Bird, F. C. J.	0	5	0
Bird, Robert	0	10	6
Bishop, W. M.	0	2	6
Blackman, T.	0	5	0
Blake, Charles A.	1	1	0
Bland, John	0	10	6
Bletsoe, F. F.	0	10	6
Blyth, Utton	0	5	0
Boothby, H. N.	0	5	0
Bourdas, Isaiah	1	1	0
Bowen, F. T.	0	5	0
Bowen, John T.	0	10	6
Bowen, John W.	1	1	0
Bowles, W. J.	0	5	0
Brand and Co.	1	1	0
Branford, A. J.	0	5	0
Bridges, C. W.	0	10	6
Brodribb, J. B.	0	10	6
Brookes, Samuel	0	10	6
Brooks, J.	0	2	6
Brooks, Thomas	0	2	6
Brooks, Tom	0	2	6
Broumpton, F. R.	0	2	6
Brown, Alfred James	0	10	6
Brown, Edgar M.	0	2	6
Bull, E. John	0	5	0
Bullock, J. Lloyd and Co.	2	2	0
Bunker, James	0	2	6
Burden, C. H. B.	0	5	0
Burgoyne, Burbidges, Cyriax and Farries	2	2	0
Burn, Henry	0	5	0
Burton, Percy H.	0	2	6
Bush, Arthur	0	5	0
Butler, J. A.	0	5	0
Butt, Edward Northway	10	10	0
Butterworth, John	0	5	0
Cadman, Daniel C.	1	1	0
Campbell, E. K.	0	5	0
Carteighe, Michael	1	1	0
Caseley, Thomas	0	5	0
Catterns, H. P.	0	10	6
Cawdell, George	0	10	6
Chapman, Joseph J.	0	10	6
Chapman, Walter	0	10	6

London—continued.	£	s.	d.
Charity, William	0	10	6
Chemist and Druggist, Proprietors of	5	5	0
Chesterfield, T. M.	0	5	0
Churchill, J. and A.	1	1	0
Churchyard, R. L.	0	5	0
Clapp, Edward F.	0	10	6
Clark, Thomas J.	0	10	0
Clarke, W. E.	0	2	6
Clarke, W. L.	0	5	0
Clayton, Thomas	0	5	0
Cocker and Son	0	10	6
Colchester, William M.	0	5	0
Cole, A. C.	1	1	0
Coleman, J.	0	5	0
Coles, A.	0	5	0
Coles, Ferdinand	0	10	6
Coles, J. W.	0	10	6
Collett, Chas. B.	0	5	0
Collier, Henry	0	10	6
Constance, Edward	0	10	6
Constance, Herbert E.	0	10	6
Constance, Sidney W.	0	10	6
Cook, W. R.	0	5	0
Cooper, Albert	1	1	0
Cooper, Henry	0	10	6
Cooper, H. H.	1	1	0
Cooper, R. H.	0	10	0
Cooper, Wm. Henry	0	10	6
Cooper, William Temple	0	10	6
Corbyn, Stacey and Co.	1	1	0
Cory, James	0	10	6
Cosway, Edwin C.	1	1	0
Cottrill, John W.	0	10	6
Coulson, Thomas	0	2	6
Cox, F. H.	0	2	6
Cracknell, Herbert	0	10	6
Cresswell, Frederick	0	10	6
Crosby, John	0	2	6
Crow, E. L.	0	10	6
Crowden, S. G.	0	10	6
Cryer, Henry	0	5	0
Cullen, Harry H.	0	5	0
Dampney, Richard S.	0	10	6
Darby and Gosden	2	2	0
Dart, W.	0	2	6
Davenport, Horace	2	2	0
Davenport, J. T.	2	2	0
Davies, H.	0	5	0
Davies, Llewelyn	0	2	6
Davies, Robert H.	1	1	0
Davis, F.	0	2	6
Davis, H. S. E.	0	10	6
Davy, Yates and Routledge	2	2	0
Dean, S.	0	5	0
De Peare, John Thomas	0	5	0
Dewar, Mrs. Mary Ann	0	10	6
Dickson, J.	0	5	0
Dinneford and Co.	2	2	0
Dixon, Herbert	0	5	0
Dodd, W. R.	0	10	0
Douglas, J. W.	0	2	6
Doulton and Co.	1	1	0
Drury, Sydney	0	5	0
Dukes, H.	0	2	6
Dymond, T. S.	0	5	0
Dymott, Francis	0	5	0
Dyson, William B.	1	1	0
Eade, George	0	10	6
Eade, James	0	10	6
Eastman, J. E.	0	10	6
Edwards, Charles	1	1	0
Edwards, James	0	5	0
Edwards, William Staples	0	5	0
Elliott, W.	0	5	0
Ellwood, T. A.	0	5	0
Elvey, Mrs. M. A.	1	1	0
Emsley, J.	0	10	6
Emson, William N.	0	5	0
Epps, James	1	1	0
Evans, Lescher and Webb	1	1	0
Evershed, G. S.	0	5	0
Fallowfield, Jonathan	1	1	0
Farmer, John	0	10	6
Fawssett, T.	0	5	0
Fitch, Robert Owen	0	10	6
Fox, William	1	1	0
Francis, G. Bult	1	1	0
Francis, George Baggett	1	1	0
Francis, Matthew R.	0	10	6
Francis, W. H.	0	10	6
Freeman, Frank	0	2	6
Froom, William Henry	1	1	0
Frost, John H.	0	5	0
Frost, W. T.	0	10	6
Fuge, H. D.	0	5	0
Gadd, Charles	0	10	6

London—continued.	£	s.	a.
Gadd, Robert	0	10	6
Gale, Samuel	1	1	0
Garman, C. E.	0	5	0
Garner, James	0	10	6
Garner, Thomas	0	5	0
Garnham, A. W.	0	5	0
Garrett, John	0	5	0
Gaskin, J. H.	0	2	6
Gaubert, Stephen	0	2	6
Gaunt, Rann Dolphin H.	1	1	0
Gerrard, A. W.	1	1	0
Glew, F. H.	0	5	0
Goddard, G. E.	0	5	0
Godfrey and Cooke	1	1	0
Godfrey, H. E.	0	5	0
Goff, Richard	0	5	0
Goldby, F.	0	5	0
Golding, J. F.	1	1	0
Golds, L. G.	0	10	6
Goodall, W. A.	0	5	0
Goodchild, Alfred C.	0	5	0
Goodwin, John	1	1	0
Gordelier, F. H.	0	19	0
Gorton and Sons	0	10	6
Gould, J.	1	1	0
Gradidge, James H.	0	10	6
Graham, Henry	0	5	0
Granger, Edwin John	1	1	0
Greaves, J. E.	0	5	0
Green, Samuel	0	5	0
Green, W. J.	0	10	6
Greenish, H. G.	0	10	6
Greenish, Thomas	1	1	0
Greenish, T. Edward	0	10	6
Greig, W.	0	2	6
Gristock and Co.	1	1	0
Gudgen, Frederick G.	0	15	6
Gulliver, William	1	1	0
Gulliver, W. F.	0	5	0
Haddock, James	0	5	0
Haden, W. E.	0	5	0
Haigh, W.	0	5	0
Hairsine, H. S.	1	1	0
Hall, Ralph	0	10	6
Hampson, Robert	1	1	0
Hanbury, Cornelius	1	1	0
Hannah, Charles	0	10	6
Hardy, Samuel C.	1	1	0
Harris, Frank William	0	5	0
Hart, Thomas	0	5	0
Harvey, Edward	1	1	0
Harvey, John William	0	2	6
Harvey, William	0	10	6
Hatfield, George B.	0	10	6
Hatfield, George W.	0	5	0
Haward, G. R.	1	1	0
Hawkins, Thomas	0	10	6
Hayllar, J.	0	2	6
Hearn, John	0	5	0
Hebbeler, K.	0	10	6
Henty, Henry Martin	0	5	0
Herbert, William	0	5	0
Hern, W. H.	0	5	0
Hewlett, J. C.	1	1	0
Hick, John	0	5	0
Hickey, Evan Lewis	0	10	6
Hickman, William	0	10	6
Hicks, Alexander D.	0	3	0
Higgins, James	0	10	6
Hill, Arthur B.	1	1	0
Hill, Arthur S.	2	2	0
Hill, William	0	5	0
Hillen, John	0	10	6
Hills, Thomas Hyde	10	10	0
Hills, Walter	2	2	0
Hobbs, John K.	0	5	0
Hodgkinson, George A.	0	10	6
Hodgkinson, Treacher and Clarke	2	2	0
Hodgkinson (Thomas), Prestons and King	2	2	0
Hodgkinson, William	1	1	0
Hodsoll, Thomas W. H.	1	1	0
Hogg, E. G.	0	10	6
Hogg, Robert	0	10	6
Hogwood, E.	1	1	0
Holding, J.	0	5	0
Holford, T. Constantine	0	10	6
Holl, Edmund	0	5	0
Holmes, A. J.	0	10	6
Holmes, Walter M.	0	10	6
Holroyd, A.	0	2	6
Hopkin and Williams	2	2	0
Hopkin, William King	2	2	0
Horne, John	0	5	0
Horsley, T. W.	0	10	0
Howard, E.	0	5	0
Howell, Maurice	0	10	6

London—continued.	£	s.	d.
Howse, W. F.	0	5	0
Howlett, Samuel	1	1	0
Hucklebridge, P. and W.	1	1	0
Hudson, T. F.	0	5	0
Huggins, Richard	0	10	6
Hughes, Evan	0	10	6
Hugill, John	1	1	0
Hugill, John H.	1	1	0
Humble, J. B.	0	5	0
Humphreys, G. R.	0	2	6
Humphreys, Richard	0	10	6
Hunt, Charles	1	1	0
Huskisson, Henry Owen	2	2	0
Hyne, Harry	0	5	0
Hyslop, John Cahill	1	1	0
Icke, Henry S.	0	10	6
Idris and Co.	2	2	0
Ince, Joseph	1	1	0
Ingham, John	0	2	6
Ingram and Royle	1	1	0
Ive, William	1	1	0
ditto (donation)	5	5	0
Izod and Son	1	1	0
Jackson, Charles	0	10	6
Jackson, Christopher	0	10	6
Jameson, W. G., jun.	1	1	0
Jarvis, John S.	0	10	6
Jenkins, Henry	1	1	0
Jenkins, Thomas	0	10	6
Jobson, Thomas	0	10	6
Johnston, W.	0	2	6
Johnson and Sons	1	1	0
Jones, Edwin	0	5	0
Jones, Henry Stevens	0	5	0
Jones, John H.	0	10	6
Jones, T. P.	1	1	0
Jones, William	0	10	6
Jones, William	0	5	0
Jozeau, G.	1	1	0
Keeling, A. G.	0	5	0
Keer, Mrs. I. S. Clarke	0	10	6
Keer, Thomas H.	0	10	6
Kent, Thomas Ramsey	0	10	6
Kerr, T.	0	5	0
King, Mrs. E. B.	0	10	6
King, Henry	0	10	0
King, J. H.	0	5	0
Kingan, D.	0	10	6
Kingsford, Frederick	1	1	0
Kirk, Snowden	0	10	6
Kitchin, J.	0	5	0
Langley, Frank C.	0	5	0
Laws, John	0	10	6
Layng, R. C.	0	5	0
Leake, Thomas W.	0	10	6
Legg, H. A.	0	10	6
Lescher, Joseph S.	1	1	0
Lewinton, Alexander B.	1	1	0
Lewis, T.	0	2	6
Lidwell, J. E.	0	10	6
Lister, W. B	1	1	0
Littlejohn, A.	0	5	0
Llewhelin, Ivor V.	0	2	6
Lloyd, Isaac T.	0	5	0
Lockyer, J. E.	0	2	6
Long, Henry	1	1	0
Long, Herbert H.	0	5	0
Longley, Charles	0	2	6
Lorimer and Co.	1	1	0
Lowe, William E.	2	2	0
Luxmoore, C. M.	0	10	6
Lyon, James	0	10	6
MacCrindle, Thomas	1	1	0
McDiarmid, F.	0	10	6
Macdonald, Alexander	0	10	6
McDougall, James	0	2	6
MacEwan, Peter	1	1	0
MacGeorge, William	0	10	6
Maitland, P. C.	0	10	6
Maizey, E.	0	10	6
Makepeace, A. J.	0	2	6
Manley, W. F.	0	10	6
Marks (Henry) and Sons	1	1	0
Marsh, E. R.	0	10	6
Marston, John Thomas	0	10	6
Marten, Frederic	0	5	0
Martin, T. C. W.	0	10	6
Martindale, William	1	1	0
Mason, H. C.	1	1	0
Mathews, Henry	1	1	0
Mathews, J. H.	1	1	0
Matterson, J. K.	1	1	0
Matthews, C. W.	0	10	6
Matthews, E. S.	0	10	6
Matthews, J.	0	10	6
Matthews, J. H.	0	5	0
Maw, Charles	1	1	0

London—continued.	£	s.	d.
Maw, Charles (donation)	65	0	0
Maw, C. Trentham	1	1	0
Maw, Son and Thompson	2	2	0
Maxwell, P. H.	0	10	6
Maynard, H. R.	0	10	6
Meggeson and Co.	1	1	0
Mellin, Charles J.	0	5	0
Michie, Charles C.	0	5	0
Miles, C. J.	0	10	6
Miller, Cecil B.	0	5	0
Miller, W. P. F.	0	5	0
Millhouse, H. H.	0	5	0
Minshull, Flora	0	5	0
Minshull, Rose C.	1	1	0
Moore, John	0	5	0
Moore, J. S.	0	5	0
Morrell, Thomas	0	5	0
Morris, E. G.	0	5	0
Morrison, J. W. T.	0	10	6
Moss, John and Co.	1	1	0
Moss, Thomas A.	0	2	6
Mundy, Alfred O.	0	10	6
Mutch, John Pratt	0	5	0
Myers, William	0	10	6
Naylor, W. A. H.	0	10	6
Neale, J.	0	5	0
Nesme, A. J.	0	5	0
Newton, T. A. C.	1	1	0
Newzam, Henry Samuel	0	10	6
Nicholls, Reginald E.	0	10	6
Nicholson, Thomas T.	0	5	0
Nind, George	0	10	6
Ninnis, T. M.	0	5	0
Ord, Septimus W.	0	5	0
Padman, Dr. John	0	10	6
Page, R. S.	0	5	0
Palmer, Francis	0	10	6
Parker, F. P.	0	10	6
Parker, Robert Henry	0	10	6
Parker, W. H.	0	5	0
Parkes, J. C.	0	10	6
Parkes, J. P.	1	1	0
Parkinson and Son	1	1	0
Parrott, Joseph	0	10	6
Parry, C. D.	0	5	0
Parsons, G. H.	2	2	0
Passingham, G. W.	0	10	6
Pattison, George	1	1	0
Peacock, George	0	5	0
Peat, Joseph	0	5	0
Peck, F. W.	0	10	6
Peel, Alfred	0	10	6
Pellew, A.	0	10	6
Penrose, A. W.	1	1	0
Perodeau, E. G.	0	5	0
Peters, D.	0	5	0
Pettinger, Elmer	0	5	0
Pharmacy Club (per Richard Bremridge, Hon. Sec.)	10	10	0
Phillips, A. J.	0	5	0
Phillips, A. W.	0	5	0
Philpott, F. W.	0	5	0
Pickard, William	2	2	0
Pierce, R. W. C.	0	5	0
Pinchen, W. J.	0	5	0
Pinyon, William	0	10	6
Plaister, W. J.	1	1	0
Pond, B. C.	0	5	0
Ponting, F. H.	0	5	0
Portway, A. C.	0	5	0
Portway, J. D.	0	10	6
Potts, Robert A.	1	1	0
Powell and Sons	1	1	0
Powell, T. H.	0	10	6
Preston, Richard	0	10	6
Pretty, Charles	0	5	0
Price, J. T.	0	2	6
Price, Robert John	0	2	6
Prichard, Edward	1	1	0
Prime, Thomas R.	0	10	6
Procter, R.	0	5	0
Puntan, H. H. C.	0	2	6
Radermacher, C. J.	0	10	6
Ragg, William	1	1	0
Ragg, W. W.	0	10	0
Reed, Charles W.	0	10	6
Rees, Harding	1	1	0
Rees-Williams, J. J.	0	5	0
Rendle, W. J.	0	5	0
Reynolds, R. J.	1	1	0
Richards, Edwin	0	10	6
Richardson, John	0	5	0
Ridley, C. H.	0	5	0
Ridley, E. H.	0	5	0
Rigden, George	0	2	6
Roach, H. W.	1	1	0
Roach, Pope	1	1	0

London—continued.	£	s.	d.
Robertson, George	0	10	6
Robeson, C. B.	0	5	0
Robinson, J.	0	5	0
Robinson, R. A.	0	10	6
Robinson, William P.	0	10	6
Rogers, James	0	10	6
Rose, Alfred	1	1	0
Rouse, F. W.	0	10	6
Rowntree, Thomas	0	10	6
Rundle, C.	0	5	0
Rutter, John	0	10	0
Sadler, William	0	10	6
Sadler, William, jun.	0	10	6
Sainsbury, S.	1	1	0
Salter, W. A.	0	5	0
Sanders, Francis T.	0	5	0
Sandford, Geo. W.	2	2	0
Sandy, Frederick William	0	10	6
Sanger and Sons	2	2	0
Sangster, Arthur	1	1	0
Saul, J. E.	1	1	0
Saunders, C.	0	10	6
Savory and Moore	3	3	0
Sayers, W. C.	0	10	6
Scoley, Thomas E.	0	10	6
Sedcole, J. W.	0	10	6
Sell, W. H.	0	10	6
Sewell, T. A. W.	0	5	0
Shacklock, J. H.	0	10	6
Shapcott, W. H. P.	0	2	6
Sharman, Wm.	0	10	6
Shaw, E. H.	0	2	6
Shaw, J. W.	0	10	6
Shephard, Thomas F.	0	10	6
Shepley, Frederick Thos.	0	5	0
Sherburn, Thomas	0	10	6
Sherwood, N.	0	10	6
Shields, R. H.	0	5	0
Shirley, S. S.	1	1	0
Shone, O. E.	0	5	0
Sibthorp, S. J. K.	0	2	6
Silverlock, Henry	5	5	0
Silvers, Francis T.	0	10	6
Slack, Josiah W.	0	10	6
Slator, Henry	0	5	0
Smart, W.	0	10	6
Smith, Fuller	0	10	6
Smith, Harry J.	0	5	0
Smith, James W.	0	7	6
Smith, John Ord	1	1	0
Smith, Percy John	1	1	0
Smith, William	0	10	6
Smith, William	0	10	6
Smith, William Frederick	1	1	0
Smith, William L.	0	10	6
Snell, Charles H.	0	10	6
Snell, Miss Marie de Vere	0	2	6
Snow, G. F.	0	2	6
Spurling, W.	0	10	6
Spyer, Newton	0	10	6
Squire and Sons	3	3	0
Stacy, Frederick	0	5	0
Stacey, Samuel Lloyd	1	1	0
Stamp, Edward B.	0	10	6
Stansfield, Richard	0	5	0
Starkie, Richard S.	1	1	0
Stenson, Joseph	0	5	0
Stephens, Henry I.	0	5	0
Stickland, W. H.	1	1	0
Stoneham, Philip	0	10	6
Strachan, John	0	10	6
Stratton, William	0	2	6
Streater, James H.	0	10	0
Strongitharm, W. G.	0	5	0
Strother, C. J.	0	10	6
Students' Critic	1	0	0
Sugden, W. A.	0	5	0
Summers, James R.	0	10	6
Suttar, J.	0	3	2
Swift, Francis	0	10	6
Symons, William H.	1	1	0
Tanner, A. E.	0	10	6
Taplin, William Gilbert	1	1	0
Taubman, Robert	0	10	6
Taylor, Edward	0	2	6
Taylor, George S.	1	1	0
Taylor, Horatio	0	10	6
Taylor, John	0	10	6
Taylor, Peter	0	5	0
Taylor, W. (Woolwich)	0	2	6
Tebbutt, Edwin	1	1	0
Temple, C. H.	0	2	6
Tench, S. E.	0	5	0
Thatcher, R.	0	2	6
Thomas, Harry A.	1	1	0
Thompson, Arthur S.	0	5	0
Thompson, Henry	0	10	6

London—continued.	£	s.	d.
Thompson, Henry Ayscough	1	1	0
Thompson, John	1	1	0
Thompson, R. W.	0	5	0
Thorn, John James	1	1	0
Thrower, E. A.	0	2	6
Tijou, Tom	0	2	6
Tingle, Miss Ellen	0	5	0
Tomlinson, Thomas	1	1	0
Tompsett, Leighton S.	0	5	0
Toon, Lionel E.	0	5	0
Trask, Thomas	1	1	0
Treharne, F. G.	0	5	0
Trick, William B.	0	10	6
Troke, Charles	1	1	0
Trotman, Alfred C.	0	10	6
Truman, F. W.	1	1	0
Truman, H. V.	0	10	6
Tugwell, Ernest H.	0	10	6
Tugwell, William H.	0	10	6
Turner, Charles E.	0	10	6
Turner, Edward A.	1	1	0
Turner, Thomas	0	5	0
Tyrer, Peter	0	10	6
Upjohn, Francis W.	0	5	0
Van, Frederick W. S.	0	5	0
Vialls, J. B.	1	1	0
Vincent, P.	1	1	0
Walker, Byatt A.	0	5	0
Walker, Charles	0	5	0
Wallbridge, H. A.	0	5	0
Wallis, G.	0	5	0
Wallis, John T. W.	0	10	6
Wallis, Owen	0	10	6
Want, W. P.	0	5	0
Warren, F. W.	0	10	6
Warren, William	0	10	6
Warrick Brothers	1	1	0
Wastie, Francis	1	1	0
Watson, William	0	10	6
Watts, Edward	0	5	0
Watts, J. N.	1	1	0
Wavell, Edward	1	1	0
Wegg, W. N.	0	5	0
Wells, Thomas	0	5	0
West, Charles	0	10	6
Weston, Samuel John	1	1	0
Westrup, Joseph B.	0	10	6
Whear, W	0	2	6
Whiffen, Thomas	5	5	0
Whigham, Robert L.	0	5	0
White, Charles	1	1	0
White, Charles E.	0	5	0
Whittle, Elias C. C.	0	5	0
Widgery, John	0	5	0
Wiggins, Henry	0	10	6
Wigginton, Alfred	0	10	6
Wilkinson, Benjamin John	0	10	6
Wilkinson, Robert	0	5	0
Wilkinson, William	0	10	6
Will, William W.	0	5	0
Willats, Richard	0	5	0
Williams, Alfred	0	5	0
Williams, Henry	2	2	0
Williams, Hugh	0	5	0
Williams, J.	0	5	0
Williams, J. W.	1	1	0
Williams, T. R.	0	2	0
Williams, Stephen	0	5	0
Willows, Francis and Butler	3	3	0
Wilson, James	1	1	0
Wilson, Thomas W.	0	10	6
Wink, J. A.	1	1	0
Wisken, Robert	0	10	6
Wodderspoon and Co.	1	1	0
Wood, C. H.	0	10	6
Wood, Jacob	1	1	0
Woodland, John	1	1	0
Woollings, Frank	0	2	6
Wooster, J. R.	1	1	0
ditto (donation)	5	5	0
Wootton, Alfred C.	2	2	0
Worsley, A. G.	0	5	0
Wretts, J. R.	0	10	6
Wright, Layman and Umney	2	2	0
Wyatt, Francis J.	0	10	6
Wybrant, A.	0	5	0
Wylde, George	0	10	6
Yates, Robert	1	1	0
Yates, Samuel P.	0	5	0
Yeatman, F. J.	0	2	6
Young, George	0	5	0

Long Bennington.

Bemrose, John	0	10	6

Long Eaton.

White, J. T.	0	5	0

Longton.

	£	s.	d.
Hemming, G. T.	0	5	0
Prince, Arthur G.	0	10	0

Looe (Cornwall).

Poad, John	0	5	0

Lossiemouth.

Bremner, James	0	5	0

Loughborough.

Baldwin, G. J.	0	2	6
Jones, C.	0	2	6
Scrase, Richard	0	5	0

Louth.

Moody, S. W.	1	1	0
Smith, William	0	2	6

Lowestoft.

Chaston, Anna Maria	0	10	6
Good, Thomas	0	15	0
Jeacock, F. D.	0	2	6
Moverley, Robert	0	10	6

Ludlow.

Marston, Alfred	0	5	0
Nickson, James	0	5	0
Smith, F. W.	0	2	6
Woodhouse, George	0	5	0

Luton.

Chantler, R. P.	0	5	0
Duberly, G. S.	0	5	0
Webb, John H.	0	2	6

Lutterworth.

Brown, Thomas	0	10	6

Lyme Regis.

Henley, George	0	5	0

Lymington.

Allen, Adam U.	0	5	0
Badcock, Henry	0	5	0

Lymm.

Evans, Isaac H.	0	5	0
Henshall, James	0	5	0

Lytham.

Hartley, John	0	7	6

Macclesfield.

Bates, William I.	0	10	6
Bower, John	0	5	0
Charge, A. W.	0	5	0
Cooper, Thomas	0	5	0
Duncalf, Thomas H.	0	10	6
Wood, Richard	0	10	6

Macduff.

McMurtrie, John	0	5	0

Machynlleth.

Davies, Hugh	0	2	6
Rees, E.	0	5	0

Maidenhead.

Barry, Thomas S.	0	10	6
Cottingham, Joseph J.	0	5	0
Walton, Ralph	0	10	6

Maidstone.

Anning, A.	0	5	0
Corfe, Alfred	0	5	0
Rogers, William	0	5	0
Rowcroft, Albert E.	0	5	0
Simpson, John W. G.	0	10	6
Stonham, Thomas G.	0	10	6
Toone, A. H.	0	5	0
Whitbread, H.	0	5	0

Maldon (Essex).

Crick, George E.	0	10	6
Elsey, Charles	0	5	0
Wallworth, David	0	10	6

Malton (Yorks).

Buckle, James	0	5	0
Harrison, William	0	10	6
Laverack, W. H.	0	5	0

Malvern.

Coldwell, David B.	0	10	6
Fox, T.	0	5	0

Malvern Wells.

Clark, Edward J.	0	5	0
Wakefield, Cecil H.	1	1	0

Manchester.

	£	s.	d.
Balmforth, A.	1	1	0
Barlow, A.	0	2	6
Bates, Frederic W.	0	5	0
Bell, James	0	2	6
Bell, Joseph	0	5	0
Benger, F. Baden	1	1	0
Bew, John	1	1	0
Billington, John	0	2	6
Blain, Alfred L.	0	5	0
Blyton, John	0	10	6
Boor, Frederick	0	10	6
Booth, William G.	0	10	6
Bransby, C. K.	0	2	6
Breadner, C. G.	0	5	0
Brooks, Joseph	1	1	0
Broughton, Thomas	0	2	6
Brown, William Scott	1	1	0
ditto (donation)	100	0	0
Bullock, A. H. (Salford)	0	2	6
Burnet, G.	0	2	6
Bushby, Thomas	0	5	0
Carruthers, Annie	0	2	6
Carter, William	0	10	6
Cocker, J. D.	0	2	6
Coulding, J. J.	0	2	6
Cowpe, M.	0	2	6
Dale, John	0	2	6
Darling, William	1	1	0
Dawson, Robert	0	5	0
Denton, J. (Salford)	0	5	0
Eatough, J. S.	0	2	6
Edwards, G.	0	5	0
Fairbrother, D.	0	2	6
Gardner, E. (Salford)	0	2	6
Gavin, Thomas	0	10	6
Gibbons, Thomas G.	1	1	0
Gibbons, Walter	0	10	6
Gibson, Robert	1	1	0
Glanville, R.	0	5	0
Gourlay, H. H.	0	2	6
Gourlay, R. G.	0	2	6
Hall, Henry Stacey	0	5	0
Harding, E.	0	5	0
Harrop, J. H.	0	5	0
Hart, James	1	1	0
Hatch, J. O.	0	5	0
Hedley, J.	0	2	6
Hogg, J. A.	0	2	6
Holt, H. C.	0	2	6
Holt, John	0	5	0
Hughes, Evan G.	0	10	0
Inglis, H.	0	5	0
Jackson, F.	0	10	6
Jackson, George	0	10	6
Jackson, Thomas	0	10	6
Jeans, Alfred	0	2	6
Johnson, W. H. (Salford)	0	10	6
Jones, John J.	0	2	6
Jones, Joseph	0	2	6
Jones, P. V.	0	5	0
Kemp, Harry	0	5	0
Lane, William	0	10	6
Leech, Robert	0	5	0
Lord, John (Salford)	0	5	0
Mansergh, W.	0	5	0
Marsden, Thomas B. (Withington)	0	10	6
Marsden, W.	0	5	0
McCormick, F. H.	0	5	0
Middleton, C.	0	2	6
Morris, J. L.	0	5	0
Mundey, H.	0	5	0
Nuttall, R. H.	1	1	0
Osborne, T. C. E.	0	2	6
Paine, Standen	1	1	0
Pickup, Robert L.	0	10	6
Pidd, Arthur J.	0	10	6
Pigot, Samuel	0	2	6
Pratt, G. W.	0	5	0
Ritchie, T.	0	2	6
Ritson, J.	0	2	6
Roberts, W. R.	0	5	0
Royle, John	0	5	0
Sanderson, G. C.	0	5	0
Scaife, Samuel	0	10	6
Smith, E.	0	5	0
Standring and Co.	1	1	0
Sugden, Samuel	0	10	6
Summer, T.	0	2	6
Sutcliffe, C. H.	0	5	0
Swinn, Charles	1	1	0
Taylor, J. J.	0	2	6
Teasdale, C.	0	10	6
Terry, Thomas (Withington)	0	5	0
Tucker, C. H.	0	5	0
Turner, W. S.	0	10	6
Twemlow, Richard	0	10	6
Vernon, A.	0	2	6

Manchester—continued.

	£	s.	d.
Walton, D.	0	2	6
Waugh, J. (Salford)	0	5	0
Wealthall, Alfred	0	10	6
West, Thomas	0	5	0
Westmacott, George H.	0	10	6
Wheeldon, James	0	5	0
Whitaker, T.	0	5	0
Whittaker, Ellis (Salford)	0	10	6
Whitfield, C. (Salford)	0	5	0
Wild, John	0	5	0
Wilkinson, George	0	5	0
Wilkinson, William	0	10	6
Williams, J. B.	0	15	6
Wood, G. E.	0	5	0
Woolley, Sons and Co.	5	5	0
Wright and Barnaby	1	1	0
Yates, Ebenezer	0	5	0

Mansfield.

Adams, Benjamin	1	1	0

March.

Davies, P. H.	0	5	0
Vawser, Jesse	0	5	0

Margate.

Baily, John	0	10	6
Candler, Joseph T.	0	10	6
Gale, Henry	0	10	6
Harvey, William S.	0	10	6
Pettman, R.	0	10	6
Stimpson, George	1	1	0
Wootton, Edward S.	0	10	6

Market Drayton.

Cooke, William	0	5	0
King, William George	1	1	0

Market Harborough.

Adams, H. G.	0	5	0
Bragg, W. B.	0	5	0
Deacon, Fanny E. (Fleckney)	0	5	0

Marton (New Zealand).

Wilton, M. H.	1	1	0

Maryport.

Cockton, John	0	5	0

Masham (Yorks).

Barker, Mathew M.	1	1	0

Mayfield.

White, Edward A.	0	5	0

Melbourne (Victoria).

Davies, E. C. J.	0	10	0
Plowman, Sidney	1	1	0
Woolnough, H. A.	0	10	6

Melton Mowbray.

Attenburrow, Jas.	0	5	0
Betts, W.	0	5	0
Gill, Josiah	0	5	0
Wing, G. N.	0	5	0

Mentone (France).

Gilson, C. B.	0	5	0

Middlesborough.

Buck, Thomas	0	5	0
Hume, William A.	0	10	0
Sowerby, R.	0	5	0
Taylor, H. H.	0	5	0
Taylor, William R.	0	5	0

Middlewich.

Holland, H.	0	5	0

Millom.

Roberts, John L.	0	2	6

Minchinhampton.

Simpkins, John	0	10	6

Mirfield (Yorks).

Crook, Charles	0	5	0

Monmouth.

Marsh, G. W. F.	0	10	6

Montrose.

Burrell, Thos.	0	10	0
Davidson, A.	0	5	0

Morpeth.

Davidson, T. R.	0	5	0
Marshall, G. T.	0	5	0
Schofield, F. E.	0	5	0

Morthoe.

	£	s.	d.
Compton, A.	0	10	6

Murrayfield (Midlothian).

	£	s.	d.
Baildon, H. B.	1	1	0

Mussoorie (India).

	£	s.	d.
Samuel, James B. and Edward	1	1	0

Nantwich.

	£	s.	d.
Manley, Henry (Aston)	0	2	6

Nelson.

	£	s.	d.
Collins, M. A.	0	5	0

Newark.

	£	s.	d.
Bennett, William	0	5	0
Cherrington, G. W.	0	5	0
Cooling, W. J.	0	10	6
Field, W. C.	0	5	0
Fisher, Harry	0	5	0
Foster, H. P.	0	5	0
March, William	0	5	0
Taylor, John, and Son	0	10	0

New Barnet.

	£	s.	d.
Young, Robert Fisher	0	10	6

New Brighton.

	£	s.	d.
Rose, Charles	0	5	0
Walker, Joseph	0	5	0

New Brompton (Kent).

	£	s.	d.
Willis, Henry J.	0	5	0

Newbury.

	£	s.	d.
Davis, Henry J.	0	5	0
Hickman and Metcalf	0	10	6
Pratt, Thomas H.	0	10	6

Newcastle Emlyn.

	£	s.	d.
Rees, D.	0	5	0

Newcastle-on-Tyne.

	£	s.	d.
Arrowsmith, L.	0	2	6
Bolan, John	0	10	6
Coates, John M.	0	10	6
Cormack, G.	0	5	0
Coxon, I.	0	2	6
Dean, E.	0	2	6
Forster, J. R.	0	5	0
Frater, G.	0	10	0
Gatward, O.	0	5	0
Ismay and Sons	0	10	6
Johnstone, W. H.	0	2	6
Marley, William	0	10	6
Martin, J.	0	5	0
Martin, N. H.	1	1	0
Matthews, J.	0	10	6
Owen, William	0	10	6
Oxen, D. H.	0	5	0
Park, F.	0	5	0
Proctor, Son and Clague	1	1	0
Proctor, William	0	5	0
Rheeder, T.	0	5	0
Richardson, Alexander	0	5	0
Roberts, J.	0	10	6
Spargo, H.	0	5	0
Stuart, Charles E.	0	10	6
Swan, J. W.	1	1	0
Ward, Benjamin	0	5	0
Watson, Mason	0	10	6
Weddell, G.	0	10	6
Wilkinson, T. T.	0	5	0
Wing, A. J.	0	5	0
Wright, Alfred	0	10	6

Newcastle-under-Lyme.

	£	s.	d.
Croydon, E. H.	0	10	6
Gould, J.	0	5	0
Heathcote, Thomas S.	0	10	6
Poole and Son	0	10	6

Newhaven (N.B.).

	£	s.	d.
Miller, Alexander S.	0	2	6
Noble, Alexander	0	2	6

Newhaven (Sussex).

	£	s.	d.
Granger, Harold	0	5	0

Newmarket.

	£	s.	d.
Barrow, Frank A.	1	1	0
Rogers and Co.	0	10	6

Newport (Isle of Wight).

	£	s.	d.
Millidge, Alfred	0	5	0
Shepperd, William J.	0	5	0

Newport (Mon.).

	£	s.	d.
Atkins, A. E.	0	5	0
Evans, David	0	5	0
Faulkner, H.	0	5	0
Garrett, T. P.	0	5	0
Gratte, Henry J.	0	5	0
Paine, Charles	0	10	6
Phillips, James W.	0	5	0
Seys, James A.	0	5	0
Smith, Albert	0	5	0
Young, John	0	10	6

Newport Pagnell.

	£	s.	d.
Taylor, F. W.	0	5	0

Newport (Salop).

	£	s.	d.
Picken, Thomas William	0	5	0

Newton Abbot.

	£	s.	d.
Stiling, John E.	0	10	6
Wright, W.	0	5	0

Newton Stewart.

	£	s.	d.
Keith, John	0	2	6

Newtown (Mont.).

	£	s.	d.
Morgan, Richard	0	10	6

Norbiton.

	£	s.	d.
Greenwood, J.	0	10	6

Northallerton.

	£	s.	d.
Fairburn, Joseph	0	10	6
Squince, J. A.	0	5	0

Northampton.

	£	s.	d.
Ashford, Evan Charles	0	5	0
Barry, James	1	1	0
Bingley, John	0	10	6
Clower, John	0	5	0
Kirby, Frederick	0	5	0
Mayger, William D.	0	10	6
Negus, Samuel T.	0	5	0
Sindall, J. W. (Executors of)	0	2	6

Northfleet.

	£	s.	d.
Lucas, Joseph M. M.	0	5	0

North Kelsey (Lincs).

	£	s.	d.
Dixon, James	0	6	8

North Walsham.

	£	s.	d.
Bailey, George Wm.	0	5	0

Northwich.

	£	s.	d.
Clough, John	0	10	0
Deakin, J. W.	0	5	0
Humphreys, Griffith	0	5	0
Lee, William	0	5	0

Norwich.

	£	s.	d.
Betts, George	0	10	6
Caley, Albert J.	0	10	6
Corder, Edward	0	10	6
Corder, Octavius	1	1	0
Cossey, John	0	5	0
De Carle, H. E.	0	5	0
Eldridge, J. H.	0	5	0
Gardiner, W.	0	5	0
Hayhoe, W.	0	5	0
Heaver, Arthur W.	0	5	0
King, H. A.	0	5	0
Mallett, H. P.	0	5	0
Mason, Philip H.	0	10	6
Nuttall, Edwin	0	10	6
Pitts, W. C.	0	5	0
Robinson, James	0	5	0
Smith, Joseph de Carl, jun.	0	10	6
Squirrell, M. P.	1	1	0
Sutton, Francis	0	10	6
Taylor, H. E.	0	5	0
Thompson, H.	0	5	0
Watson, J. E. H.	0	10	6

Nottingham.

	£	s.	d.
Dadley, Elijah	0	10	6
Edgson, Hugh	0	10	6
Fletcher, Thomas B.	0	5	0
Flowerdew, W. C.	0	2	6
Lumby, Fred.	0	5	0
Manfull, H. J.	0	5	0
Middleton, A.	0	5	0
Newball and Mason	1	1	0
Parker, W. H.	0	10	0
Pearson, Edward	1	1	0
Rayson, J. T.	0	5	0
Robinson, Joseph	0	5	0
Shippam, Henry	0	2	6
Smithurst, John	0	5	0
Taylor, Thomas C.	0	10	6
Watkinson, Thos.	0	10	6

Nuneaton.

	£	s.	d.
Iliffe, George	0	5	0
Lester, Henry	0	5	0

Oban (N.B.).

	£	s.	d.
Lawrence, S.	0	5	0
Robertson, A.	0	2	6

Odiham.

	£	s.	d.
Woodman, George	0	5	0

Oldbury.

	£	s.	d.
Homes, Joseph P.	0	5	0

Oldham.

	£	s.	d.
Andrew, J. H.	0	2	6
Bagshaw, Henry B.	0	10	6
Bagshaw, William	0	10	6
Bates, Henry	0	10	6
Bates, Hiram	0	5	0
Berry, Thomas	0	5	0
Braddock, George	1	1	0
Brelsford, James	0	10	6
Geddes, William	0	5	0
Glover, J.	0	2	6
Hargraves, H. L.	0	10	6
Haslop, William	0	5	0
Hurst, James	0	5	0
Inglis, W. K.	0	2	6
Lees, James	0	2	6
Lord, Robert B.	0	5	0
Tomlinson, A. G.	0	5	0
Wilson, Alexander G.	0	5	0

Old Radford.

	£	s.	d.
Bully, A. E.	0	5	0

Oswestry.

	£	s.	d.
Evans, John	0	5	0
Roberts, William Carey	0	2	6
Smale, Mary E.	0	5	0
Smale, Richard B.	0	5	0
Vaughan, David	0	5	0

Otley (Yorks).

	£	s.	d.
Lockwood, T.	0	5	0
Pratt, Richard M.	0	10	6

Oxford.

	£	s.	d.
Bloxham, W. E.	0	5	0
Clayton, C.	0	2	6
Court, G. F.	0	5	0
Druce, George C.	0	10	6
Hill, James H.	0	5	0
Jenkins, Alexander	0	5	0
Prior, George T.	0	10	6
Squire, James	0	5	0
Thurland, Henry	0	10	6
Walsh, Edward	0	10	6

Paignton.

	£	s.	d.
Riches, F. F.	0	2	6
Riches, T.	0	5	0
Sherriff, George	0	5	0

Paisley.

	£	s.	d.
MacCowan, R. T.	0	5	0

Partick (N.B.).

	£	s.	d.
McNicol, John	0	5	0
Rait, Robert C.	0	10	6

Pau (France).

	£	s.	d.
Jarvis, John	1	1	0

Paulton (Somerset).

	£	s.	d.
Bush, Thomas	0	5	0

Pembroke Dock.

	£	s.	d.
Bowling, J. H.	0	2	6
Laen, William	0	5	0

Pendleton.

	£	s.	d.
Jeans, Thomas R.	0	5	0
Robinson, B.	0	5	0

Penrith.

	£	s.	d.
Redfern, Tom	0	10	0

Penzance.

	£	s.	d.
Buckett, A. H.	0	5	0
Shakerley, Benjamin	0	5	0
Symons, N. H.	0	5	0

Pershore.

	£	s.	d.
Smith, Arthur W.	0	5	0

Perth.

	£	s.	d.
Donald, David	0	7	6

	£	s.	d.
Peterborough.			
Bloodworth, Thomas	0	2	6
Bodger, J. W.	0	2	6
Booth, Samuel	0	2	6
Bright, Richard H. D.	0	2	6
Carlton, Arthur	0	10	6
Dye, C. P.	0	2	6
Heanley and Saunders	0	10	6
Knight, W. T.	0	10	6
Pearson, John H.	0	5	0
Sturton and Sons	0	10	6
Turner, R. P.	0	2	6
Whitwell, Ewen	0	5	0
Petersfield.			
Nichols, Frederic B.	0	5	0
Petworth.			
Edgar, F. G.	0	5	0
Pinner.			
Wilkinson, T.	1	1	0
Plymouth.			
Adams, W. T.	0	5	0
Allen, Joseph	0	10	6
Bailey, John H.	0	5	0
Balkwill, A. P.	2	2	0
Barge, John	0	2	6
Cocks, James	0	5	0
Foster, F. H.	0	10	0
Goodwin, Medmer	0	10	6
Hearder, H. P.	0	10	6
Hetherington, A. H.	0	5	0
Hunt, F. W.	0	10	6
Luke, R. S.	0	5	0
Maitland, F.	0	5	0
Maurice, James	2	2	0
Park, Charles J.	0	10	6
Roper, R. F.	0	5	0
Sloggett, Thomas C.	0	5	0
Turney, Samuel B.	0	5	0
Weary, C. T.	0	5	0
Woods, W. H.	0	5	0
Woods, William	1	1	0
Pocklington.			
Boyden, John A. C.	0	2	6
Pontefract.			
Bratley, William	0	5	0
Hodgson, George	0	5	0
Pontlottyn.			
Roberts, W.	0	5	0
Pontypool.			
Ford, Edward B.	0	10	6
Pontypridd.			
Arnott, Daniel	0	2	6
Cule, Taliesin	0	10	6
Jones, J. P.	0	10	6
Prothero, G. R.	0	2	6
Poole.			
Atkins, T. W.	0	5	0
Pomeroy, F. T.	0	5	0
Port Elizabeth (Cape Colony).			
Willet, John A.	0	10	6
Porth.			
Davies, Thomas	0	5	0
Evans, Mrs. Annie	0	5	0
Porthcawl.			
Thomas, J. J.	0	5	0
Portland.			
Childs, Joseph L.	0	5	0
Porto Alegre (Brazil).			
Hallawell, J.	1	1	0
Portobello.			
Nesbit, John	1	1	0
Portsmouth.			
Bailey, H. H.	0	2	6
Brewis, T.	0	5	0
Mumby, Charles and Co.	1	1	0
Portsoy.			
Clark, James	0	2	6
Port Talbot.			
Loveluck, G. D.	0	2	6
Williams, Moses	0	5	0
Poulton-le-Fylde (Lancs.).			
Blade, E.	0	5	0
Preston.			
Arkle, C. A.	0	2	6
Parker, Thomas	0	5	0
Pemberton, William	0	2	6
Sharples, George	0	5	0
Ramsey (Hunts.).			
Palmer, Frederick W.	0	10	6
Ramsgate.			
Franks, Alfred	0	5	0
Morton, Henry	0	5	0
Pavey, H. J.	0	5	0
Puckey, W.	0	5	0
Saunders, Charles J. H.	0	2	6
Thomas, H.	1	1	0
Reading.			
Bradley, Charles	0	10	6
Butler, B. H.	0	5	0
Cardwell, E.	0	10	6
Cave, J. R.	0	2	6
Coles, S. J.	0	5	0
Craft, James	0	5	0
Cross, John	0	2	6
Hayward, S.	0	2	6
Hayward William G.	0	5	0
Knowles, J. H.	0	5	0
Rowell, John C.	0	5	0
Tunbridge, Frederick	0	5	0
Young, J. M. (Theale)	0	5	0
Redditch.			
Moule, William	0	5	0
Redhill.			
Ralling, Ernest L.	0	10	6
Sillitoe, F. S.	1	1	0
Reepham.			
Cripps, Johnson	0	10	6
Reigate.			
Sargant, J.	0	10	6
Retford.			
Baker, William	0	10	6
Westbrook, Dr. C.	1	1	0
Rhyl.			
Lawrence, George R.	1	1	0
Rhymney.			
Dixon, Franklin	1	1	0
Richmond (Surrey).			
Bletsoe, John	0	10	6
Hornby, Alfred	0	10	6
Melvin, G.	0	2	6
Mumbray, R. G.	0	10	6
Thacker, William	1	1	0
Ripon.			
Parkin, J. B.	0	10	6
Thornley, F.	0	5	0
Rochdale.			
Bamford, J. W.	0	5	0
Hadfield, James	0	5	0
Highley, William	0	5	0
Kerr, William	0	2	6
Mason, Arthur	0	5	0
Partington, William	0	2	6
Porter, T.	0	5	0
Taylor, Edward	0	5	0
Whittaker, J. W.	0	2	6
Wood, John	0	2	6
Rochester.			
Brown, A. H.	0	2	6
Brown, Hugh S. F.	0	2	6
Cowan, Frank	0	5	0
Hewitt, Joseph S.	0	5	0
Watts, G. W.	0	5	0
Rochford.			
Harrington, A. L.	0	2	6
Rock Ferry.			
Dutton, H. O.	1	1	0
Roehampton.			
Swain, James	0	5	0
Rome.			
Barrass, T. E.	0	5	0
Romford.			
Lasham, John W.	0	10	6
Ross.			
Matthews, T. A.	0	5	0
Rothbury.			
Farrage, Robert	0	10	6
Rotherfield.			
Field, William	0	5	0
Rotherham.			
Bradshaw, C. H.	1	1	0
Horsfield, J. M.	0	5	0
Rothesay.			
Duncan, William	0	5	0
Macintosh, Archibald	0	5	0
Rugby.			
Clerke, W. B.	0	5	0
Ruthin.			
Magin, Arthur E.	0	2	6
Rouw, T. J.	0	5	0
Ryde (Isle of Wight).			
Dixon, Henry	0	10	6
Gibbs, William	0	10	6
Pollard, Henry H.	0	10	6
Smith, Tenison	0	10	6
Smith, William	0	5	0
Rye (Sussex).			
Horrell, W. H. D.	0	2	6
Waters, William A.	0	10	6
Saffron Walden.			
Hutchin, W. F.	0	5	0
Machon, H.	0	15	6
St. Albans.			
Allenby, Henry	0	2	6
Ekins, Arthur E.	0	10	6
St. Andrews.			
Bruce, A. K.	0	10	6
Govan, Alexander	0	10	6
Kirk, John J.	0	2	6
St. Austell.			
Bice, James	0	5	0
St. Bees.			
Broomfield, R. W.	1	1	0
St. Clears.			
Johns, John	0	2	6
Williams, Evan	0	10	6
St. Davids.			
David, Albert	0	2	6
St. Day.			
Corfield, Charles	0	10	6
St. Helens.			
Cotton, J. C.	0	10	6
Harrison, James	0	5	0
Sherlock, Thomas	0	5	0
St. Just.			
Wearing, John	0	2	6
St. Leonards. See Hastings.			
St. Neots.			
Mellor, J. G.	0	5	0
Wise, James	0	5	0
Sale.			
Smith, Allen	0	5	0
Salisbury.			
Atkins, Samuel Ralph	1	1	0
Atkins, William R.	0	10	6
Hardy, R. E.	0	5	0
King, L. W.	0	5	0
Newton, J. W.	0	10	6
Orchard, E. J.	0	10	6
Rowe, J.	0	5	0
Saltash.			
Mathew, William H.	0	5	0
Saltburn-by-the-Sea.			
Taylor, William	0	10	6
Sandbach.			
Gee, G. H.	0	2	6
San Remo (Italy).			
Squire, Frank R.	1	1	0
Sandgate.			
Jenner, William M.	0	5	0
Kennett, E.	0	2	6
Sandown (Isle of Wight).			
Cocksedge, H. B.	0	10	6

Sandwich.

	£	s.	d.
Baker, Frank	0	10	6
Dixon, William (Ash)	0	5	0
Woodruff, A. E. (Eastry)	0	5	0

Scarborough.

Chapman, Henry	0	10	6
Clare and Hunt	1	1	0
Cuttle, Arthur E.	0	2	6
Hill, R. M.	0	2	6
Hughes, John E.	0	10	6
Jones, Alfred	0	5	0
Jones, C.	0	2	6
Simms, R. J.	0	2	6
Smith, John F.	0	5	0
Whitfield, John	1	1	0

Seacombe.

Hinkley, E.	0	2	6
Holt, Richard W.	0	5	0

Seaham Harbour.

Storey, W.	0	5	0

Seaton.

Skinner, A. J. P.	0	5	0

Selkirk.

Dunn, Thomas	0	5	0

Settle.

Shepherd, J. W.	0	10	

Shanklin (Isle of Wight).

Brown, Andrew Henry	0	10	6
Deeks, W. T.	0	10	6

Sheepshed.

Moore, Thomas	0	5	0

Sheerness.

Hills, William	0	2	6
Prosser, David	1	1	0
Rayner, William	0	5	0

Sheffield.

Basker, J. P.	0	2	6
Bonnett, F.	0	2	6
Bradwall, J. H.	0	5	0
Carr, George	0	5	0
Clayton, William	0	10	6
Cubley, G. A.	0	10	6
Dobb, J. T.	0	10	6
Dunnill, G. H.	0	5	0
Eardley, J. F.	0	5	0
Ellinor, George	0	10	6
Elliott, John G.	1	0	0
Eyre, S.	0	5	0
Fox, A. R.	0	10	6
Froggatt and Son	0	5	0
Furness, Joseph M.	0	5	0
Grierson, G. A.	0	5	0
Harrison, Thomas M.	0	5	0
Hewitt, J. P.	0	5	0
Ibbitt, H. E.	0	2	6
Jepson, Xeno	0	2	6
Lowe, S. P.	0	5	0
Marshall, J.	0	5	0
Miller, John T.	0	5	0
Miner, M. T.	0	2	6
Morrison, C. O.	0	5	0
Newsholme, G. T. Wilkinson	1	1	0
Owen, W.	0	5	0
Preston, Job	0	10	6
Priestley, Henry	0	10	6
Radford, Charles	0	5	0
Reckless, W.	0	10	6
Salisbury, John M.	0	10	6
Stevenson, W.	0	5	0
Turner, J.	0	5	0
Ward, William	0	10	6
Watson, H. G.	0	5	0
Watson, Robert W.	0	10	6
Watts, J.	0	5	0
Wiles, Edwin	0	5	0

Shepton Mallet.

Fudgé, Charles William	0	5	0

Shields, North.

Burn, Thomas	0	2	6
Gibson, James	0	10	6
Hogg, Joseph F.	0	2	6
Irvin, W. G.	0	2	6
Kirkness, R.	0	5	0

Shields, South.

Forrest, Robert	0	10	6
Noble, John	0	5	0
Walker, James	0	2	6

Shrewsbury.

	£	s.	d.
Adams, William	1	1	0
Blunt, T. P.	1	1	0
Cross, A. R.	0	5	0
Cross, William G.	3	3	0
Gouldbourn, William	0	10	6
Pattison, H.	0	5	0
Perkins, Christopher	0	5	0
Pyefinch, John	0	5	0
Salter, Benjamin	1	1	0
Salter, Joseph B.	1	1	0

Sidmouth.

Chessall, Rowland	0	5	0

Silverdale.

Wilson, Edward	0	5	0

Sittingbourne.

Cocking, T. S.	0	5	0
Gordelier, William G.	1	1	0

Sleaford.

Harrison, T. E.	0	5	0
Spyvee, W.	0	2	6
Wood, J. R.	0	5	0

Slough.

Elliman, Sons and Co.	1	1	0
Griffith, Richard	0	10	6

Smallthorne.

Fletcher, Thomas	0	10	6

Snaith.

Bean, John	0	10	6

Southam.

Archer, Thomas	0	2	6

Southall (Middlesex).

Diggens, E. D.	0	5	0

Southampton.

Alderslade, W.	0	5	0
Bates, William	0	5	0
Bishop, Samuel	0	5	0
Borchert, Heinrich T. G.	1	1	0
Chipperfield, R.	1	11	6
Dawson, Oliver R.	0	10	6
Fletcher, J. B. (Totton)	0	5	0
Hughes, J. H.	0	5	0
Madge, James C.	0	10	6
Mumford, Alfred	0	10	6
Randall, William B.	1	1	0
Rubie, J. T.	0	5	0
Spearing, James	0	10	6
Wedge, George D.	0	2	6

Southend.

Dawson, George R.	0	5	0
Wright, Mrs. G.	0	10	6

South Molton.

Swingburn, Richard H.	0	10	6

Southport.

Adams, C. M.	0	5	0
Ashton, William	1	1	0
Ball, Henry	0	5	0
Elliott, Stephen J.	0	2	6
Gill, Hugh	0	5	0
Gillett, Mrs.	0	5	0
Hay, David	0	5	0
Horsefall, John	0	10	6
Mainwaring, R.	0	10	6
Merchant and Co.	0	5	0
Neame, H. A.	0	2	6
Radley, William V.	0	10	6
Righton, James	0	10	6
Round, Frederick	1	1	0
Surr, Edward	0	10	6
Whitworth, James	0	10	6
Wilding, G. J.	0	10	6
Wimpenny, James M.	0	5	0
Winter, William	0	10	6

Southsea.

Callaway, L.	0	10	6
Childs, James L.	0	10	6
Cruse, Thomas H.	1	1	0
Deacon, F. G.	0	5	0
Ford, H. S.	0	5	0
Gossling, W. R.	0	5	0
Sangster, John G.	0	5	0
Trist, R.	0	5	0

South Stockton.

Ronchetti, T. A.	0	5	0

Southwell.

	£	s.	d.
Downing, J. H.	0	10	0

Southwold.

Critten, Robert P.	0	2	6

Spalding.

Bell, E. W.	0	5	0
Branston, J. W.	0	5	0
Donington, R.	0	5	0
Steeper, Samuel	0	5	0

Spennymoor.

Burdon, Thomas A.	0	5	0

Spilsby.

Rainey, J. J.	0	5	0

Stafford.

Averill, Henry Alcock	0	10	6
Averill, John	0	10	6
Spilsbury, James	0	5	0
Viggars, G. D.	0	2	6

Stamford.

Dickinson, Frederick	0	10	6
March, Frederick	0	5	0

Stevenage.

Fresson, Lewis Francis	0	10	6

Stockport.

Arnfield, J. C.	0	5	0
Dodge, William	0	10	6
Johnson, Thomas J.	0	5	0
Kay Brothers	2	2	0
Orton, W. B.	0	5	0
Sidley, Thomas I.	0	10	6
Towle, Samuel	0	2	6

Stockton-on-Tees.

Bainbridge, Robert R.	0	2	6

Stoke Ferry.

Newsam, W. H.	0	5	0

Stoke-on-Trent.

Adams, Frank	0	10	6
Adams, William H.	0	10	6
Guest, George C.	0	2	6
Harris, Robert H.	0	5	0
Jones, John	0	10	0
Smith, Arthur H.	0	10	6
Wilson, Clement Fisher	0	10	6

Stoke (Surrey).

Ratheram, William	0	5	0

Stone (Staffs).

Slater, Thomas	0	10	6
Slater, Thomas, jun.	0	5	0

Stonehouse (Devon).

Davey, H. D.	0	2	6
Netten, Henry J. T.	0	5	0

Stony Stratford.

Cox, Julia Jane	0	10	6
Robinson, William H.	0	10	6

Stourbridge.

Biggs, F. W.	0	2	6
Burgess, William	0	5	0
Loverock, Henry	0	5	0
Selleck, W. R.	0	5	0

Stourport.

Twinberrow, J.	0	10	0

Stowmarket.

Gostling, George J.	1	1	0
Simpson, Robert G.	0	5	0
Wilson, Thomas	0	5	0

Stradbroke.

Foulsham, Harry B.	0	5	0

Stratton.

Pickard, Henry	0	5	0

Strood.

Picnot, Charles	1	1	0

Stroud.

Coley, Samuel J.	0	10	6

Sunbury-on-Thames.

Price, J.	0	5	0

Sunderland.

Aslin, John	0	5	0
Aslin, William	0	2	6

Sunderland—continued.	£	s.	d.
Bowman, S.	0	2	6
Fairman, George P.	0	10	6
Harrison, John	0	10	6
Harrison, W. B.	0	5	0
Mitchinson, John	0	5	0
Ranken, Charles	0	5	0
Scott, W.	0	5	0
Surbiton.			
Arfield, William	0	5	0
Lowe, Charles	0	10	6
Sutton (Cheshire).			
Dangerfield, W. H.	0	5	0
Sutton-in-Ashfield.			
Briggs, G. W.	0	5	0
Swaffham.			
Bell, Frederick R.	0	5	0
Christopherson, Fred	0	5	0
Finch, Jacob	0	10	6
Swansea.			
Atkins, John	0	5	0
Davies, J. M.	0	5	0
Davies, John (31, High Street)	0	5	0
Davies, John (75, Oxford Street)	0	2	6
Davies, John (Walters Road)	0	10	6
Davies, William	0	5	0
Evans, D.	0	2	6
George, William	0	10	6
Grose, Nicholas M.	1	1	0
Hughes, James	0	5	0
Jones, Moses	0	10	6
Keall, F. P.	0	10	6
Lloyd, John W.	0	5	0
Lowther, H. R.	0	5	0
Rees, Daniel	0	5	0
Richards, J.	0	5	0
Roberts, J. K.	0	5	0
Thomas, L.	0	5	0
Trick, M.	0	5	0
Williams, J. T.	0	10	6
Yorath, C.	0	5	0
Swindon.			
Green, John	0	5	0
Tarporley.			
Aston, Walter	0	5	0
Taunton.			
Copestake, H. H.	0	5	0
Hambly, Charles J.	0	5	0
Kirkpatrick, Mrs.	0	5	0
Tavistock.			
Doble, H. T.	0	5	0
Gill, William	0	2	6
Teignmouth.			
Cocking, Frederick J.	0	5	0
Evans, Joseph J. O.	0	5	0
Maunder, William	0	5	0
Tenbury.			
Slade, John	0	10	6
Tenby.			
Davies, Moses P.	0	5	0
James, George	0	5	0
Williams, William	0	10	6
Tewkesbury.			
Barlow, G. R.	0	2	6
Wilkes, D. T. (Bredon)	0	2	6
Thame.			
Tame, Thomas	0	5	0
Thirsk.			
Ayre, George	0	10	6
Ayre, Henry	0	2	6
Thornhill (N.B.).			
Fingland, James	0	5	0
Thornton Heath.			
Knott, Samuel	0	5	0
Thrapston.			
Pars, R. C.	0	10	6
Ticehurst.			
Corke, Edward	0	10	6
Titchfield.			
Smith, W. O.	0	10	6

Tiverton.	£	s.	d.
Havill and Son	0	5	0
Rossiter, Thomas E.	0	5	0
Tritton, C. E.	0	5	0
Todmorden.			
Maddock, H.	0	5	0
Stevenson, W.	0	2	6
Topsham.			
Ellis, Frederick	0	2	6
Torquay.			
Bathe, William	0	5	0
Bridgman, William Louis	0	5	0
Cocks, John W.	0	5	0
Guyer, James B.	0	10	6
Horton, Thomas	0	5	0
Knight, Benjamin	0	5	0
Moon, G. W.	0	5	0
Ness, Thomas H.	0	5	0
Shapley, Charles	0	10	6
Sloman, Richard	0	10	6
Stammwitz, Louisa	0	10	6
Taylor, John	0	10	6
Tomlin, J. P.	0	5	0
Waymouth, T. S.	0	5	0
Totnes.			
Butland, Charles	0	5	0
Cooke, E. H.	0	2	6
Morse, C. H. Stafford	0	5	0
Tredegar.			
Phillips, Charles L.	0	10	6
Tregaron.			
Jones, T.	0	2	6
Truro.			
Anstey, J. U.	0	5	0
Bucher, W. H.	0	5	0
Feaver, Samuel	0	13	0
James, Hamilton	0	5	0
Percy, Thomas B.	0	10	0
Tunbridge.			
Millidge, Thomas E.	0	10	6
Wardley, S. F.	0	10	6
Tunbridge Wells.			
Arnold, Spencer	0	10	6
Batting, Thomas G.	0	10	6
Cheverton, George	1	1	0
Dunkley and Rogers	1	1	0
Howard, George W.	0	10	6
Howard, Richard	0	10	6
Sells, Robert J.	0	10	6
Thompson, G. A.	0	5	0
Wells, A. J.	0	5	0
Whitrow, Benjamin	0	10	0
Williams, James	0	10	6
Tunstall.			
Keightley, Joseph	0	5	0
Tutbury.			
Green, Isaac	0	5	0
Twickenham.			
Alexander, William	0	5	0
Bishop, Thomas	1	1	0
Peake, Henry F.	0	5	0
Shelley, Henry	0	10	6
Tynemouth.			
Atkinson, Joseph	0	5	0
Uckfield.			
Farr, E. H.	0	10	6
Ulverston.			
Willan, Robert	0	10	6
Upton-on-Severn.			
Gibbs, John	0	10	6
Urmston.			
Duncalf, Richard	0	5	0
Uttoxeter.			
Woodward, H.	1	1	0
Woolrich, Charles B.	0	10	6
Ventnor (Isle of Wight).			
Littlefield, J. W.	1	1	0
Nicholls, A. L.	0	2	6
Smith, C. A.	1	1	0
Weston, Charles	1	1	0

Wadebridge.	£	s.	d.
Philp, J.	0	5	0
Wakefield.			
Cardwell, James	0	5	0
Chaplin, John Lambert	0	10	6
Duffin, Thomas	0	10	6
Moorhouse, Walter	0	5	0
Pollard, William	0	5	0
Saville, George	0	10	6
Smith, G. E.	0	10	6
Thornton, E.	0	5	0
Wice, J. H.	0	10	6
Wallingford.			
Ashmall, George	0	5	0
Payne, Sidney	1	1	0
Upton, Eustace J.	0	10	6
Wallington.			
Knowles, R.	0	5	0
Wood, Edward	0	10	6
Walmer.			
Wood, Henry	0	5	0
Walsall.			
Bayley, C.	0	10	6
Elliott, George	0	5	0
Grove and Son	0	5	0
Morris, J. O.	0	5	0
Thorp, J.	0	2	6
Walsham-le-Willows.			
Harrington, Arthur	0	5	0
Waltham Abbey.			
Griffiths, J. M.	0	10	6
Marshall, A.	1	1	0
Walton-on-Thames.			
Power, William	0	5	0
Ware.			
Medcalf, Benjamin	0	10	6
Medcalf, Benjamin Pearce	0	10	6
Wareham.			
Harman, E. S.	0	5	0
Marshallsay, R. J.	0	5	0
Randall, Thomas	0	10	6
Warrington.			
Young, John R.	0	10	0
Watchet.			
Daymond, Samuel	0	2	6
Watford.			
Chater, Edward M.	1	1	0
Chater, Matthew Taylor	1	1	0
Cottle, Alfred James	0	5	0
Curtis, H. E.	0	5	0
Maries, H. D.	0	5	0
Parrott, W. S.	0	10	6
Wath-upon-Dearne.			
Hick, Allan	0	10	6
Watton.			
Pechey, T. P.	0	5	0
Vincent, Lacey A.	0	10	6
Weaverham.			
Manifold, John J.	0	10	6
Wednesbury.			
Gittoes, Samuel J.	0	10	6
Wellingborough.			
Smith, John T.	0	2	6
Wellington (New Zealand).			
Ridd, A. H.	0	2	6
Wellington (Somerset).			
Gregory, Walter	0	5	0
Windeatt, G. J.	0	5	0
Wells (Norfolk).			
Ruttip, Robert R.	0	10	6
Wells (Somerset).			
Manning, Richard James	0	10	6
Slater, Jonathan	0	5	0
Welshpool.			
Griffiths, Thomas	0	5	0
Welton.			
Myers, George Henry	0	5	0

Falkirk.	£	s.	d.
Lyon, Thomas	0	5	0
Murdoch, David	0	10	6
Falmouth.			
Newman, Walter F.	0	5	0
Solomon, W. H.	0	10	6
Fareham.			
Batchelor, Alfred E.	0	5	0
Batchelor, Charles	0	5	0
Franklin, Alfred	0	10	6
Faringdon.			
Davis, G. A.	0	2	6
Farnham.			
Cullingford, L. J.	1	1	0
Griffith, J.	0	10	6
Felixstowe.			
Squirrell, Miss C. O.	2	2	0
Fenton.			
Knight, Jesse	0	5	0
Massey, Stephen	0	5	0
Ferry Hill.			
Hunter, H.	0	2	6
Flint.			
Jones, O. W.	0	5	0
Folkestone.			
Bishop, E. J.	0	10	6
Goodliffe, George	0	10	6
Harwood, Charles	0	5	0
Lea, Frederick J.	0	5	0
Lea, John	0	10	6
Stainer, John	0	10	6
Folkingham.			
Carter, Mrs.	0	2	6
Fordingbridge.			
Haydon, Frederick W.	0	5	0
Forfar.			
Fowler, G. R.	0	5	0
Ranken, James A.	0	5	0
Ranken, John	0	5	0
Fortune's Well.			
Grant, Donald	0	5	0
Foulsham.			
Maddison, Mary	0	5	0
Fraserburgh.			
Burnett, Robert	0	5	0
Gainsborough.			
Forrest, Richard Wm.	0	10	6
Garstang.			
Thomas, J. J.	0	5	0
Gateshead-on-Tyne.			
Elliott, Robert	0	10	6
Greenwell, William C.	0	5	0
Weddle, W.	0	10	6
Glasgow.			
Brodie, Robert	0	5	0
Clarke, Joseph A.	0	5	0
Currie, John (Eglinton Street)	0	5	0
Currie, John (Sauchiehall Street)	0	5	0
Currie, W. L.	0	5	0
Dickie, James	0	5	0
Dunlop, Thomas	0	5	0
Fenwick, John	0	5	0
Foster, John	0	10	6
Frazer, Daniel	1	1	0
Garry, George	0	2	6
Glasgow Apothecaries' Co.	1	1	0
Glen, Robert	0	5	0
Greig, William	0	10	6
Harrower, Peter	0	5	0
Henderson, John	0	5	0
Jaap, John	0	10	6
Kinninmont, Alexander	1	1	0
Lambie, Hugh	0	5	0
Laurence, John	0	10	6
McMillan, John	1	1	0
Neil, J.	0	5	0
Paterson, A.	0	5	0
Rose, Alexander	0	10	6
Thomson, William	0	5	0
Whitelaw, James	1	1	0

Gloucester.	£	s.	d.
Foulkes, W. H.	0	10	6
Franklin, James	0	5	0
Hughes, Evan G.	0	5	0
Jenkins, Henry	0	5	0
Meadows, Henry	0	10	6
Sadleir, John	0	10	6
Stafford, William	0	10	6
Trigg, James W.	0	5	0
Ward, Joseph	0	10	6
Godalming.			
Mather, J. H.	0	10	0
Gorton.			
Plant, Frank G. L.	0	5	0
Gosforth.			
Gaitskell, James	0	5	0
Gosport.			
French, Benjamin	0	5	0
Govan.			
Skinner, John	0	5	0
Graaff Reinet (Cape Colony).			
Rivett, A. J.	0	10	6
Grantham.			
Bishop, William	0	2	6
Fisher, F. D.	0	5	0
Gamble, Arthur	0	5	0
Hall, R. Arnold	0	10	6
Hunt, Thomas	0	5	0
Welborn, George	0	2	6
Whysall, William	0	10	6
Gravesend.			
Clarke, Richard F.	1	1	0
Reid, C. Stuart	0	2	6
Sharp, S.	0	5	0
Wiseman, E.	0	2	6
Grays (Essex).			
Kirby, Samuel John	0	5	0
Great Bedwyn.			
Gerard, George R.	0	10	6
Great Grimsby.			
Barker, William	0	5	0
Cook, Robert, jun.	0	5	0
Mason, William D.	0	2	6
Robinson, Jonathan Scott	0	2	6
White, J. C.	0	2	6
Willey, W.	0	5	0
Guernsey.			
Nickolls, J. B.	0	5	0
Guildford.			
Beck, J. W.	0	5	0
Jeffries, Henry	1	1	0
Martin, Edward W.	0	10	6
Thompson, Thomas	0	5	0
Wheeler, Frederick	0	5	0
Guisborough.			
Fairburn, Robert W.	0	5	0
Haddington.			
Gardiner, D.	0	5	0
Watt, James and J.	0	10	6
Halesworth.			
Gostling, John H.	0	5	0
Halifax.			
Brook, Robert	0	10	6
Dyer, William	0	5	0
Jessop, Jonathan	0	5	0
Seely, H. W.	0	2	6
Swire, Jabez	0	5	0
Halstead.			
Marlar, John F.	0	2	6
Hampton Wick.			
Miller, C. S.	0	5	0
Hanley.			
Cornwell, T. C.	0	5	0
Furnival, John D.	0	10	6
Moore, John William	0	5	0

Hanwell.	£	s.	d.
Kirkham, Frank	0	2	6
Harleston.			
Fisher, W. H.	0	10	6
Woods, Charles	0	5	0
Harrogate.			
Davis, Richard H.	0	10	6
Greenwood, Charles	0	10	6
Greenwood, John	0	10	6
Potter, Charles	0	5	0
Reynolds, Freshfield	0	10	6
Wilson and Son	1	1	0
Wood, A. W.	0	5	0
Harwich.			
Bevan, Charles F.	0	10	6
Harding, Joseph	0	10	6
Worts, Augustine	0	5	0
Haslingden.			
Blayney, Joseph J.	0	5	0
Hastings and St. Leonards.			
Bathe, R. S.	0	10	6
Beck, Albert N.	0	5	0
Bolton, Thomas	0	5	0
Brooker, Algernon	0	5	0
Brooks, Frederick	0	5	0
Crisford, F. J.	0	2	6
Croasdale, J. C.	0	2	6
Feaver, John	0	10	6
Hasselby, E. H.	0	5	0
Jameson, W. E.	1	1	0
Jenner, H. A.	0	5	0
Keyworth. G. A.	0	10	6
Lemmon, G. F.	0	2	6
MacKenzie, C. A.	0	2	6
Maggs, F. W.	0	5	0
Maggs, Samuel B.	0	10	0
Neve, Francis C.	0	10	0
Rossiter, Frederick	0	10	6
Snowdon, Robert	0	5	0
Tharle, C. A.	0	10	6
Tree, Frederick	0	2	6
Tully, John	0	5	0
Vint, Thomas D.	0	5	0
Haverfordwest.			
Jenkins, Jabez (Lysyfrân)	0	5	0
Saunders, Charles P.	0	5	0
Saunders, David P.	0	10	6
Hawick.			
Craig, John	0	5	0
Kennedy, D.	0	10	0
Maben, Thomas	1	1	0
Turnbull, W. S.	0	5	0
Hay.			
Davies, John Lutwyche	0	5	0
Hayle.			
Williams, J. H.	0	5	0
Heaton Chapel.			
Thorp, John	1	1	0
Hebden Bridge.			
Hey, David	0	10	6
Hey, Thomas K.	0	10	6
Heckington.			
Sumners, Michael Cole	0	5	0
Heckmondwike.			
Booth, John	1	1	0
Stead, Walter	0	5	0
Helensburgh.			
Harvie, George	0	5	0
McMurray, J.	0	5	0
Smith, Walter	0	5	0
Helmsley.			
Allenby, W.	0	5	0
Helston.			
Wakeham, Charles	0	5	0
Hemel Hempstead.			
Argue, James	0	5	0
Ellis, C. J.	0	2	6
Henley-on-Thames.			
Batchelor, C. J. H.	0	5	0

Hereford.	£	s.	d.
Guy, E.	0	5	0
Haines, W. E.	0	5	0
Jackson, J. J.	0	10	6
Pearmund, H. S.	0	5	0
Walker, John	0	10	6
Williams, W. and H. B.	0	10	6

Hertford.

Durrant, G. R.	0	10	6

Hexham.

Gibson, J. P.	1	1	0
Richardson, George	0	5	0
Riddle, W. R.	0	5	0

Heywood.

Beckett, William	0	10	6

Highworth (Wilts).

Ballard, Edwin	0	5	0

Hitchin.

Perks and Llewellyn	1	1	0
Ransom and Son	1	1	0

Hong Kong (China).

Crow, W. E.	1	1	0
Watson, W. M.	0	5	0
Lucas, E. W.	0	5	0

Honley.

Broadbent, John B.	0	10	6

Horncastle.

Betts, William	0	5	0

Horsforth.

Wynn, Frederick	0	5	0

Houghton-le-Spring.

Rowell, R. H.	0	5	0

Hounslow.

Bowering, I.	0	5	0
Cull, Joseph	0	10	6

Howden (Yorks.).

Loam, J. G.	0	5	0

Huddersfield.

Bygott, W. T.	0	2	6
Dickinson, J. H.	0	5	0
Fitton, Robert	0	10	6
King, William	1	10	6
Needham, —	0	5	0
Piggott, W. F.	0	2	6
Swift, C. H.	0	5	0
Sykes, H.	0	5	0
Wheatley, Charles	0	10	0

Hull.

Allison, E. and H.	1	1	0
Bell, Charles B.	1	1	0
Bousfield, W. M.	0	5	0
Campbell, Charles	0	5	0
Chapman, E. J.	0	5	0
Chapman, Joseph	0	2	6
Creasser, Matthew	0	5	0
Desforge, J. H.	0	5	0
Dobson, J. B.	0	5	0
Dolling, Alfred	0	5	0
Dunlop, John	0	5	0
Dyson, George	0	5	0
Gibson, C. P. (Trustees of)	0	5	0
Grindell, John	0	10	6
Hall, Henry R. F.	0	5	0
Hammond, William H.	0	5	0
Hart, George William	0	10	6
Hebblethwaite, G. A.	0	2	6
Hollingsworth, James	0	5	0
Hoyles, George	0	2	6
Kenny, Thomas	0	5	0
Linford, John S.	1	1	0
Lofthouse and Saltmer	1	1	0
Oldham, James	0	5	0
Parsons, H. J.	0	2	6
Raynor, A.	0	5	0
Shaw, Ward	0	5	0
Sheffield, A. J.	0	5	0
Souter, Jas. S.	0	10	6
Staning, Walter	0	5	0
Stoakes, Benjamin M.	0	5	0

Hunstanton.

Twiss, Wm.	0	10	6

Huntingdon.	£	s.	d.
Baxter, Robert	0	10	6
Cooper, A.	0	2	6

Huntly (N.B.).

Chalmers, G.	0	2	6

Hurstpierpoint.

Hudson, Alfred W.	0	2	6

Hyde.

Oldfield, Henry	0	10	6

Hyères (France).

Powell, Walter A.	0	5	0

Hythe.

Lemmon, R. A.	1	1	0

Ilford.

Beal, E. J.	1	1	0

Ilfracombe.

Affleck, T. S.	0	2	6
Crang, Walter	0	10	6
Wheeler, James	0	5	0

Ilkeston.

Potts, Charles	1	1	0

Ilkley.

Worfolk, G. W.	0	10	6

Ingatestone.

Stuart, Henry James	0	5	0

Inverness.

Allan, Alexander	0	5	0
Bethune, W. J.	0	2	6
Fraser, John	0	5	0
Galloway and Son	0	5	0
MacRitchie, D.	0	2	6
Mitchell, H.	0	5	0

Ipswich.

Anness, Samuel R.	0	10	6
Chapman and Pain	1	1	0
Clifton, F. S.	0	5	0
Cornell, William	1	1	0
Cossey, James D.	0	10	6
Crassweller, W. E.	0	5	0
Eyre, H. R.	0	5	0
Grimwade, Ridley and Co.	0	10	6
Matcham, Edward	0	5	0
Miller, T. T.	0	5	0
Nunn, C. G.	0	5	0
Spurgeon, Fredk. J.	0	5	0
Wigg, L. N.	0	5	0
Wiggin, J. C.	0	10	6
Younger, Robert E.	0	5	0

Irvine.

Gillespie, James	0	5	0

Isleworth.

Reece, James	0	5	0

Jarrow-on-Tyne.

Hooper, Richard	0	2	6

Jedburgh.

Walker, A.	0	5	0

Jersey.

Baker, John T.	0	5	0
Cole, George	1	1	0
Ereaut, John	1	1	0
Millais, Mrs.	1	1	0
Miller, Henry	0	5	0
Poingdestre, C. R.	0	10	6

Keighley.

Midgley, Walter	0	5	0
Riddiough, F.	0	5	0

Kendal.

Bateson, Thomas	1	1	0
Burton, Matthew	1	1	0
Hind, Thomas W. L.	1	1	0
Rigg, G. F.	0	10	6
Severs, Joseph	1	1	0

Kenilworth.

Barton, Henry Emlyn	0	10	6

Keswick.

Townley, Thomas W.	0	10	6

Kettering.	£	s.	d.
Gray, A. U.	0	2	6
Thursfield, John F.	0	10	0

Kew.

Edwards, J. E.	0	10	6

Kidsgrove.

Griffiths, Edwin H.	0	10	6

Kilmarnock.

Borland, John	1	1	0
Borland, John, jun.	0	10	6

King's Lynn.

Atmore, George	0	5	0
Cocher, John A.	0	5	0
Count, Sidney	0	5	0

Kingston-on-Thames.

Bond, C. R.	0	10	6
Brewster, William	0	10	6
Higgs, Alfred	0	5	0
Walmsley, Samuel	0	5	0
Whaley, Edward	0	10	6

Kirby Lonsdale.

Birkett, John	0	5	0

Kirkcaldy.

Storrar, David	0	10	6

Knaresborough.

Lawrence, W. P.	0	5	0
Thompson, George	0	10	6

Knutsford.

Silvester, Henry T.	0	5	0

Lancaster.

Arkle, William	0	5	0
Briggs, W.	0	5	0
Fell, James J.	0	5	0
Holmes, E.	0	5	0
Troughton, Henry	0	5	0
Vince, James	0	5	0

Landport.

Gall, Frederic	0	2	6
Perfect, George	0	5	0

Langholm.

Beattie, Thomas	0	5	0

Largs (N.B.).

Barr, Bryce	0	5	0

Launceston.

Downing, Frederick	0	5	0
Wise, William	0	5	0

Leamington.

Barnitt, John	0	10	6
Barrett, Josephus T.	1	1	0
Davis, Benjamin	0	10	6
Davis, C.	0	2	6
Eynon, D. J.	0	10	6
Holloway, E. A.	0	2	6
Pullin, William H.	1	1	0
Robinson, J. J.	0	5	0
Sansom, Henry	0	2	6
Smith, Samuel A.	1	1	0
Smith, Samuel H.	0	10	6
Stanley, Herbert	0	10	6

Ledbury.

Freeman, Ernest	0	10	6

Lee (Kent).

Heath, F. D.	0	5	0

Leeds.

Archer, Joseph S.	0	2	6
Beacock, J. H.	0	5	0
Bilbrough, A.	1	1	0
Branson, F. W.	0	10	6
Briggs, George	0	5	0
Brown, Edward	0	5	0
Brown, E. O.	0	5	0
Cole, E. H.	1	1	0
Exley, George	0	5	0
Fawthorp, James	0	5	0
Fourness and Son	0	10	6
Fox, W. A.	0	2	6
Goodall, Backhouse and Co.	2	2	0
Greasley, M. F.	0	10	6

Leeds—continued.

	£	s.	d.
Harvey, William (Headingley)	1	1	0
Hirst, Brooke and Hirst	2	2	0
Hirst, David	0	10	0
Holmes, Francis	0	5	0
Holmes, Joseph	0	10	6
Horsfield, E.	0	5	0
Jefferson, P.	0	5	0
Reynolds, Richard	1	1	0
Reynolds, Richard F.	0	5	0
Robinson, W.	0	5	0
Schoon, G.	0	1	0
Smeeton, William	0	10	6
Taylor and Fletcher	1	1	0
Taylor, Samuel	1	1	0

Leek.

	£	s.	d.
Blades, Josiah B.	0	2	6
Johnson, William	0	5	0

Leicester.

	£	s.	d.
Berridge, Alfred	0	5	0
Broof, R.	0	10	6
Burford, S. F.	0	10	6
Butler, T. E.	0	5	0
Cadoux, S. H.	0	5	0
Carr, William	0	10	6
Clark, John W.	2	2	0
Clark, Walter B.	0	10	6
Cleaver, Samuel	0	5	0
Cox, S. G.	0	10	6
Ellis, George	0	5	0
Esam, Richard	0	10	6
Freeland, A. J. (Kibworth)	0	2	6
Harvey, William R.	1	1	0
Lloyd, T. H.	1	1	0
Pickering, Henry	0	5	0
Rowe, W.	0	5	0
Sharp, Edward K.	0	5	0
Wand, Stephen	0	10	6
West, J. L.	1	1	0
Wilby, Frederick W.	0	10	6
Woolley, G. J. B.	0	5	0

Leighton Buzzard.

	£	s.	d.
Herington, H. E.	0	5	0
Herington, Joseph	1	1	0

Leith.

	£	s.	d.
Crichton, Alexander	0	5	0
Duncan, Flockhart Powell and Co.	0	10	6
Duncan, Wm.	0	2	6
Finlayson, Thomas	0	5	0
McDougall, R. I.	0	5	0
Mair, Alexander	0	5	0
Robertson, R.	0	2	6

Lenton.

	£	s.	d.
Wilson, Thomas	0	5	0

Lenzie (N.B.).

	£	s.	d.
Pettigrew, J. W.	0	4	0

Leominster.

	£	s.	d.
Davis, David F.	1	1	0
Ellwood, M. J.	0	5	0
Sandiland, Robert B., jun.	0	5	0

Lerwick.

	£	s.	d.
Porteous, Arthur A.	0	2	6

Leven.

	£	s.	d.
Hogg, A.	0	2	6

Lewes.

	£	s.	d.
Briscoe, Charles (West Firle)	0	5	0
Head, John	0	10	6
Head, John T.	0	10	6

Leytonstone.

	£	s.	d.
Bennett, C.	0	2	6
Wilson, J.	0	5	0

Lincoln.

	£	s.	d.
Battle, Son and Maltby	0	10	6
Tomlinson, Charles K.	0	10	6

Littleborough.

	£	s.	d.
Hall, Samuel	0	5	0

Little Chishill.

	£	s.	d.
Jefferson, Thomas	0	10	6

Littlehampton.

	£	s.	d.
Longman, J. H.	0	2	6
Smart, C. F.	1	1	0

Liverpool.

	£	s.	d.
Abraham, Alfred Clay	1	1	0
Abraham, Thomas Fell	1	1	0
Adams, Thomas E.	0	10	0

Liverpool—continued.

	£	s.	d.
Adams, T. E., jun.	0	5	0
Albright, Henry	0	10	6
Alexander, George	0	5	0
Alexander, John	0	10	6
Allan, James H.	1	1	0
Aris, G. H.	0	5	0
Ayrton and Saunders	0	10	6
Bain, John	0	5	0
Barrett, A. A.	0	5	0
Blabey, J. J. (Woolton)	1	1	0
Blabey, J. R. (Woolton)	0	2	6
Blood, Charles (Formby)	0	5	0
Blundell, John	0	10	6
Brown, Edwin	0	2	6
Brown, Joseph	0	2	6
Buck, Richard C.	0	5	0
Clay, Dod and Co.	1	1	0
Coley, James	0	5	0
Dickins, B.	0	5	0
Drawbridge, Joseph G.	0	10	6
Drawbridge, T. F.	0	5	0
Ellams, George	0	10	0
Elliott, Robert John	0	10	6
Ellithorne, A. H.	0	5	0
Evans, Sons and Co.	5	5	0
Fergusson, W. and J.	0	10	6
Field, C.	0	10	6
Fleming, Mrs. Agnes	0	5	0
Fowler, George	0	5	0
Fraser, Alexander	0	5	0
Furniss, Thomas	0	5	0
Galloway, J. B.	0	5	0
Greenall, Alfred	1	1	0
Hackett, Thomas	0	10	0
Hawood, Charles	0	5	0
Hocken, Joshua	0	10	6
Hodges, E. G.	0	5	0
Hodgson, T. S.	0	5	0
Jackson, H.	0	10	6
James, John	0	5	0
Johnson, J. H. and S.	2	2	0
Jones, R. H.	0	5	0
Jordan, J. A.	0	5	0
Kirk, W. P.	0	5	0
Lee, Samuel W.	1	1	0
Lett, Arthur J.	0	5	0
McGuffie and Co.	1	1	0
Midgley, John E.	0	2	6
Morgan, H. B.	0	5	0
Parkinson, Richard	0	10	6
Parry, R.	0	5	0
Pheysey, Richard (Waterloo)	0	10	6
Richardson, Richard T.	0	10	6
Ridgway, T. E.	0	5	0
Sawden, Alfred	0	10	6
Smith, J. J. (Walton-on-the-Hill)	0	10	6
Smith, R. G.	0	5	0
Symes, Charles	2	2	0
Thomas, Robert	0	10	6
Thompson, John	1	1	0
Thompson and Capper	1	1	0
Tollitt, W.	0	2	6
Troughton, Christopher	0	10	6
Ward, J. S.	0	5	0
Warhurst, Mrs. A.	2	2	0
Williams, William	0	5	0
Wokes, T. S.	0	5	0
Woodhead, H. C.	0	10	6
Wright, William	0	5	0

Llanbyther.

	£	s.	d.
Jones, J.	0	2	6

Llandilo.

	£	s.	d.
Williams, W. J.	0	2	6

Llandudno.

	£	s.	d.
Burton, Joseph	1	1	0
Sinclair, Mrs. M. A.	0	10	6

Llanelly.

	£	s.	d.
Evans, Gwilym	1	1	0

Llangollen.

	£	s.	d.
Jones, Humphrey	0	5	0

Llanidloes.

	£	s.	d.
Jones, Thomas Pryce	0	2	6

Llanrwst.

	£	s.	d.
Jones, Owen	0	2	6

Loddon.

	£	s.	d.
Ellis, T. W.	0	10	6

London.

	£	s.	d.
Adam, Miss A. M.	1	1	0
Adam, Miss J. S.	0	5	0
Adam, Miss L.	1	1	0

London—continued.

	£	s.	d.
Allden, John	1	1	0
Allen, Charles B.	3	3	0
Amoore, Lewis P.	0	10	6
Andrews, Frederick	0	10	6
Applegate, Edwin	0	10	6
Arkinstall, William	1	1	0
Ashford, H. S.	0	5	0
Atkinson, James	0	5	0
Atkinson, John G.	1	1	0
Attwood, Henry E.	1	1	0
Austin, Henry Felix	1	1	0
Babb, James	0	5	0
Bacon, Henry J.	0	2	6
Baines, Wm. H.	0	10	6
Baker, Alfred P.	0	10	6
Baker, H. W.	0	10	6
Ball, The Chemists', per Mr. W. H. Francis	15	15	0
Ball, The Junior Pharmacy, per Mr. W. H. Kerr	10	10	0
Balls, George	0	10	6
Banbury, Richard	0	5	0
Barnard, A. P.	0	5	0
Barnard, John	1	1	0
Barnes, James Benjamin	1	1	0
Barnes, James Burden	0	5	0
Barret, Edward Louis	1	1	0
Barry, Frederic	0	5	0
Bartle, W. F.	0	5	0
Bartlett, G. F. H.	0	5	0
Bartley, George A.	0	10	6
Bascombe, Frederick	0	10	6
Bascombe, William	0	5	0
Bate, Henry	1	1	0
Bateman, T. H.	1	1	0
Beasley, Frederick	0	5	0
Beddard, John	1	1	0
Bedford, C.	0	10	6
Bell, Matthew W.	1	1	0
Bell, William H.	1	1	0
Bennett, George	0	5	0
Bennett, Thomas	0	5	0
Bently, William Jas.	0	10	6
Bessell, J. W.	0	5	0
Best, James	0	10	6
Bevan, William	0	10	0
Bigg, Thomas	1	1	0
Bindloss, G. F.	0	10	6
Bingley, Richard	0	10	6
Birch, Henry C.	1	1	0
Bird, Augustus	2	2	0
Bird and Storey	1	1	0
Bird, F. C. J.	0	5	0
Bird, Robert	0	10	6
Bishop, W. M.	0	2	6
Blackman, T.	0	5	0
Blake, Charles A.	1	1	0
Bland, John	0	10	6
Bletsoe, F. F.	0	10	6
Blyth, Utton	0	5	0
Boothby, H. N.	0	5	0
Bourdas, Isaiah	1	1	0
Bowen, F. T.	0	5	0
Bowen, John T.	0	10	6
Bowen, John W.	1	1	0
Bowles, W. J.	0	5	0
Brand and Co.	1	1	0
Branford, A. J.	0	5	0
Bridges, C. W.	0	10	6
Brodribb, J. B.	0	10	6
Brookes, Samuel	0	10	6
Brooks, J.	0	2	6
Brooks, Thomas	0	2	6
Brooks, Tom	0	2	6
Broumpton, F. R.	0	2	6
Brown, Alfred James	0	10	6
Brown, Edgar M.	0	2	6
Bull, E. John	0	5	0
Bullock, J. Lloyd and Co.	2	2	0
Bunker, James	0	2	6
Burden, C. H. B.	0	5	0
Burgoyne, Burbidges, Cyriax and Farries	2	2	0
Burn, Henry	0	5	0
Burton, Percy H.	0	2	6
Bush, Arthur	0	5	0
Butler, J. A.	0	5	0
Butt, Edward Northway	10	10	0
Butterworth, John	0	5	0
Cadman, Daniel C.	1	1	0
Campbell, E. K.	0	5	0
Carteighe, Michael	1	1	0
Caseley, Thomas	0	5	0
Catterns, H. P.	0	10	6
Cawdell, George	0	10	6
Chapman, Joseph J.	0	10	6
Chapman, Walter	0	10	6

London—continued.	£	s.	d.
Charity, William	0	10	6
Chemist and Druggist, Proprietors of	5	5	0
Chesterfield, T. M.	0	5	0
Churchill, J. and A.	1	1	0
Churchyard, R. L.	0	5	0
Clapp, Edward F.	0	10	6
Clark, Thomas J.	0	10	0
Clarke, W. E.	0	2	6
Clarke, W. L.	0	5	0
Clayton, Thomas	0	5	0
Cocker and Son	0	10	6
Colchester, William M.	0	5	0
Cole, A. C.	1	1	0
Coleman, J.	0	5	0
Coles, A.	0	5	0
Coles, Ferdinand	0	10	6
Coles, J. W.	0	10	6
Collett, Chas. B.	0	5	0
Collier, Henry	0	10	6
Constance, Edward	0	10	6
Constance, Herbert E.	0	10	6
Constance, Sidney W.	0	10	6
Cook, W. R.	0	5	0
Cooper, Albert	1	1	0
Cooper, Henry	0	10	6
Cooper, H. H.	1	1	0
Cooper, R. H.	0	10	0
Cooper, Wm. Henry	0	10	6
Cooper, William Temple	0	10	6
Corbyn, Stacey and Co.	1	1	0
Cory, James	0	10	6
Cosway, Edwin C.	1	1	0
Cottrill, John W.	0	10	6
Coulson, Thomas	0	2	6
Cox, F. H.	0	2	6
Cracknell, Herbert	0	10	6
Cresswell, Frederick	0	10	6
Crosby, John	0	2	6
Crow, E. L.	0	10	6
Crowden, S. G.	0	10	6
Cryer, Henry	0	5	0
Cullen, Harry H.	0	5	0
Dampney, Richard S.	0	10	6
Darby and Gosden	2	2	0
Dart, W.	0	2	6
Davenport, Horace	2	2	0
Davenport, J. T.	2	2	0
Davies, H.	0	5	0
Davies, Llewelyn	0	2	6
Davies, Robert H.	1	1	0
Davis, F.	0	2	6
Davis, H. S. E.	0	10	6
Davy, Yates and Routledge	2	2	0
Dean, S.	0	5	0
De Peare, John Thomas	0	5	0
Dewar, Mrs. Mary Ann	0	10	6
Dickson, J.	0	5	0
Dinneford and Co.	2	2	0
Dixon, Herbert	0	5	0
Dodd, W. R.	0	10	0
Douglas, J. W.	0	2	6
Doulton and Co.	1	1	0
Drury, Sydney	0	5	0
Dukes, H.	0	2	6
Dymond, T. S.	0	5	0
Dymott, Francis	0	5	0
Dyson, William B.	1	1	0
Eade, George	0	10	6
Eade, James	0	10	6
Eastman, J. E.	0	10	6
Edwards, Charles	1	1	0
Edwards, James	0	5	0
Edwards, William Staples	0	5	0
Elliott, W.	0	5	0
Ellwood, T. A.	0	5	0
Elvey, Mrs. M. A.	1	1	0
Emsley, J.	0	10	6
Emson, William N.	0	5	0
Epps, James	1	1	0
Evans, Lescher and Webb	1	1	0
Evershed, G. S.	0	5	0
Fallowfield, Jonathan	1	1	0
Farmer, John	0	10	6
Fawssett, T.	0	5	0
Fitch, Robert Owen	0	10	6
Fox, William	1	1	0
Francis, G. Bult	1	1	0
Francis, George Baggett	1	1	0
Francis, Matthew R.	0	10	6
Francis, W. H.	0	10	6
Freeman, Frank	0	2	6
Froom, William Henry	1	1	0
Frost, John H.	0	5	0
Frost, W. T.	0	10	6
Fuge, H. D.	0	5	0
Gadd, Charles	0	10	6

London—continued.	£	s.	d.
Gadd, Robert	0	10	6
Gale, Samuel	1	1	0
Garman, C. E.	0	5	0
Garner, James	0	10	6
Garner, Thomas	0	5	0
Garnham, A. W.	0	5	0
Garrett, John	0	5	0
Gaskin, J. H.	0	2	6
Gaubert, Stephen	0	2	6
Gaunt, Rann Dolphin H.	1	1	0
Gerrard, A. W.	1	1	0
Glew, F. H.	0	5	0
Goddard, G. E.	0	5	0
Godfrey and Cooke	1	1	0
Godfrey, H. E.	0	5	0
Goff, Richard	0	5	0
Goldby, F.	0	5	0
Golding, J. F.	1	1	0
Golds, L. G.	0	10	6
Goodall, W. A.	0	5	0
Goodchild, Alfred C.	0	5	0
Goodwin, John	1	1	0
Gordelier, F. H.	0	19	0
Gorton and Sons	0	10	6
Gould, J.	1	1	0
Gradidge, James H.	0	10	6
Graham, Henry	0	5	0
Granger, Edwin John	1	1	0
Greaves, J. E.	0	5	0
Green, Samuel	0	5	0
Green, W. J.	0	10	6
Greenish, H. G.	0	10	6
Greenish, Thomas	1	1	0
Greenish, T. Edward	0	10	6
Greig, W.	0	2	6
Gristock and Co.	1	1	0
Gudgen, Frederick G.	0	15	6
Gulliver, William	1	1	0
Gulliver, W. F.	0	5	0
Haddock, James	0	5	0
Haden, W. E.	0	5	0
Haigh, W.	0	5	0
Hairsine, H. S.	1	1	0
Hall, Ralph	0	10	6
Hampson, Robert	1	1	0
Hanbury, Cornelius	1	1	0
Hannah, Charles	0	10	6
Hardy, Samuel C.	1	1	0
Harris, Frank William	0	5	0
Hart, Thomas	0	5	0
Harvey, Edward	1	1	0
Harvey, John William	0	2	6
Harvey, William	0	10	6
Hatfield, George B.	0	10	6
Hatfield, George W.	0	5	0
Haward, G. R.	1	1	0
Hawkins, Thomas	0	10	6
Hayllar, J.	0	2	6
Hearn, John	0	5	0
Hebbeler, K.	0	10	6
Henty, Henry Martin	0	5	0
Herbert, William	0	5	0
Hern, W. H.	0	5	0
Hewlett, J. C.	1	1	0
Hick, John	0	5	0
Hickey, Evan Lewis	0	10	6
Hickman, William	0	10	6
Hicks, Alexander D.	0	3	0
Higgins, James	0	10	6
Hill, Arthur B.	1	1	0
Hill, Arthur S.	2	2	0
Hill, William	0	5	0
Hillen, John	0	10	6
Hills, Thomas Hyde	10	10	0
Hills, Walter	2	2	0
Hobbs, John K.	0	5	0
Hodgkinson, George A.	0	10	6
Hodgkinson, Treacher and Clarke	2	2	0
Hodgkinson (Thomas), Prestons and King	2	2	0
Hodgkinson, William	1	1	0
Hodsoll, Thomas W. H.	1	1	0
Hogg, E. G.	0	10	6
Hogg, Robert	0	10	6
Hogwood, E.	1	1	0
Holding, J.	0	5	0
Holford, T. Constantine	0	10	6
Holl, Edmund	0	5	0
Holmes, A. J.	0	10	6
Holmes, Walter M.	0	10	6
Holroyd, A.	0	2	6
Hopkin and Williams	2	2	0
Hopkin, William King	2	2	0
Horne, John	0	5	0
Horsley, T. W.	0	10	0
Howard, E.	0	5	0
Howell, Maurice	0	10	6

London—continued.	£	s.	d.
Howse, W. F.	0	5	0
Howlett, Samuel	1	1	0
Hucklebridge, P. and W.	1	1	0
Hudson, T. F.	0	5	0
Huggins, Richard	0	10	6
Hughes, Evan	0	10	6
Hugill, John	1	1	0
Hugill, John H.	1	1	0
Humble, J. B.	0	5	0
Humphreys, G. R.	0	2	6
Humphreys, Richard	0	10	6
Hunt, Charles	1	1	0
Huskisson, Henry Owen	2	2	0
Hyne, Harry	0	5	0
Hyslop, John Cahill	1	1	0
Icke, Henry S.	0	10	6
Idris and Co.	2	2	0
Ince, Joseph	1	1	0
Ingham, John	0	2	6
Ingram and Royle	1	1	0
Ive, William	1	1	0
ditto (donation)	5	5	0
Izod and Son	1	1	0
Jackson, Charles	0	10	6
Jackson, Christopher	0	10	6
Jameson, W. G., jun.	1	1	0
Jarvis, John S.	0	10	6
Jenkins, Henry	1	1	0
Jenkins, Thomas	0	10	6
Jobson, Thomas	0	10	6
Johnston, W.	0	2	6
Johnson and Sons	1	1	0
Jones, Edwin	0	5	0
Jones, Henry Stevens	0	5	0
Jones, John H.	0	10	6
Jones, T. P.	1	1	0
Jones, William	0	10	6
Jones, William	0	5	0
Jozeau, G.	1	1	0
Keeling, A. G.	0	5	0
Keer, Mrs. I. S. Clarke	0	10	6
Keer, Thomas H.	0	10	6
Kent, Thomas Ramsey	0	10	6
Kerr, T.	0	5	0
King, Mrs. E. B.	0	10	6
King, Henry	0	10	0
King, J. H.	0	5	0
Kingan, D.	0	10	6
Kingsford, Frederick	1	1	0
Kirk, Snowden	0	10	6
Kitchin, J.	0	5	0
Langley, Frank C.	0	5	0
Laws, John	0	10	6
Layng, R. C.	0	5	0
Leake, Thomas W.	0	10	6
Legg, H. A.	0	10	6
Lescher, Joseph S.	1	1	0
Lewinton, Alexander B.	1	1	0
Lewis, T.	0	2	6
Lidwell, J. E.	0	10	6
Lister, W. B	1	1	0
Littlejohn, A.	0	5	0
Llewhelin, Ivor V.	0	2	6
Lloyd, Isaac T.	0	5	0
Lockyer, J. E.	0	2	6
Long, Henry	1	1	0
Long, Herbert H.	0	5	0
Longley, Charles	0	2	6
Lorimer and Co.	1	1	0
Lowe, William E.	2	2	0
Luxmoore, C. M.	0	10	6
Lyon, James	0	10	6
MacCrindle, Thomas	1	1	0
McDiarmid, F.	0	10	6
Macdonald, Alexander	0	10	6
McDougall, James	0	2	6
MacEwan, Peter	1	1	0
MacGeorge, William	0	10	6
Maitland, P. C.	0	10	6
Maizey, E.	0	10	6
Makepeace, A. J.	0	2	6
Manley, W. F.	0	10	6
Marks (Henry) and Sons	1	1	0
Marsh, E. R.	0	10	6
Marston, John Thomas	0	10	6
Marten, Frederic	0	5	0
Martin, T. C. W.	0	10	6
Martindale, William	1	1	0
Mason, H. C.	1	1	0
Mathews, Henry	1	1	0
Mathews, J. H.	1	1	0
Matterson, J. K.	1	1	0
Matthews, C. W.	0	10	6
Matthews, E. S.	0	10	6
Matthews, J.	0	10	6
Matthews, J. H.	0	5	0
Maw, Charles	1	1	0

London—continued.	£	s.	d.
Maw, Charles (donation)	65	0	0
Maw, C. Trentham	1	1	0
Maw, Son and Thompson	2	2	0
Maxwell, P. H.	0	10	6
Maynard, H. R.	0	10	6
Meggeson and Co.	1	1	0
Mellin, Charles J.	0	5	0
Michie, Charles C.	0	5	0
Miles, C. J.	0	10	6
Miller, Cecil B.	0	5	0
Miller, W. P. F.	0	5	0
Millhouse, H. H.	0	5	0
Minshull, Flora	0	5	0
Minshull, Rose C.	1	1	0
Moore, John	0	5	0
Moore. J. S.	0	5	0
Morrell, Thomas	0	5	0
Morris. E. G.	0	5	0
Morrison, J. W. T.	0	10	6
Moss, John and Co.	1	1	0
Moss, Thomas A.	0	2	6
Mundy, Alfred O.	0	10	6
Mutch, John Pratt	0	5	0
Myers, William	0	10	6
Naylor, W. A. H.	0	10	6
Neale, J.	0	5	0
Nesme, A. J.	0	5	0
Newton, T. A. C.	1	1	0
Newzam, Henry Samuel	0	10	6
Nicholls, Reginald E.	0	10	6
Nicholson, Thomas T.	0	5	0
Nind, George	0	10	6
Ninnis, T. M.	0	5	0
Ord, Septimus W.	0	5	0
Padman, Dr. John	0	10	6
Page, R. S.	0	5	0
Palmer, Francis	0	10	6
Parker, F. P.	0	10	6
Parker, Robert Henry	0	10	6
Parker, W. H.	0	5	0
Parkes, J. C.	0	10	6
Parkes, J. P.	1	1	0
Parkinson and Son	1	1	0
Parrott, Joseph	0	10	6
Parry, C. D.	0	5	0
Parsons, G. H.	2	2	0
Passingham, G. W.	0	10	6
Pattison, George	1	1	0
Peacock, George	0	5	0
Peat, Joseph	0	5	0
Peck, F. W.	0	10	6
Peel, Alfred	0	10	6
Pellew, A.	0	10	6
Penrose, A. W.	1	1	0
Perodeau, E. G.	0	5	0
Peters, D.	0	5	0
Pettinger, Elmer	0	5	0
Pharmacy Club (per Richard Bremridge, Hon. Sec.)	10	10	0
Phillips, A. J.	0	5	0
Phillips, A. W.	0	5	0
Philpott, F. W.	0	5	0
Pickard, William	2	2	0
Pierce, R. W. C.	0	5	0
Pinchen, W. J.	0	5	0
Pinyon, William	0	10	6
Plaister, W. J.	1	1	0
Pond, B. C.	0	5	0
Ponting, F. H.	0	5	0
Portway, A. C.	0	5	0
Portway, J. D.	0	10	6
Potts, Robert A.	1	1	0
Powell and Sons	1	1	0
Powell, T. H.	0	10	6
Preston, Richard	0	10	6
Pretty, Charles	0	5	0
Price, J. T.	0	2	6
Price, Robert John	0	2	6
Prichard. Edward	1	1	0
Prime, Thomas R.	0	10	6
Procter, R.	0	5	0
Puntan, H. H. C.	0	2	6
Radermacher, C. J.	0	10	6
Ragg, William	1	1	0
Ragg, W. W.	0	10	0
Reed, Charles W.	0	10	6
Rees, Harding	1	1	0
Rees-Williams, J. J.	0	5	0
Rendle, W. J.	0	5	0
Reynolds, R. J.	1	1	0
Richards, Edwin	0	10	6
Richardson, John	0	5	0
Ridley, C. H.	0	5	0
Ridley, E. H.	0	5	0
Rigden, George	0	2	6
Roach, H. W.	1	1	0
Roach, Pope	1	1	0

London—continued.	£	s.	d.
Robertson, George	0	10	6
Robeson, C. B.	0	5	0
Robinson, J.	0	5	0
Robinson, R. A.	0	10	6
Robinson, William P.	0	10	6
Rogers, James	0	10	6
Rose, Alfred	1	1	0
Rouse, F. W.	0	10	6
Rowntree, Thomas	0	10	6
Rundle, C.	0	5	0
Rutter, John	0	10	0
Sadler, William	0	10	6
Sadler, William, jun.	0	10	6
Sainsbury, S.	1	1	0
Salter, W. A.	0	5	0
Sanders, Francis T.	0	5	0
Sandford, Geo. W.	2	2	0
Sandy, Frederick William	0	10	6
Sanger and Sons	2	2	0
Sangster, Arthur	1	1	0
Saul, J. E.	1	1	0
Saunders, C.	0	10	6
Savory and Moore	3	3	0
Sayers, W. C.	0	10	6
Scoley, Thomas E.	0	10	6
Sedcole, J. W.	0	10	6
Sell, W. H.	0	10	6
Sewell, T. A. W.	0	5	0
Shacklock, J. H.	0	10	6
Shapcott, W. H. P.	0	2	6
Sharman, Wm.	0	10	6
Shaw, E. H.	0	2	6
Shaw, J. W.	0	10	6
Shephard. Thomas F.	0	10	6
Shepley, Frederick Thos.	0	5	0
Sherburn, Thomas	0	10	6
Sherwood, N.	0	10	6
Shields, R. H.	0	5	0
Shirley, S. S.	1	1	0
Shone, O. E.	0	5	0
Sibthorp, S. J. K.	0	2	6
Silverlock, Henry	5	5	0
Silvers, Francis T.	0	10	6
Slack, Josiah W.	0	10	6
Slator, Henry	0	5	0
Smart, W.	0	10	6
Smith, Fuller	0	10	6
Smith, Harry J.	0	5	0
Smith, James W.	0	7	6
Smith, John Ord	1	1	0
Smith, Percy John	1	1	0
Smith, William	0	10	6
Smith, William	0	10	6
Smith, William Frederick	1	1	0
Smith, William L.	0	10	6
Snell, Charles H.	0	10	6
Snell, Miss Marie de Vere	0	2	6
Snow, G. F.	0	2	6
Spurling, W.	0	10	6
Spyer, Newton	0	10	6
Squire and Sons	3	3	0
Stacy, Frederick	0	5	0
Stacey, Samuel Lloyd	1	1	0
Stamp, Edward B.	0	10	6
Stansfield, Richard	0	5	0
Starkie, Richard S.	1	1	0
Stenson, Joseph	0	5	0
Stephens, Henry I.	0	5	0
Stickland, W. H.	1	1	0
Stoneham, Philip	0	10	6
Strachan, John	0	10	6
Stratton, William	0	2	6
Streater, James H.	0	10	0
Strongitharm, W. G.	0	5	0
Strother, C. J.	0	10	6
Students' Critic	1	0	0
Sugden, W. A.	0	5	0
Summers, James R.	0	10	6
Suttar, J.	0	3	2
Swift, Francis	0	10	6
Symons, William H.	1	1	0
Tanner, A. E.	0	10	6
Taplin, William Gilbert	1	1	0
Taubman, Robert	0	10	6
Taylor, Edward	0	2	6
Taylor, George S.	1	1	0
Taylor, Horatio	0	10	6
Taylor, John	0	10	6
Taylor, Peter	0	5	0
Taylor, W. (Woolwich)	0	2	6
Tebbutt, Edwin	1	1	0
Temple, C. H.	0	2	6
Tench, S. E.	0	5	0
Thatcher, R.	0	2	6
Thomas, Harry A.	1	1	0
Thompson, Arthur S.	0	5	0
Thompson, Henry	0	10	6

London—continued.	£	s.	d.
Thompson, Henry Ayscough	1	1	0
Thompson, John	1	1	0
Thompson, R. W.	0	5	0
Thorn, John James	1	1	0
Thrower, E. A.	0	2	6
Tijou, Tom	0	2	6
Tingle, Miss Ellen	0	5	0
Tomlinson, Thomas	1	1	0
Tompsett, Leighton S.	0	5	0
Toon, Lionel E.	0	5	0
Trask, Thomas	1	1	0
Treharne, F. G.	0	5	0
Trick, William B.	0	10	6
Troke, Charles	1	1	0
Trotman, Alfred C.	0	10	6
Truman, F. W.	1	1	0
Truman, H. V.	0	10	6
Tugwell, Ernest H.	0	10	6
Tugwell, William H.	0	10	6
Turner, Charles E.	0	10	6
Turner, Edward A.	1	1	0
Turner, Thomas	0	5	0
Tyrer, Peter	0	10	6
Upjohn, Francis W.	0	5	0
Van, Frederick W. S.	0	5	0
Vialls, J. B.	1	1	0
Vincent, P.	1	1	0
Walker, Byatt A.	0	5	0
Walker, Charles	0	5	0
Wallbridge, H. A.	0	5	0
Wallis, G.	0	5	0
Wallis, John T. W.	0	10	6
Wallis, Owen	0	10	6
Want, W. P.	0	5	0
Warren, F. W.	0	10	6
Warren, William	0	10	6
Warrick Brothers	1	1	0
Wastie, Francis	1	1	0
Watson, William	0	10	6
Watts, Edward	0	5	0
Watts, J. N.	1	1	0
Wavell, Edward	1	1	0
Wegg, W. N.	0	5	0
Wells, Thomas	0	5	0
West, Charles	0	10	6
Weston, Samuel John	1	1	0
Westrup, Joseph B.	0	10	6
Whear, W.	0	2	6
Whiffen, Thomas	5	5	0
Whigham, Robert L.	0	5	0
White, Charles	1	1	0
White, Charles E.	0	5	0
Whittle, Elias C. C.	0	5	0
Widgery, John	0	5	0
Wiggins, Henry	0	10	6
Wigginton, Alfred	0	10	6
Wilkinson, Benjamin John	0	10	6
Wilkinson, Robert	0	5	0
Wilkinson, William	0	10	6
Will, William W.	0	5	0
Willats, Richard	0	5	0
Williams, Alfred	0	5	0
Williams, Henry	2	2	0
Williams, Hugh	0	5	0
Williams, J.	0	5	0
Williams, J. W.	1	1	0
Williams, T. R.	0	2	0
Williams, Stephen	0	5	0
Willows, Francis and Butler	3	3	0
Wilson, James	1	1	0
Wilson, Thomas W.	0	10	6
Wink, J. A.	1	1	0
Wisken, Robert	0	10	6
Wodderspoon and Co.	1	1	0
Wood, C. H.	0	10	6
Wood, Jacob	1	1	0
Woodland, John	1	1	0
Woollings, Frank	0	2	6
Wooster, J. R.	1	1	0
ditto (donation)	5	5	0
Wootton, Alfred C.	2	2	0
Worsley, A. G.	0	5	0
Wretts, J. R.	0	10	6
Wright, Layman and Umney	2	2	0
Wyatt, Francis J.	0	10	6
Wybrant, A.	0	5	0
Wylde, George	0	10	6
Yates, Robert	1	1	0
Yates, Samuel P.	0	5	0
Yeatman, F. J.	0	2	6
Young, George	0	5	0

Long Bennington.

Bemrose, John	0	10	6

Long Eaton.

White, J. T.	0	5	0

Longton.

	£	s.	d.
Hemming, G. T.	0	5	0
Prince, Arthur G.	0	10	0

Looe (Cornwall).

Poad, John	0	5	0

Lossiemouth.

Bremner, James	0	5	0

Loughborough.

Baldwin, G. J.	0	2	6
Jones, C.	0	2	6
Scrase, Richard	0	5	0

Louth.

Moody, S. W.	1	1	0
Smith, William	0	2	6

Lowestoft.

Chaston, Anna Maria	0	10	6
Good, Thomas	0	15	0
Jeacock, F. D.	0	2	6
Moverley, Robert	0	10	6

Ludlow.

Marston, Alfred	0	5	0
Nickson, James	0	5	0
Smith, F. W.	0	2	6
Woodhouse, George	0	5	0

Luton.

Chantler, R. P.	0	5	0
Duberly, G. S.	0	5	0
Webb, John H.	0	2	6

Lutterworth.

Brown, Thomas	0	10	6

Lyme Regis.

Henley, George	0	5	0

Lymington.

Allen, Adam U.	0	5	0
Badcock, Henry	0	5	0

Lymm.

Evans, Isaac H.	0	5	0
Henshall, James	0	5	0

Lytham.

Hartley, John	0	7	6

Macclesfield.

Bates, William I.	0	10	6
Bower, John	0	5	0
Charge, A. W.	0	5	0
Cooper, Thomas	0	5	0
Duncalf, Thomas H.	0	10	6
Wood, Richard	0	10	6

Macduff.

McMurtrie, John	0	5	0

Machynlleth.

Davies, Hugh	0	2	6
Rees, E.	0	5	0

Maidenhead.

Barry, Thomas S.	0	10	6
Cottingham, Joseph J.	0	5	0
Walton, Ralph	0	10	6

Maidstone.

Anning, A.	0	5	0
Corfe, Alfred	0	5	0
Rogers, William	0	5	0
Rowcroft, Albert E.	0	5	0
Simpson, John W. G.	0	10	6
Stonham, Thomas G.	0	10	6
Toone, A. H.	0	5	0
Whitbread, H.	0	5	0

Maldon (Essex).

Crick, George E.	0	10	6
Elsey, Charles	0	5	0
Wallworth, David	0	10	6

Malton (Yorks).

Buckle, James	0	5	0
Harrison, William	0	10	6
Laverack, W. H.	0	5	0

Malvern.

Coldwell, David B.	0	10	6
Fox, T.	0	5	0

Malvern Wells.

Clark, Edward J.	0	5	0
Wakefield, Cecil H.	1	1	0

Manchester.

	£	s.	d.
Balmforth, A.	1	1	0
Barlow, A.	0	2	6
Bates, Frederic W.	0	5	0
Bell, James	0	2	6
Bell, Joseph	0	5	0
Benger, F. Baden	1	1	0
Bew, John	1	1	0
Billington, John	0	2	6
Blain, Alfred L.	0	5	0
Blyton, John	0	10	6
Boor, Frederick	0	10	6
Booth, William G.	0	10	6
Bransby, C. K.	0	2	6
Breadner, C. G.	0	5	0
Brooks, Joseph	1	1	0
Broughton, Thomas	0	2	6
Brown, William Scott	1	1	0
ditto (donation)	100	0	0
Bullock, A. H. (Salford)	0	2	6
Burnet, G.	0	2	6
Bushby, Thomas	0	5	0
Carruthers, Annie	0	2	6
Carter, William	0	10	6
Cocker, J. D.	0	2	6
Coulding, J. J.	0	2	6
Cowpe, M.	0	2	6
Dale, John	0	2	6
Darling, William	1	1	0
Dawson, Robert	0	5	0
Denton, J. (Salford)	0	5	0
Eatough, J. S.	0	2	6
Edwards, G.	0	5	0
Fairbrother, D.	0	2	6
Gardner, E. (Salford)	0	2	6
Gavin, Thomas	0	10	6
Gibbons, Thomas G.	1	1	0
Gibbons, Walter	0	10	6
Gibson, Robert	1	1	0
Glanville, R.	0	5	0
Gourlay, H. H.	0	2	6
Gourlay, R. G.	0	2	6
Hall, Henry Stacey	0	5	0
Harding, E.	0	5	0
Harrop, J. H.	0	5	0
Hart, James	1	1	0
Hatch, J. O.	0	5	0
Hedley, J.	0	2	6
Hogg, J. A.	0	2	6
Holt, H. C.	0	2	6
Holt, John	0	5	0
Hughes, Evan G.	0	10	0
Inglis, H.	0	5	0
Jackson, F.	0	10	6
Jackson, George	0	10	6
Jackson, Thomas	0	10	6
Jeans, Alfred	0	2	6
Johnson, W. H. (Salford)	0	10	6
Jones, John J.	0	2	6
Jones, Joseph	0	2	6
Jones, P. V.	0	5	0
Kemp, Harry	0	5	0
Lane, William	0	10	6
Leech, Robert	0	5	0
Lord, John (Salford)	0	5	0
Mansergh, W.	0	5	0
Marsden, Thomas B. (Withington)	0	10	6
Marsden, W.	0	5	0
McCormick, F. H.	0	5	0
Middleton, C.	0	2	6
Morris, J. L.	0	5	0
Mundey, H.	0	5	0
Nuttall, R. H.	1	1	0
Osborne, T. C. E.	0	2	6
Paine, Standen	1	1	0
Pickup, Robert L.	0	10	6
Pidd, Arthur J.	0	10	6
Pigot, Samuel	0	2	6
Pratt, G. W.	0	5	0
Ritchie, T.	0	2	6
Ritson, J.	0	2	6
Roberts, W. R.	0	5	0
Royle, John	0	5	0
Sanderson, G. C.	0	5	0
Scaife, Samuel	0	10	6
Smith, E.	0	5	0
Standring and Co.	1	1	0
Sugden, Samuel	0	10	6
Summer, T.	0	2	6
Sutcliffe, C. H.	0	5	0
Swinn, Charles	1	1	0
Taylor, J. J.	0	2	6
Teasdale, C.	0	10	6
Terry, Thomas (Withington)	0	5	0
Tucker, C. H.	0	5	0
Turner, W. S.	0	10	6
Twemlow, Richard	0	10	6
Vernon, A.	0	2	6

Manchester—continued.

	£	s.	d.
Walton, D.	0	2	6
Waugh, J. (Salford)	0	5	0
Wealthall, Alfred	0	10	6
West, Thomas	0	5	0
Westmacott, George H.	0	10	6
Wheeldon, James	0	5	0
Whitaker, T.	0	5	0
Whittaker, Ellis (Salford)	0	10	6
Whitfield, C. (Salford)	0	5	0
Wild, John	0	5	0
Wilkinson, George	0	5	0
Wilkinson, William	0	10	6
Williams, J. B.	0	15	6
Wood, G. E.	0	5	0
Woolley, Sons and Co.	5	5	0
Wright and Barnaby	1	1	0
Yates, Ebenezer	0	5	0

Mansfield.

Adams, Benjamin	1	1	0

March.

Davies, P. H.	0	5	0
Vawser, Jesse	0	5	0

Margate.

Baily, John	0	10	6
Candler, Joseph T.	0	10	6
Gale, Henry	0	10	6
Harvey, William S.	0	10	6
Pettman, R.	0	10	6
Stimpson, George	1	1	0
Wootton, Edward S.	0	10	6

Market Drayton.

Cooke, William	0	5	0
King, William George	1	1	0

Market Harborough.

Adams, H. G.	0	5	0
Bragg, W. B.	0	5	0
Deacon, Fanny E. (Fleckney)	0	5	0

Marton (New Zealand).

Wilton, M. H.	1	1	0

Maryport.

Cockton, John	0	5	0

Masham (Yorks).

Barker, Mathew M.	1	1	0

Mayfield.

White, Edward A.	0	5	0

Melbourne (Victoria).

Davies, E. C. J.	0	10	0
Plowman, Sidney	1	1	0
Woolnough, H. A.	0	10	6

Melton Mowbray.

Attenburrow, Jas.	0	5	0
Betts, W.	0	5	0
Gill, Josiah	0	5	0
Wing, G. N.	0	5	0

Mentone (France).

Gilson, C. B.	0	5	0

Middlesborough.

Buck, Thomas	0	5	0
Hume, William A.	0	10	0
Sowerby, R.	0	5	0
Taylor, H. H.	0	5	0
Taylor, William R.	0	5	0

Middlewich.

Holland, H.	0	5	0

Millom.

Roberts, John L.	0	2	6

Minchinhampton.

Simpkins, John	0	10	6

Mirfield (Yorks).

Crook, Charles	0	5	0

Monmouth.

Marsh, G. W. F.	0	10	6

Montrose.

Burrell, Thos.	0	10	0
Davidson, A.	0	5	0

Morpeth.

Davidson, T. R.	0	5	0
Marshall, G. T.	0	5	0
Schofield, F. E.	0	5	0

Mortheo.

	£	s.	d.
Compton, A.	0	10	6

Murrayfield (Midlothian).

Baildon, H. B.	1	1	0

Mussoorie (India).

Samuel, James B. and Edward	1	1	0

Nantwich.

Manley, Henry (Aston)	0	2	6

Nelson.

Collins, M. A.	0	5	0

Newark.

Bennett, William	0	5	0
Cherrington, G. W.	0	5	0
Cooling, W. J.	0	10	6
Field, W. C.	0	5	0
Fisher, Harry	0	5	0
Foster, H. P.	0	5	0
March, William	0	5	0
Taylor, John, and Son	0	10	0

New Barnet.

Young, Robert Fisher	0	10	6

New Brighton.

Rose, Charles	0	5	0
Walker, Joseph	0	5	0

New Brompton (Kent).

Willis, Henry J.	0	5	0

Newbury.

Davis, Henry J.	0	5	0
Hickman and Metcalf	0	10	6
Pratt, Thomas H.	0	10	6

Newcastle Emlyn.

Rees, D.	0	5	0

Newcastle-on-Tyne.

Arrowsmith, L.	0	2	6
Bolan, John	0	10	6
Coates, John M.	0	10	6
Cormack, G.	0	5	0
Coxon, I.	0	2	6
Dean, E.	0	2	6
Forster, J. R.	0	5	0
Frater, G.	0	10	0
Gatward, O.	0	5	0
Ismay and Sons	0	10	6
Johnstone, W. H.	0	2	6
Marley, William	0	10	6
Martin, J.	0	5	0
Martin, N. H.	1	1	0
Matthews, J.	0	10	6
Owen, William	0	10	6
Oxen, D. H.	0	5	0
Park, F.	0	5	0
Proctor, Son and Clague	1	1	0
Proctor, William	0	5	0
Rheeder, T.	0	5	0
Richardson, Alexander	0	5	0
Roberts, J.	0	10	6
Spargo, H.	0	5	0
Stuart, Charles E.	0	10	6
Swan, J. W.	1	1	0
Ward, Benjamin	0	5	0
Watson, Mason	0	10	6
Weddell, G.	0	10	6
Wilkinson, T. T.	0	5	0
Wing, A. J.	0	5	0
Wright, Alfred	0	10	6

Newcastle-under-Lyme.

Croydon, E. H.	0	10	6
Gould, J.	0	5	0
Heathcote, Thomas S.	0	10	6
Poole and Son	0	10	6

Newhaven (N.B.).

Miller, Alexander S.	0	2	6
Noble, Alexander	0	2	6

Newhaven (Sussex).

Granger, Harold	0	5	0

Newmarket.

Barrew, Frank A.	1	1	0
Rogers and Co.	0	10	6

Newport (Isle of Wight).

Millidge, Alfred	0	5	0
Shepperd, William J.	0	5	0

Newport (Mon.).

	£	s.	d.
Atkins, A. E.	0	5	0
Evans, David	0	5	0
Faulkner, H.	0	5	0
Garrett, T. P.	0	5	0
Gratte, Henry J.	0	5	0
Paine, Charles	0	10	6
Phillips, James W.	0	5	0
Seys, James A.	0	5	0
Smith, Albert	0	5	0
Young, John	0	10	6

Newport Pagnell.

Taylor, F. W.	0	5	0

Newport (Salop).

Picken, Thomas William	0	5	0

Newton Abbot.

Stiling, John E.	0	10	6
Wright, W.	0	5	0

Newton Stewart.

Keith, John	0	2	6

Newtown (Mont.).

Morgan, Richard	0	10	6

Norbiton.

Greenwood, J.	0	10	6

Northallerton.

Fairburn, Joseph	0	10	6
Squince, J. A.	0	5	0

Northampton.

Ashford, Evan Charles	0	5	0
Barry, James	1	1	0
Bingley, John	0	10	6
Clower, John	0	5	0
Kirby, Frederick	0	5	0
Mayger, William D.	0	10	6
Negus, Samuel T.	0	5	0
Sindall, J. W. (Executors of)	0	2	6

Northfleet.

Lucas, Joseph M. M.	0	5	0

North Kelsey (Lincs).

Dixon, James	0	6	8

North Walsham.

Bailey, George Wm.	0	5	0

Northwich.

Clough, John	0	10	0
Deakin, J. W.	0	5	0
Humphreys, Griffith	0	5	0
Lee, William	0	5	0

Norwich.

Betts, George	0	10	6
Caley, Albert J.	0	10	6
Corder, Edward	0	10	6
Corder, Octavius	1	1	0
Cossey, John	0	5	0
De Carle, H. E.	0	5	0
Eldridge, J. H.	0	5	0
Gardiner, W.	0	5	0
Hayhoe, W.	0	5	0
Heaver, Arthur W.	0	5	0
King, H. A.	0	5	0
Mallett, H. P.	0	5	0
Mason, Philip H.	0	10	6
Nuttall, Edwin	0	10	6
Pitts, W. C.	0	5	0
Robinson, James	0	5	0
Smith, Joseph de Carl, jun.	0	10	6
Squirrell, M. P.	1	1	0
Sutton, Francis	0	10	6
Taylor, H. E.	0	5	0
Thompson, H.	0	5	0
Watson, J. E. H.	0	10	6

Nottingham.

Dadley, Elijah	0	10	6
Edgson, Hugh	0	10	6
Fletcher, Thomas B.	0	5	0
Flowerdew, W. C.	0	2	6
Lumby, Fred.	0	5	0
Manfull, H. J.	0	5	0
Middleton, A.	0	5	0
Newball and Mason	1	1	0
Parker, W. H.	0	10	0
Pearson, Edward	1	1	0
Rayson, J. T.	0	5	0
Robinson, Joseph	0	5	0
Shippam, Henry	0	2	6
Smithurst, John	0	5	0
Taylor, Thomas C.	0	10	6
Watkinson, Thos.	0	10	6

Nuneaton.

	£	s.	d.
Iliffe, George	0	5	0
Lester, Henry	0	5	0

Oban (N.B.).

Lawrence, S.	0	5	0
Robertson, A.	0	2	6

Odiham.

Woodman, George	0	5	0

Oldbury.

Homes, Joseph P.	0	5	0

Oldham.

Andrew, J. H.	0	2	6
Bagshaw, Henry B.	0	10	6
Bagshaw, William	0	10	6
Bates, Henry	0	10	6
Bates, Hiram	0	5	0
Berry, Thomas	0	5	0
Braddock, George	1	1	0
Brelsford, James	0	10	6
Geddes, William	0	5	0
Glover, J.	0	2	6
Hargraves, H. L.	0	10	6
Haslop, William	0	5	0
Hurst, James	0	5	0
Inglis, W. K.	0	2	6
Lees, James	0	2	6
Lord, Robert B.	0	5	0
Tomlinson, A. G.	0	5	0
Wilson, Alexander G.	0	5	0

Old Radford.

Bully, A. E.	0	5	0

Oswestry.

Evans, John	0	5	0
Roberts, William Carey	0	2	6
Smale, Mary E.	0	5	0
Smale, Richard B.	0	5	0
Vaughan, David	0	5	0

Otley (Yorks).

Lockwood, T.	0	5	0
Pratt, Richard M.	0	10	6

Oxford.

Bloxham, W. E.	0	5	0
Clayton, C.	0	2	6
Court, G. F.	0	5	0
Druce, George C.	0	10	6
Hill, James H.	0	5	0
Jenkins, Alexander	0	5	0
Prior, George T.	0	10	6
Squire, James	0	5	0
Thurland, Henry	0	10	6
Walsh, Edward	0	10	6

Paignton.

Riches, F. F.	0	2	6
Riches, T.	0	5	0
Sherriff, George	0	5	0

Paisley.

MacCowan, R. T.	0	5	0

Partick (N.B.).

McNicol, John	0	5	0
Rait, Robert C.	0	10	6

Pau (France).

Jarvis, John	1	1	0

Paulton (Somerset).

Bush, Thomas	0	5	0

Pembroke Dock.

Bowling, J. H.	0	2	6
Laen, William	0	5	0

Pendleton.

Jeans, Thomas R.	0	5	0
Robinson, B.	0	5	0

Penrith.

Redfern, Tom	0	10	0

Penzance.

Buckett, A. H.	0	5	0
Shakerley, Benjamin	0	5	0
Symons, N. H.	0	5	0

Pershore.

Smith, Arthur W.	0	5	0

Perth.

Donald, David	0	7	6

Peterborough.

	£	s.	d.
Bloodworth, Thomas	0	2	6
Bodger, J. W.	0	2	6
Booth, Samuel	0	2	6
Bright, Richard H. D.	0	2	6
Carlton, Arthur	0	10	6
Dye, C. P.	0	2	6
Heanley and Saunders	0	10	6
Knight, W. T.	0	10	6
Pearson, John H.	0	5	0
Sturton and Sons	0	10	6
Turner, R. P.	0	2	6
Whitwell, Ewen	0	5	0

Petersfield.

Nichols, Frederic B.	0	5	0

Petworth.

Edgar, F. G.	0	5	0

Pinner.

Wilkinson, T.	1	1	0

Plymouth.

Adams, W. T.	0	5	0
Allen, Joseph	0	10	6
Bailey, John H.	0	5	0
Balkwill, A. P.	2	2	0
Barge, John	0	2	6
Cocks, James	0	5	0
Foster, F. H.	0	10	0
Goodwin, Medmer	0	10	6
Hearder, H. P.	0	10	6
Hetherington, A. H.	0	5	0
Hunt, F. W.	0	10	6
Luke, R. S.	0	5	0
Maitland, F.	0	5	0
Maurice, James	2	2	0
Park, Charles J.	0	10	6
Roper, R. F.	0	5	0
Sloggett, Thomas C.	0	5	0
Turney, Samuel B.	0	5	0
Weary, C. T.	0	5	0
Woods, W. H.	0	5	0
Woods, William	1	1	0

Pocklington.

Boyden, John A. C.	0	2	6

Pontefract.

Bratley, William	0	5	0
Hodgson, George	0	5	0

Pontlottyn.

Roberts, W.	0	5	0

Pontypool.

Ford, Edward B.	0	10	6

Pontypridd.

Arnott, Daniel	0	2	6
Cule, Taliesin	0	10	6
Jones, J. P.	0	10	6
Prothero, G. R.	0	2	6

Poole.

Atkins, T. W.	0	5	0
Pomeroy, F. T.	0	5	0

Port Elizabeth (Cape Colony).

Willet, John A.	0	10	6

Perth.

Davies, Thomas	0	5	0
Evans, Mrs. Annie	0	5	0

Porthcawl.

Thomas, J. J.	0	5	0

Portland.

Childs, Joseph L.	0	5	0

Porto Alegre (Brazil).

Hallawell, J.	1	1	0

Portobello.

Nesbit, John	1	1	0

Portsmouth.

Bailey, H. H.	0	2	6
Brewis, T.	0	5	0
Mumby, Charles and Co.	1	1	0

Portsoy.

Clark, James	0	2	6

Port Talbot.

Loveluck, G. D.	0	2	6
Williams, Moses	0	5	0

Poulton-le-Fylde (Lancs.).

Blade, E.	0	5	0

Preston.

	£	s.	d.
Arkle, C. A.	0	2	6
Parker, Thomas	0	5	0
Pemberton, William	0	2	6
Sharples, George	0	5	0

Ramsey (Hunts.).

Palmer, Frederick W.	0	10	6

Ramsgate.

Franks, Alfred	0	5	0
Morton, Henry	0	5	0
Pavey, H. J.	0	5	0
Puckey, W.	0	5	0
Saunders, Charles J. H.	0	2	6
Thomas, H.	1	1	0

Reading.

Bradley, Charles	0	10	6
Butler, B. H.	0	5	0
Cardwell, E.	0	10	6
Cave, J. R.	0	2	6
Coles, S. J.	0	5	0
Craft, James	0	5	0
Cross, John	0	2	6
Hayward, S.	0	2	6
Hayward William G.	0	5	0
Knowles, J. H.	0	5	0
Rowell, John C.	0	5	0
Tunbridge, Frederick	0	5	0
Young, J. M. (Theale)	0	5	0

Redditch.

Moule, William	0	5	0

Redhill.

Ralling, Ernest L.	0	10	6
Sillitoe, F. S.	1	1	0

Reepham.

Cripps, Johnson	0	10	6

Reigate.

Sargant, J.	0	10	6

Retford.

Baker, William	0	10	6
Westbrook, Dr. C.	1	1	0

Rhyl.

Lawrence, George R.	1	1	0

Rhymney.

Dixon, Franklin	1	1	0

Richmond (Surrey).

Bletsoe, John	0	10	6
Hornby, Alfred	0	10	6
Melvin, G.	0	2	6
Mumbray, R. G.	0	10	6
Thacker, William	1	1	0

Ripon.

Parkin, J. B.	0	10	6
Thornley, F.	0	5	0

Rochdale.

Bamford, J. W.	0	5	0
Hadfield, James	0	5	0
Highley, William	0	5	0
Kerr, William	0	2	6
Mason, Arthur	0	5	0
Partington, William	0	2	6
Porter, T.	0	5	0
Taylor, Edward	0	5	0
Whittaker, J. W.	0	2	6
Wood, John	0	2	6

Rochester.

Brown, A. H.	0	2	6
Brown, Hugh S. F.	0	2	6
Cowan, Frank	0	5	0
Hewitt, Joseph S.	0	5	0
Watts, G. W.	0	5	0

Rochford.

Harrington, A. L.	0	2	6

Rock Ferry.

Dutton, H. O.	1	1	0

Roehampton.

Swain, James	0	5	0

Rome.

Barrass, T. E.	0	5	0

Romford.

Lasham, John W.	0	10	6

Ross.

Matthews, T. A.	0	5	0

Rothbury.

	£	s.	d.
Farrage, Robert	0	10	6

Rotherfield.

Field, William	0	5	0

Rotherham.

Bradshaw, C. H.	1	1	0
Horsfield, J. M.	0	5	0

Rothesay.

Duncan, William	0	5	0
Macintosh, Archibald	0	5	0

Rugby.

Clerke, W. B.	0	5	0

Ruthin.

Magin, Arthur E.	0	2	6
Rouw, T. J.	0	5	0

Ryde (Isle of Wight).

Dixon, Henry	0	10	6
Gibbs, William	0	10	6
Pollard, Henry H.	0	10	6
Smith, Tenison	0	10	6
Smith, William	0	5	0

Rye (Sussex).

Horrell, W. H. D.	0	2	6
Waters, William A.	0	10	6

Saffron Walden.

Hutchin, W. F.	0	5	0
Machon, H.	0	15	6

St. Albans.

Allenby, Henry	0	2	6
Ekins, Arthur E.	0	10	6

St. Andrews.

Bruce, A. K.	0	10	6
Govan, Alexander	0	10	6
Kirk, John J.	0	2	6

St. Austell.

Bice, James	0	5	0

St. Bees.

Broomfield, R. W.	1	1	0

St. Clears.

Johns, John	0	2	6
Williams, Evan	0	10	6

St. Davids.

David, Albert	0	2	6

St. Day.

Corfield, Charles	0	10	6

St. Helens.

Cotton, J. C.	0	10	6
Harrison, James	0	5	0
Sherlock, Thomas	0	5	0

St. Just.

Wearing, John	0	2	6

St. Leonards. See Hastings.

St. Neots.

Mellor, J. G.	0	5	0
Wise, James	0	5	0

Sale.

Smith, Allen	0	5	0

Salisbury.

Atkins, Samuel Ralph	1	1	0
Atkins, William R.	0	10	6
Hardy, R. E.	0	5	0
King, L. W.	0	5	0
Newton, J. W.	0	10	6
Orchard, E. J.	0	10	6
Rowe, J.	0	5	0

Saltash.

Mathew, William H.	0	5	0

Saltburn-by-the-Sea.

Taylor, William	0	10	6

Sandbach.

Gee, G. H.	0	2	6

San Remo (Italy).

Squire, Frank R.	1	1	0

Sandgate.

Jenner, William M.	0	5	0
Kennett, E.	0	2	6

Sandown (Isle of Wight).

Cocksedge, H. B.	0	10	6

Sandwich.

	£	s.	d.
Baker, Frank	0	10	6
Dixon, William (Ash)	0	5	0
Woodruff, A. E. (Eastry)	0	5	0

Scarborough.

Chapman, Henry	0	10	6
Clare and Hunt	1	1	0
Cuttle, Arthur E.	0	2	6
Hill, R. M.	0	2	6
Hughes, John E.	0	10	6
Jones, Alfred	0	5	0
Jones, C.	0	2	6
Simms, R. J.	0	2	6
Smith, John F.	0	5	0
Whitfield, John	1	1	0

Seacombe.

Hinkley, E.	0	2	6
Holt, Richard W.	0	5	0

Seaham Harbour.

Storey, W.	0	5	0

Seaton.

Skinner, A. J. P.	0	5	0

Selkirk.

Dunn, Thomas	0	5	0

Settle.

Shepherd, J. W.	0	10	

Shanklin (Isle of Wight).

Brown, Andrew Henry	0	10	6
Deeks, W. T.	0	10	6

Sheepshed.

Moore, Thomas	0	5	0

Sheerness.

Hills, William	0	2	6
Prosser, David	1	1	0
Rayner, William	0	5	0

Sheffield.

Basker, J. P.	0	2	6
Bonnett, F.	0	2	6
Bradwall, J. H.	0	5	0
Carr, George	0	5	0
Clayton, William	0	10	6
Cubley, G. A.	0	10	6
Dobb, J. T.	0	10	6
Dunnill, G. H.	0	5	0
Eardley, J. F.	0	5	0
Ellinor, George	0	10	6
Elliott, John G.	1	0	0
Eyre, S.	0	5	0
Fox, A. R.	0	10	6
Froggatt and Son	0	5	0
Furness, Joseph M.	0	5	0
Grierson, G. A.	0	5	0
Harrison, Thomas M.	0	5	0
Hewitt, J. P.	0	5	0
Ibbitt, H. E.	0	2	6
Jepson, Xeno	0	2	6
Lowe, S. P.	0	5	0
Marshall, J.	0	5	0
Miller, John T.	0	5	0
Miner, M. T.	0	2	6
Morrison, C. O.	0	5	0
Newsholme, G. T. Wilkinson	1	1	0
Owen, W.	0	5	0
Preston, Job	0	10	6
Priestley, Henry	0	10	6
Radford, Charles	0	5	6
Reckless, W.	0	10	6
Salisbury, John M.	0	10	6
Stevenson, W.	0	5	0
Turner, J.	0	5	0
Ward, William	0	10	6
Watson, H. G.	0	5	0
Watson, Robert W.	0	10	6
Watts, J.	0	5	0
Wiles, Edwin	0	5	0

Shepton Mallet.

Fudgé, Charles William	0	5	0

Shields, North.

Burn, Thomas	0	2	6
Gibson, James	0	10	6
Hogg, Joseph F.	0	2	6
Irvin, W. G.	0	2	6
Kirkness, R.	0	5	0

Shields, South.

Forrest, Robert	0	10	6
Noble, John	0	5	0
Walker, James	0	2	6

Shrewsbury.

	£	s.	d.
Adams, William	1	1	0
Blunt, T. P.	1	1	0
Cross, A. R.	0	5	0
Cross, William G.	3	3	0
Gouldbourn, William	0	10	6
Pattison, H.	0	5	0
Perkins, Christopher	0	5	0
Pyefinch, John	0	5	0
Salter, Benjamin	1	1	0
Salter, Joseph B.	1	1	0

Sidmouth.

Chessall, Rowland	0	5	0

Silverdale.

Wilson, Edward	0	5	0

Sittingbourne.

Cocking, T. S.	0	5	0
Gordelier, William G.	1	1	0

Sleaford.

Harrison, T. E.	0	5	0
Spyvee, W.	0	2	6
Wood, J. R.	0	5	0

Slough.

Elliman, Sons and Co.	1	1	0
Griffith, Richard	0	10	6

Smallthorne.

Fletcher, Thomas	0	10	6

Snaith.

Bean, John	0	10	6

Southam.

Archer, Thomas	0	2	6

Southall (Middlesex).

Diggens, E. D.	0	5	0

Southampton.

Alderslade, W.	0	5	0
Bates, William	0	5	0
Bishop, Samuel	0	5	0
Borchert, Heinrich T. G.	1	1	0
Chipperfield, R.	1	11	6
Dawson, Oliver R.	0	10	6
Fletcher, J. B. (Totton)	0	5	0
Hughes, J. H.	0	5	0
Madge, James C.	0	10	6
Mumford, Alfred	0	10	6
Randall, William B.	1	1	0
Rubie, J. T.	0	5	0
Spearing, James	0	10	6
Wedge, George D.	0	2	6

Southend.

Dawson, George R.	0	5	0
Wright, Mrs. G.	0	10	6

South Molton.

Swingburn, Richard H.	0	10	6

Southport.

Adams, C. M.	0	5	0
Ashton, William	1	1	0
Ball, Henry	0	5	0
Elliott, Stephen J.	0	2	6
Gill, Hugh	0	5	0
Gillett, Mrs.	0	5	0
Hay, David	0	5	0
Horsefall, John	0	10	6
Mainwaring, R.	0	10	6
Merchant and Co.	0	5	0
Neame, H. A.	0	2	6
Radley, William V.	0	10	6
Righton, James	0	10	6
Round, Frederick	1	1	0
Surr, Edward	0	10	6
Whitworth, James	0	10	6
Wilding, G. I.	0	10	6
Wimpenny, James M.	0	5	0
Winter, William	0	10	6

Southsea.

Callaway, L.	0	10	6
Childs, James L.	0	10	6
Cruse, Thomas H.	1	1	0
Deacon, F. G.	0	5	0
Ford, H. S.	0	5	0
Gossling, W. R.	0	5	0
Sangster, John G.	0	5	0
Trist, R.	0	5	0

South Stockton.

Ronchetti, T. A.	0	5	0

Southwell.

	£	s.	d.
Downing, J. H.	0	10	0

Southwold.

Critten, Robert P.	0	2	6

Spalding.

Bell, E. W.	0	5	0
Branston, J. W.	0	5	0
Donington, R.	0	5	0
Steeper, Samuel	0	5	0

Spennymoor.

Burdon, Thomas A.	0	5	0

Spilsby.

Rainey, J. J.	0	5	0

Stafford.

Averill, Henry Alcock	0	10	6
Averill, John	0	10	6
Spilsbury, James	0	5	0
Viggars, G. D.	0	2	6

Stamford.

Dickinson, Frederick	0	10	6
March, Frederick	0	5	0

Stevenage.

Fresson, Lewis Francis	0	10	6

Stockport.

Arnfield, J. C.	0	5	0
Dodge, William	0	10	6
Johnson, Thomas J.	0	5	0
Kay Brothers	2	2	0
Orton, W. B.	0	5	0
Sidley, Thomas I.	0	10	6
Towle, Samuel	0	2	6

Stockton-on-Tees.

Bainbridge, Robert R.	0	2	6

Stoke Ferry.

Newsam, W. H.	0	5	0

Stoke-on-Trent.

Adams, Frank	0	10	6
Adams, William H.	0	10	6
Guest, George C.	0	2	6
Harris, Robert H.	0	5	0
Jones, John	0	10	0
Smith, Arthur H.	0	10	6
Wilson, Clement Fisher	0	10	6

Stoke (Surrey).

Ratheram, William	0	5	0

Stone (Staffs).

Slater, Thomas	0	10	6
Slater, Thomas, jun.	0	5	0

Stonehouse (Devon).

Davey, H. D.	0	2	6
Netten, Henry J. T.	0	5	0

Stony Stratford.

Cox, Julia Jane	0	10	6
Robinson, William H.	0	10	6

Stourbridge.

Biggs, F. W.	0	2	6
Burgess, William	0	5	0
Loverock, Henry	0	5	0
Selleck, W. R.	0	5	0

Stourport.

Twinberrow, J.	0	10	0

Stowmarket.

Gostling, George J.	1	1	0
Simpson, Robert G.	0	5	0
Wilson, Thomas	0	5	0

Stradbroke.

Foulsham, Harry B.	0	5	0

Stratton.

Pickard, Henry	0	5	0

Strood.

Picnot, Charles	1	1	0

Stroud.

Coley, Samuel J.	0	10	6

Sunbury-on-Thames.

Price, J.	0	5	0

Sunderland.

Aslin, John	0	5	0
Aslin, William	0	2	6

Sunderland—continued.

	£	s.	d.
Bowman, S.	0	2	6
Fairman, George P.	0	10	6
Harrison, John	0	10	6
Harrison, W. B.	0	5	0
Mitchinson, John	0	5	0
Ranken, Charles	0	5	0
Scott, W.	0	5	0

Surbiton.

Arfield, William	0	5	0
Lowe, Charles	0	10	6

Sutton (Cheshire).

Dangerfield, W. H.	0	5	0

Sutton-in-Ashfield.

Briggs, G. W.	0	5	0

Swaffham.

Bell, Frederick R.	0	5	0
Christopherson, Fred	0	5	0
Finch, Jacob	0	10	6

Swansea.

Atkins, John	0	5	0
Davies, J. M.	0	5	0
Davies, John (31, High Street)	0	5	0
Davies, John (75, Oxford Street)	0	2	6
Davies, John (Walters Road)	0	10	6
Davies, William	0	5	0
Evans, D.	0	2	6
George, William	0	10	6
Grose, Nicholas M.	1	1	0
Hughes, James	0	5	0
Jones, Moses	0	10	6
Keall, F. P.	0	10	6
Lloyd, John W.	0	5	0
Lowther, H. R.	0	5	0
Rees, Daniel	0	5	0
Richards, J.	0	5	0
Roberts, J. K.	0	5	0
Thomas, L.	0	5	0
Trick, M.	0	5	0
Williams, J. T.	0	10	6
Yorath, C.	0	5	0

Swindon.

Green, John	0	5	0

Tarporley.

Aston, Walter	0	5	0

Taunton.

Copestake, H. H.	0	5	0
Hambly, Charles J.	0	5	0
Kirkpatrick, Mrs.	0	5	0

Tavistock.

Doble, H. T.	0	5	0
Gill, William	0	2	6

Teignmouth.

Cocking, Frederick J.	0	5	0
Evans, Joseph J. O.	0	5	0
Maunder, William	0	5	0

Tenbury.

Slade, John	0	10	6

Tenby.

Davies, Moses P.	0	5	0
James, George	0	5	0
Williams, William	0	10	6

Tewkesbury.

Barlow, G. R.	0	2	6
Wilkes, D. T. (Bredon)	0	2	6

Thame.

Tame, Thomas	0	5	0

Thirsk.

Ayre, George	0	10	6
Ayre, Henry	0	2	6

Thornhill (N.B.).

Fingland, James	0	5	0

Thornton Heath.

Knott, Samuel	0	5	0

Thrapston.

Pars, R. C.	0	10	6

Ticehurst.

Corke, Edward	0	10	6

Titchfield.

Smith, W. O.	0	10	6

Tiverton.

	£	s.	d.
Havill and Son	0	5	0
Rossiter, Thomas E.	0	5	0
Tritton, C. E.	0	5	0

Todmorden.

Maddock, H.	0	5	0
Stevenson, W.	0	2	6

Topsham.

Ellis, Frederick	0	2	6

Torquay.

Bathe, William	0	5	0
Bridgman, William Louis	0	5	0
Cocks, John W.	0	5	0
Guyer, James B.	0	10	6
Horton, Thomas	0	5	0
Knight, Benjamin	0	5	0
Moon, G. W.	0	5	0
Ness, Thomas H.	0	5	0
Shapley, Charles	0	10	6
Sloman, Richard	0	10	6
Stammwitz, Louisa	0	10	6
Taylor, John	0	10	6
Tomlin, J. P.	0	5	0
Waymouth, T. S.	0	5	0

Totnes.

Butland, Charles	0	5	0
Cooke, E. H.	0	2	6
Morse, C. H. Stafford	0	5	0

Tredegar.

Phillips, Charles L.	0	10	6

Tregaron.

Jones, T.	0	2	6

Truro.

Anstey, J. U.	0	5	0
Bucher, W. H.	0	5	0
Feaver, Samuel	0	13	0
James, Hamilton	0	5	0
Percy, Thomas B.	0	10	0

Tunbridge.

Millidge, Thomas E.	0	10	6
Wardley, S. F.	0	10	6

Tunbridge Wells.

Arnold, Spencer	0	10	6
Batting, Thomas G.	0	10	6
Cheverton, George	1	1	0
Dunkley and Rogers	1	1	0
Howard, George W.	0	10	6
Howard, Richard	0	10	6
Sells, Robert J.	0	10	6
Thompson, G. A.	0	5	0
Wells, A. J.	0	5	0
Whitrow, Benjamin	0	10	0
Williams, James	0	10	6

Tunstall.

Keightley, Joseph	0	5	0

Tutbury.

Green, Isaac	0	5	0

Twickenham.

Alexander, William	0	5	0
Bishop, Thomas	1	1	0
Peake, Henry F.	0	5	0
Shelley, Henry	0	10	6

Tynemouth.

Atkinson, Joseph	0	5	0

Uckfield.

Farr, E. H.	0	10	6

Ulverston.

Willan, Robert	0	10	6

Upton-on-Severn.

Gibbs, John	0	10	6

Urmston.

Duncalf, Richard	0	5	0

Uttoxeter.

Woodward, H.	1	1	0
Woolrich, Charles B.	0	10	6

Ventnor (Isle of Wight).

Littlefield, J. W.	1	1	0
Nicholls, A. L.	0	2	6
Smith, C. A.	1	1	0
Weston, Charles	1	1	0

Wadebridge.

	£	s.	d.
Philp, J.	0	5	0

Wakefield.

Cardwell, James	0	5	0
Chaplin, John Lambert	0	10	6
Duffin, Thomas	0	10	6
Moorhouse, Walter	0	5	0
Pollard, William	0	5	0
Saville, George	0	10	6
Smith, G. E.	0	10	6
Thornton, E.	0	5	0
Wice, J. H.	0	10	6

Wallingford.

Ashmall, George	0	5	0
Payne, Sidney	1	1	0
Upton, Eustace J.	0	10	6

Wallington.

Knowles, R.	0	5	0
Wood, Edward	0	10	6

Walmer.

Wood, Henry	0	5	0

Walsall.

Bayley, C.	0	10	6
Elliott, George	0	5	0
Grove and Son	0	5	0
Morris, J. O.	0	5	0
Thorp, J.	0	2	6

Walsham-le-Willows.

Harrington, Arthur	0	5	0

Waltham Abbey.

Griffiths, J. M.	0	10	6
Marshall, A.	1	1	0

Walton-on-Thames.

Power, William	0	5	0

Ware.

Medcalf, Benjamin	0	10	6
Medcalf, Benjamin Pearce	0	10	6

Wareham.

Harman, E. S.	0	5	0
Marshallsay, R. J.	0	5	0
Randall, Thomas	0	10	6

Warrington.

Young, John R.	0	10	0

Watchet.

Daymond, Samuel	0	2	6

Watford.

Chater, Edward M.	1	1	0
Chater, Matthew Taylor	1	1	0
Cottle, Alfred James	0	5	0
Curtis, H. E.	0	5	0
Maries, H. D.	0	5	0
Parrott, W. S.	0	10	6

Wath-upon-Dearne.

Hick, Allan	0	10	6

Watton.

Pechey, T. P.	0	5	0
Vincent, Lacey A.	0	10	6

Weaverham.

Manifold, John J.	0	10	6

Wednesbury.

Gittoes, Samuel J.	0	10	6

Wellingborough.

Smith, John T.	0	2	6

Wellington (New Zealand).

Ridd, A. H.	0	2	6

Wellington (Somerset).

Gregory, Walter	0	5	0
Windeatt, G. J.	0	5	0

Wells (Norfolk).

Rump, Robert R.	0	10	6

Wells (Somerset).

Manning, Richard James	0	10	6
Slater, Jonathan	0	5	0

Welshpool.

Griffiths, Thomas	0	5	0

Welton.

Myers, George Henry	0	5	0

Sandwich.

	£	s.	d.
Baker, Frank	0	10	6
Dixon, William (Ash)	0	5	0
Woodruff, A. E. (Eastry)	0	5	0

Scarborough.

Chapman, Henry	0	10	6
Clare and Hunt	1	1	0
Cuttle, Arthur E.	0	2	6
Hill, R. M.	0	2	6
Hughes, John E.	0	10	6
Jones, Alfred	0	5	0
Jones, C.	0	2	6
Simms, R. J.	0	2	6
Smith, John F.	0	5	0
Whitfield, John	1	1	0

Seacombe.

Hinkley, E.	0	2	6
Holt, Richard W.	0	5	0

Seaham Harbour.

Storey, W.	0	5	0

Seaton.

Skinner, A. J. P.	0	5	0

Selkirk.

Dunn, Thomas	0	5	0

Settle.

Shepherd, J. W.	0	10	

Shanklin (Isle of Wight).

Brown, Andrew Henry	0	10	6
Deeks, W. T.	0	10	6

Sheepshed.

Moore, Thomas	0	5	0

Sheerness.

Hills, William	0	2	6
Prosser, David	1	1	0
Rayner, William	0	5	0

Sheffield.

Basker, J. P.	0	2	6
Bonnett, F.	0	2	6
Bradwall, J. H.	0	5	0
Carr, George	0	5	0
Clayton, William	0	10	6
Cubley, G. A.	0	10	6
Dobb, J. T.	0	10	6
Dunnill, G. H.	0	5	0
Eardley, J. F.	0	5	0
Ellinor, George	0	10	6
Elliott, John G.	1	0	0
Eyre, S.	0	5	0
Fox, A. R.	0	10	6
Froggatt and Son	0	5	0
Furness, Joseph M.	0	5	0
Grierson, G. A.	0	5	0
Harrison, Thomas M.	0	5	0
Hewitt, J. P.	0	5	0
Ibbitt, H. E.	0	2	6
Jepson, Xeno	0	2	6
Lowe, S. P.	0	5	0
Marshall, J.	0	5	0
Miller, John T.	0	5	0
Miner, M. T.	0	2	6
Morrison, C. O.	0	5	0
Newsholme, G. T. Wilkinson	1	1	0
Owen, W.	0	5	0
Preston, Job	0	10	6
Priestley, Henry	0	10	6
Radford, Charles	0	5	0
Reckless, W.	0	10	6
Salisbury, John M.	0	10	6
Stevenson, W.	0	5	0
Turner, J.	0	5	0
Ward, William	0	10	6
Watson, H. G.	0	5	0
Watson, Robert W.	0	10	6
Watts, J.	0	5	0
Wiles, Edwin	0	5	0

Shepton Mallet.

Fudgé, Charles William	0	5	0

Shields, North.

Burn, Thomas	0	2	6
Gibson, James	0	10	6
Hogg, Joseph F.	0	2	6
Irvin, W. G.	0	2	6
Kirkness, R.	0	5	0

Shields, South.

Forrest, Robert	0	10	6
Noble, John	0	5	0
Walker, James	0	2	6

Shrewsbury.

	£	s.	d.
Adams, William	1	1	0
Blunt, T. P.	1	1	0
Cross, A. R.	0	5	0
Cross, William G.	3	3	0
Gouldbourn, William	0	10	6
Pattison, H.	0	5	0
Perkins, Christopher	0	5	0
Pyefinch, John	0	5	0
Salter, Benjamin	1	1	0
Salter, Joseph B.	1	1	0

Sidmouth.

Chessall, Rowland	0	5	0

Silverdale.

Wilson, Edward	0	5	0

Sittingbourne.

Cocking, T. S.	0	5	0
Gordelier, William G.	1	1	0

Sleaford.

Harrison, T. E.	0	5	0
Spyvee, W.	0	2	6
Wood, J. R.	0	5	0

Slough.

Elliman, Sons and Co.	1	1	0
Griffith, Richard	0	10	6

Smallthorne.

Fletcher, Thomas	0	10	6

Snaith.

Bean, John	0	10	6

Southam.

Archer, Thomas	0	2	6

Southall (Middlesex).

Diggens, E. D.	0	5	0

Southampton.

Alderslade, W.	0	5	0
Bates, William	0	5	0
Bishop, Samuel	0	5	0
Borchert, Heinrich T. G.	1	1	0
Chipperfield, R.	1	11	6
Dawson, Oliver R.	0	10	6
Fletcher, J. B. (Totton)	0	5	0
Hughes, J. H.	0	5	0
Madge, James C.	0	10	6
Mumford, Alfred	0	10	6
Randall, William B.	1	1	0
Rubie, J. T.	0	5	0
Spearing, James	0	10	6
Wedge, George D.	0	2	6

Southend.

Dawson, George R.	0	5	0
Wright, Mrs. G.	0	10	6

South Molton.

Swingburn, Richard H.	0	10	6

Southport.

Adams, C. M.	0	5	0
Ashton, William	1	1	0
Ball, Henry	0	5	0
Elliott, Stephen J.	0	2	6
Gill, Hugh	0	5	0
Gullett, Mrs.	0	5	0
Hay, David	0	5	0
Horsefall, John	0	10	6
Mainwaring, R.	0	10	6
Merchant and Co.	0	5	0
Neame, H. A.	0	2	6
Radley, William V.	0	10	6
Righton, James	0	10	6
Round, Frederick	1	1	0
Surr, Edward	0	10	6
Whitworth, James	0	10	6
Wilding, G. I.	0	10	6
Wimpenny, James M.	0	5	0
Winter, William	0	10	6

Southsea.

Callaway, L.	0	10	6
Childs, James L.	0	10	6
Cruse, Thomas H.	1	1	0
Deacon, F. G.	0	5	0
Ford, H. S.	0	5	0
Gossling, W. R.	0	5	0
Sangster, John G.	0	5	0
Trist, R.	0	5	0

South Stockton.

Ronchetti, T. A.	0	5	[illegible]

Southwell.

	£	s.	d.
Downing, J. H.	0	10	0

Southwold.

Critten, Robert P.	0	2	6

Spalding.

Bell, E. W.	0	5	0
Branston, J. W.	0	5	0
Donington, R.	0	5	0
Steeper, Samuel	0	5	0

Spennymoor.

Burdon, Thomas A.	0	5	0

Spilsby.

Rainey, J. J.	0	5	0

Stafford.

Averill, Henry Alcock	0	10	6
Averill, John	0	10	6
Spilsbury, James	0	5	0
Viggars, G. D.	0	2	6

Stamford.

Dickinson, Frederick	0	10	6
March, Frederick	0	5	0

Stevenage.

Fresson, Lewis Francis	0	10	6

Stockport.

Arnfield, J. C.	0	5	0
Dodge, William	0	10	6
Johnson, Thomas J.	0	5	0
Kay Brothers	2	2	0
Orton, W. B.	0	5	0
Sidley, Thomas I.	0	10	6
Towle, Samuel	0	2	6

Stockton-on-Tees.

Bainbridge, Robert R.	0	2	6

Stoke Ferry.

Newsam, W. H.	0	5	0

Stoke-on-Trent.

Adams, Frank	0	10	6
Adams, William H.	0	10	6
Guest, George C.	0	2	6
Harris, Robert H.	0	5	0
Jones, John	0	10	0
Smith, Arthur H.	0	10	6
Wilson, Clement Fisher	0	10	6

Stoke (Surrey).

Ratheram, William	0	5	0

Stone (Staffs).

Slater, Thomas	0	10	6
Slater, Thomas, jun.	0	5	0

Stonehouse (Devon).

Davey, H. D.	0	2	[illegible]
Netten, Henry J. T.	0	[illegible]	[illegible]

Stony Stratford.

Cox, Julia Jane	[illegible]	[illegible]	[illegible]
Robinson, William H.	[illegible]	[illegible]	[illegible]

Stour

Biggs, F. W.	[illegible]	[illegible]	[illegible]
Burgess, William	[illegible]	[illegible]	[illegible]
Loverock, Henry	[illegible]	[illegible]	[illegible]
Selleck, W. R.	[illegible]	[illegible]	[illegible]

[illegible]

Twinberrow, J.	[illegible]	[illegible]	[illegible]

[illegible]

Gostling, Ge	[illegible]	[illegible]	[illegible]
Simpson,	[illegible]	[illegible]	[illegible]
Wilson, T	[illegible]	[illegible]	[illegible]

[illegible]

Foulsh	[illegible]	[illegible]	[illegible]

[illegible]

Pick	[illegible]	[illegible]	[illegible]

[illegible]

Pi	[illegible]	[illegible]	[illegible]

Tiverton.

	£	s.	d.
nd Son	0	5	0
r, Thomas E.	0	5	0
C. E.	0	5	0

Todmorden.

	£	s.	d.
c, H...	0	5	0
n, W.	0	2	6

Topsham.

	£	s.	d.
derick	0	2	6

Torquay.

	£	s.	d.
illiam	0	5	0
, William Louis	0	5	0
n W.	0	5	0
nes B.	0	10	6
omas	0	5	0
njamin	0	5	0
W...	0	5	0
as H.	0	5	0
harles	0	10	6
hard	0	10	6
Louisa	0	10	6
n	0	10	6
	0	5	0
T. S.	0	5	0

Totnes.

	£	s.	d.
rles	0	5	0
	0	2	6
Stafford	0	5	0

Tredegar.

	£	s.	d.
les L.	0	10	6

Tregaron.

	£	s.	d.
	0	2	6

Truro.

	£	s.	d.
	0	5	0
	0	5	0
l	0	13	0
n	0	5	0
B.	0	10	0

Tunbridge.

	£	s.	d.
s E.	0	10	6
	0	10	6

bridge Wells.

	£	s.	d.
	0	10	6
G.	0	10	6
e	1	1	0
ers	1	1	0
V.	0	10	6
	0	10	6
	0	10	6
	0	5	0
	0	5	0
	0	10	0
	0	10	6

unstall.

	£	s.	d.
	0	5	0

utbury.

	£	s.	d.
	0	5	0

kenham.

	£	s.	d.
	0	5	0
	1	1	0
	0	5	0
	0	10	6

nth.

	£	s.	d.
	0	5	0

ld.

	£	s.	d.
	0	10	6

ton.

	£	s.	d.
	0	10	6

-Severn.

	£	s.	d.
	0	10	6

ton.

	£	s.	d.
	0	5	0

ster.

	£	s.	d.
	1	1	0
	0	10	6

Wight).

	£	s.	d.
	1	1	0
	0	2	6
	1	1	0
	1	1	0

Wadebridge.

	£	s.	d.
Philp, J.	0	5	0

Wakefield.

	£	s.	d.
Cardwell, James	0	5	0
Chaplin, John Lambert	0	10	6
Duffin, Thomas	0	10	6
Moorhouse, Walter	0	5	0
Pollard, William	0	5	0
Saville, George	0	10	6
Smith, G. E.	0	10	6
Thornton, E.	0	5	0
Wice, J. H.	0	10	6

Wallingford.

	£	s.	d.
Ashmall, George	0	5	0
Payne, Sidney	1	1	0
Upton, Eustace J.	0	10	6

Wallington.

	£	s.	d.
Knowles, R.	0	5	0
Wood, Edward	0	10	6

Walmer.

	£	s.	d.
Wood, Henry	0	5	0

Walsall.

	£	s.	d.
Bayley, C.	0	10	6
Elliott, George	0	5	0
Grove and Son	0	5	0
Morris, J. O.	0	5	0
Thorp, J.	0	2	6

Walsham-le-Willows.

	£	s.	d.
Harrington, Arthur	0	5	0

Waltham Abbey.

	£	s.	d.
Griffiths, J. M.	0	10	6
Marshall, A.	1	1	0

Walton-on-Thames.

	£	s.	d.
Power, William	0	5	0

Ware.

	£	s.	d.
Medcalf, Benjamin	0	10	6
Medcalf, Benjamin Pearce	0	10	6

Wareham.

	£	s.	d.
Harman, E. S.	0	5	0
Marshallsay, R. J.	0	5	0
Randall, Thomas	0	10	6

Warrington.

	£	s.	d.
Young, John R.	0	10	0

Watchet.

	£	s.	d.
Daymond, Samuel	0	2	6

Watford.

	£	s.	d.
Chater, Edward M.	1	1	0
Chater, Matthew Taylor	1	1	0
Cottle, Alfred James	0	5	0
Curtis, H. E.	0	5	0
Maries, H. D.	0	5	0
Parrott, W. S.	0	10	6

Wath-upon-Dearne.

	£	s.	d.
Hick, Allan	0	10	6

Watton.

	£	s.	d.
Pechey, T. P.	0	5	0
Vincent, Lacey A.	0	10	6

Weaverham.

	£	s.	d.
Manifold, John J.	0	10	6

Wednesbury.

	£	s.	d.
Gittoes, Samuel J.	0	10	6

Wellingborough.

	£	s.	d.
Smith, John T.	0	2	6

Wellington (New Zealand).

	£	s.	d.
Ridd, A. H.	0	2	6

Wellington (Somerset).

	£	s.	d.
Gregory, Walter	0	5	0
Windeatt, G. J.	0	5	0

Wells (Norfolk).

	£	s.	d.
Rump, Robert R.	0	10	6

Wells (Somerset).

	£	s.	d.
Manning, Richard Jam	0	10	6
Slater, Jonathan		5	0

	£	s.	d.
Griffiths, Th			
My			0

Falkirk.

	£	s.	d.
Lyon, Thomas	0	5	0
Murdoch, David	0	10	6

Falmouth.

Newman, Walter F.	0	5	0
Solomon, W. H.	0	10	6

Fareham.

Batchelor, Alfred E.	0	5	0
Batchelor, Charles	0	5	0
Franklin, Alfred	0	10	6

Faringdon.

Davis, G. A.	0	2	6

Farnham.

Cullingford, L. J.	1	1	0
Griffith, J.	0	10	6

Felixstowe.

Squirrell, Miss C. O.	2	2	0

Fenton.

Knight, Jesse	0	5	0
Massey, Stephen	0	5	0

Ferry Hill.

Hunter, H.	0	2	6

Flint.

Jones, O. W.	0	5	0

Folkestone.

Bishop, E. J.	0	10	6
Goodliffe, George	0	10	6
Harwood, Charles	0	5	0
Lea, Frederick J.	0	5	0
Lea, John	0	10	6
Stainer, John	0	10	6

Folkingham.

Carter, Mrs.	0	2	6

Fordingbridge.

Haydon, Frederick W.	0	5	0

Forfar.

Fowler, G. R.	0	5	0
Ranken, James A.	0	5	0
Ranken, John	0	5	0

Fortune's Well.

Grant, Donald	0	5	0

Foulsham.

Maddison, Mary	0	5	0

Fraserburgh.

Burnett, Robert	0	5	0

Gainsborough.

Forrest, Richard Wm.	0	10	6

Garstang.

Thomas, J. J.	0	5	0

Gateshead-on-Tyne.

Elliott, Robert	0	10	6
Greenwell, William C.	0	5	0
Weddle, W.	0	10	6

Glasgow.

Brodie, Robert	0	5	0
Clarke, Joseph A.	0	5	0
Currie, John (Eglinton Street)	0	5	0
Currie, John (Sauchiehall Street)	0	5	0
Currie, W. L.	0	5	0
Dickie, James	0	5	0
Dunlop, Thomas	0	5	0
Fenwick, John	0	5	0
Foster, John	0	10	6
Frazer, Daniel	1	1	0
Garry, George	0	2	6
Glasgow Apothecaries' Co.	1	1	0
Glen, Robert	0	5	0
Greig, William	0	10	6
Harrower, Peter	0	5	0
Henderson, John	0	5	0
Jaap, John	0	10	6
Kinninmont, Alexander	1	1	0
Lambie, Hugh	0	5	0
Laurence, John	0	10	6
McMillan, John	1	1	0
Neil, J.	0	5	0
Paterson, A.	0	5	0
Rose, Alexander	0	10	6
Thomson, William	0	5	0
Whitelaw, James	1	1	0

Gloucester.

	£	s.	d.
Foulkes, W. H.	0	10	6
Franklin, James	0	5	0
Hughes, Evan G.	0	5	0
Jenkins, Henry	0	5	0
Meadows, Henry	0	10	6
Sadleir, John	0	10	6
Stafford, William	0	10	6
Trigg, James W.	0	5	0
Ward, Joseph	0	10	6

Godalming.

Mather, J. H.	0	10	0

Gorton.

Plant, Frank G. L.	0	5	0

Gosforth.

Gaitskell, James	0	5	0

Gosport.

French, Benjamin	0	5	0

Govan.

Skinner, John	0	5	0

Graaff Reinet (Cape Colony).

Rivett, A. J.	0	10	6

Grantham.

Bishop, William	0	2	6
Fisher, F. D.	0	5	0
Gamble, Arthur	0	5	0
Hall, R. Arnold	0	10	6
Hunt, Thomas	0	5	0
Welborn, George	0	2	6
Whysall, William	0	10	6

Gravesend.

Clarke, Richard F.	1	1	0
Reid, C. Stuart	0	2	6
Sharp, S.	0	5	0
Wiseman, E.	0	2	6

Grays (Essex).

Kirby, Samuel John	0	5	0

Great Bedwyn.

Gerard, George R.	0	10	6

Great Grimsby.

Barker, William	0	5	0
Cook, Robert, jun.	0	5	0
Mason, William D.	0	2	6
Robinson, Jonathan Scott	0	2	6
White, J. C.	0	2	6
Willey, W.	0	5	0

Guernsey.

Nickolls, J. B.	0	5	0

Guildford.

Beck, J. W.	0	5	0
Jeffries, Henry	1	1	0
Martin, Edward W.	0	10	6
Thompson, Thomas	0	5	0
Wheeler, Frederick	0	5	0

Guisborough.

Fairburn, Robert W.	0	5	0

Haddington.

Gardiner, D.	0	5	0
Watt, James and J.	0	10	6

Halesworth.

Gostling, John H.	0	5	0

Halifax.

Brook, Robert	0	10	6
Dyer, William	0	5	0
Jessop, Jonathan	0	5	0
Seely, H. W.	0	2	6
Swire, Jabez	0	5	0

Halstead.

Marlar, John F.	0	2	6

Hampton Wick.

Miller, C. S.	0	5	0

Hanley.

Cornwell, T. C.	0	5	0
Furnival, John D.	0	10	6
Moore, John William	0	5	0

Hanwell.

	£	s.	d.
Kirkham, Frank	0	2	6

Harleston.

Fisher, W. H.	0	10	6
Woods, Charles	0	5	0

Harrogate.

Davis, Richard H.	0	10	6
Greenwood, Charles	0	10	6
Greenwood, John	0	10	6
Potter, Charles	0	5	0
Reynolds, Freshfield	0	10	6
Wilson and Son	1	1	0
Wood, A. W.	0	5	0

Harwich.

Bevan, Charles F.	0	10	6
Harding, Joseph	0	10	6
Worts, Augustine	0	5	0

Haslingden.

Blayney, Joseph J.	0	5	0

Hastings and St. Leonards.

Bathe, R. S.	0	10	6
Beck, Albert N.	0	5	0
Bolton, Thomas	0	5	0
Brooker, Algernon	0	5	0
Brooks, Frederick	0	5	0
Crisford, F. J.	0	2	6
Croasdale, J. C.	0	2	6
Feaver, John	0	10	6
Hasselby, E. H.	0	5	0
Jameson, W. E.	1	1	0
Jenner, H. A.	0	5	0
Keyworth, G. A.	0	10	6
Lemmon, G. F.	0	2	6
MacKenzie, C. A.	0	2	6
Maggs, F. W.	0	5	0
Maggs, Samuel B.	0	10	0
Neve, Francis C.	0	10	0
Rossiter, Frederick	0	10	6
Snowdon, Robert	0	5	0
Tharle, C. A.	0	10	6
Tree, Frederick	0	2	6
Tully, John	0	5	0
Vint, Thomas D.	0	5	0

Haverfordwest.

Jenkins, Jabez (Lysyfrân)	0	5	0
Saunders, Charles P.	0	5	0
Saunders, David P.	0	10	6

Hawick.

Craig, John	0	5	0
Kennedy, D.	0	10	0
Maben, Thomas	1	1	0
Turnbull, W. S.	0	5	0

Hay.

Davies, John Lutwyche	0	5	0

Hayle.

Williams, J. H.	0	5	0

Heaton Chapel.

Thorp, John	1	1	0

Hebden Bridge.

Hey, David	0	10	6
Hey, Thomas K.	0	10	6

Heckington.

Sumners, Michael Cole	0	5	0

Heckmondwike.

Booth, John	1	1	0
Stead, Walter	0	5	0

Helensburgh.

Harvie, George	0	5	0
McMurray, J.	0	5	0
Smith, Walter	0	5	0

Helmsley.

Allenby, W.	0	5	0

Helston.

Wakeham, Charles	0	5	0

Hemel Hempstead.

Argue, James	0	5	0
Ellis, C. J.	0	2	6

Henley-on-Thames.

Batchelor, C. J. H.	0	5	0

Hereford.

	£	s.	d.
Guy, E.	0	5	0
Haines, W. E.	0	5	0
Jackson, J. J.	0	10	6
Pearmund, H. S.	0	5	0
Walker, John	0	10	6
Williams, W. and H. B.	0	10	6

Hertford.

Durrant, G. R.	0	10	6

Hexham.

Gibson, J. P.	1	1	0
Richardson, George	0	5	0
Riddle, W. R.	0	5	0

Heywood.

Beckett, William	0	10	6

Highworth (Wilts).

Ballard, Edwin	0	5	0

Hitchin.

Perks and Llewellyn	1	1	0
Ransom and Son	1	1	0

Hong Kong (China).

Crow, W. E.	1	1	0
Watson, W. M.	0	5	0
Lucas, E. W.	0	5	0

Honley.

Broadbent, John B.	0	10	6

Horncastle.

Betts, William	0	5	0

Horsforth.

Wynn, Frederick	0	5	0

Houghton-le-Spring.

Rowell, R. H.	0	5	0

Hounslow.

Bowering, I.	0	5	0
Cull, Joseph	0	10	6

Howden (Yorks.).

Loam, J. G.	0	5	0

Huddersfield.

Bygott, W. T.	0	2	6
Dickinson, J. H.	0	5	0
Fitton, Robert	0	10	6
King, William	1	10	6
Needham, —	0	5	0
Piggott, W. F.	0	2	6
Swift, C. H.	0	5	0
Sykes, H.	0	5	0
Wheatley, Charles	0	10	0

Hull.

Allison, E. and H.	1	1	0
Bell, Charles B.	1	1	0
Bousfield, W. M.	0	5	0
Campbell, Charles	0	5	0
Chapman, E. J.	0	5	0
Chapman, Joseph	0	2	6
Creasser, Matthew	0	5	0
Desforge, J. H.	0	5	0
Dobson, J. B.	0	5	0
Dolling, Alfred	0	5	0
Dunlop, John	0	5	0
Dyson, George	0	5	0
Gibson, C. P. (Trustees of)	0	5	0
Grindell, John	0	10	6
Hall, Henry R. F.	0	5	0
Hammond, William H.	0	5	0
Hart, George William	0	10	6
Hebblethwaite, G. A.	0	2	6
Hollingsworth, James	0	5	0
Hoyles, George	0	2	6
Kenny, Thomas	0	5	0
Linford, John S.	1	1	0
Lofthouse and Saltmer	1	1	0
Oldham, James	0	5	0
Parsons, H. J.	0	2	6
Raynor, A.	0	5	0
Shaw, Ward	0	5	0
Sheffield, A. J.	0	5	0
Souter, Jas. S.	0	10	6
Staning, Walter	0	5	0
Stoakes, Benjamin M.	0	5	0

Hunstanton.

Twiss, Wm.	0	10	6

Huntingdon.

	£	s.	d.
Baxter, Robert	0	10	6
Cooper, A.	0	2	6

Huntly (N.B.).

Chalmers, G.	0	2	6

Hurstpierpoint.

Hudson, Alfred W.	0	2	6

Hyde.

Oldfield, Henry	0	10	6

Hyères (France).

Powell, Walter A.	0	5	0

Hythe.

Lemmon, R. A.	1	1	0

Ilford.

Beal, E. J.	1	1	0

Ilfracombe.

Affleck, T. S.	0	2	6
Crang, Walter	0	10	6
Wheeler, James	0	5	0

Ilkeston.

Potts, Charles	1	1	0

Ilkley.

Worfolk, G. W.	0	10	6

Ingatestone.

Stuart, Henry James	0	5	0

Inverness.

Allan, Alexander	0	5	0
Bethune, W. J.	0	2	6
Fraser, John	0	5	0
Galloway and Son	0	5	0
MacRitchie, D.	0	2	6
Mitchell, H.	0	5	0

Ipswich.

Anness, Samuel R.	0	10	6
Chapman and Pain	1	1	0
Clifton, R. S.	0	5	0
Cornell, William	1	1	0
Cossey, James D.	0	10	6
Crassweller, W. E.	0	5	0
Eyre, H. R.	0	5	0
Grimwade, Ridley and Co.	0	10	6
Matcham, Edward	0	5	0
Miller, T. T.	0	5	0
Nunn, C. G.	0	5	0
Spurgeon, Fredk. J.	0	5	0
Wigg, L. N.	0	5	0
Wiggin, J. C.	0	10	6
Younger, Robert E.	0	5	0

Irvine.

Gillespie, James	0	5	0

Isleworth.

Reece, James	0	5	0

Jarrow-on-Tyne.

Hooper, Richard	0	2	6

Jedburgh.

Walker, A.	0	5	0

Jersey.

Baker, John T.	0	5	0
Cole, George	1	1	0
Ereaut, John	1	1	0
Millais, Mrs.	1	1	0
Miller, Henry	0	5	0
Poingdestre, C. R.	0	10	6

Keighley.

Midgley, Walter	0	5	0
Riddiough, F.	0	5	0

Kendal.

Bateson, Thomas	1	1	0
Burton, Matthew	1	1	0
Hind, Thomas W. L.	1	1	0
Rigg, G. F.	0	10	6
Severs, Joseph	1	1	0

Kenilworth.

Barton, Henry Emlyn	0	10	6

Keswick.

Townley, Thomas W.	0	10	6

Kettering.

	£	s.	d.
Gray, A. U.	0	2	6
Thursfield, John F.	0	10	0

Kew.

Edwards, J. E.	0	10	6

Kidsgrove.

Griffiths, Edwin H.	0	10	6

Kilmarnock.

Borland, John	1	1	0
Borland, John, jun.	0	10	6

King's Lynn.

Atmore, George	0	5	0
Cocher, John A.	0	5	0
Count, Sidney	0	5	0

Kingston-on-Thames.

Bond, C. R.	0	10	6
Brewster, William	0	10	6
Higgs, Alfred	0	5	0
Walmsley, Samuel	0	5	0
Whaley, Edward	0	10	6

Kirby Lonsdale.

Birkett, John	0	5	0

Kirkcaldy.

Storrar, David	0	10	6

Knaresborough.

Lawrence, W. P.	0	5	0
Thompson, George	0	10	6

Knutsford.

Silvester, Henry T.	0	5	0

Lancaster.

Arkle, William	0	5	0
Briggs, W.	0	5	0
Fell, James J.	0	5	0
Holmes, E.	0	5	0
Troughton, Henry	0	5	0
Vince, James	0	5	0

Landport.

Gall, Frederic	0	2	6
Perfect, George	0	5	0

Langholm.

Beattie, Thomas	0	5	0

Largs (N.B.).

Barr, Bryce	0	5	0

Launceston.

Downing, Frederick	0	5	0
Wise, William	0	5	0

Leamington.

Barnitt, John	0	10	6
Barrett, Josephus T.	1	1	0
Davis, Benjamin	0	10	6
Davis, C.	0	2	6
Eynon, D. J.	0	10	6
Holloway, E. A.	0	2	6
Pullin, William H.	1	1	0
Robinson, J. J.	0	5	0
Sansom, Henry	0	2	6
Smith, Samuel A.	1	1	0
Smith, Samuel H.	0	10	6
Stanley, Herbert	0	10	6

Ledbury.

Freeman, Ernest	0	10	6	5
				6

Leo (Kent).

				6
Heath, F. D.	0	5	10	6
			1	0

Leeds.

		0	10	6
Archer, Joseph S.	c	0	10	6
Beacock, J. H.		0	5	0
Bilbrough, A.		0	10	6
Branson, F. W.		1	1	0
Briggs, George		1	1	0
Brown, Edward		1	1	0
Brown, E. O.		1	1	0
Cole, E. H.		1	1	0
Exley, George		0	10	6
Fawthorp, James		0	10	6
Fourness and Son		0	10	6
Fox, W. A.		0	5	0
Goodall, Backhouse and (		1	1	0
Greasley, M. F.				

Leeds—continued.

	£	s.	d.
Harvey, William (Headingley)	1	1	0
Hirst, Brooke and Hirst	2	2	0
Hirst, David	0	10	0
Holmes, Francis	0	5	0
Holmes, Joseph	0	10	6
Horsfield, E.	0	5	0
Jefferson, P.	0	5	0
Reynolds, Richard	1	1	0
Reynolds, Richard F.	0	5	0
Robinson, W.	0	5	0
Schoon, G.	0	1	0
Smeeton, William	0	10	6
Taylor and Fletcher	1	1	0
Taylor, Samuel	1	1	0

Leek.

Blades, Josiah B.	0	2	6
Johnson, William	0	5	0

Leicester.

Berridge, Alfred	0	5	0
Broof, R.	0	10	6
Burford, S. F.	0	10	6
Butler, T. E.	0	5	0
Cadoux, S. H.	0	5	0
Carr, William	0	10	6
Clark, John W.	2	2	0
Clark, Walter B.	0	10	6
Cleaver, Samuel	0	5	0
Cox, S. G.	0	10	6
Ellis, George	0	5	0
Esam, Richard	0	10	6
Freeland, A. J. (Kibworth)	0	2	6
Harvey, William R.	1	1	0
Lloyd, T. H.	1	1	0
Pickering, Henry	0	5	0
Rowe, W.	0	5	0
Sharp, Edward K.	0	5	0
Wand, Stephen	0	10	6
West, J. L.	1	1	0
Wilby, Frederick W.	0	10	6
Woolley, G. J. B.	0	5	0

Leighton Buzzard.

Herington, H. E.	0	5	0
Herington, Joseph	1	1	0

Leith.

Crichton, Alexander	0	5	0
Duncan, Flockhart Powell and Co.	0	10	6
Duncan, Wm.	0	2	6
Finlayson, Thomas	0	5	0
McDougall, R. I.	0	5	0
Mair, Alexander	0	5	0
Robertson, R.	0	2	6

Lenton.

Wilson, Thomas	0	5	0

Lenzie (N.B.).

Pettigrew, J. W.	0	4	0

Leominster.

Davis, David F.	1	1	0
Ellwood, M. J.	0	5	0
Sandiland, Robert B., jun.	0	5	0

Lerwick.

Porteous, Arthur A.	0	2	6

Leven.

Hogg, A.	0	2	6

Lewes.

Briscoe, Charles (West Firle)	0	5	0
Head, John	0	10	6
Head, John T.	0	10	6

Leytonstone.

A Bennett, C.	0	2	6
F Wilson, J.	0	5	0

Fos

Fras

Lincoln.

Garry, tle, Son and Maltby 0 10 6
Glasgowinson, Charles K. 0 10 6
Glen, Ro

Littleborough.

Greig, Wil
Harrower, Pmuel 0 5 0
Henderson, Jo

Little Chishill.

Jaap, John 0 10 6
Kinninmont, Alexmas ..
Lambie, Hugh ittlehampton.
Laurence, John 0 2 6
McMillan, John 1 1 0
Neil, J. .. ..
Paterson, A. .. .. .. erpool.
Rose, Alexander 1 1 0
Thomson, William .. Al 1 1 0
Whitelaw, James 0 10 0

Liverpool—continued.

	£	s.	d.
Adams, T. E., jun.	0	5	0
Albright, Henry	0	10	6
Alexander, George	0	5	0
Alexander, John	0	10	6
Allan, James H.	1	1	0
Aris, G. H.	0	5	0
Ayrton and Saunders	0	10	6
Bain, John	0	5	0
Barrett, A. A.	0	5	0
Blabey, J. J. (Woolton)	1	1	0
Blabey, J. R. (Woolton)	0	2	6
Blood, Charles (Formby)	0	5	0
Blundell, John	0	10	6
Brown, Edwin	0	2	6
Brown, Joseph	0	2	6
Buck, Richard C.	0	5	0
Clay, Dod and Co.	1	1	0
Coley, James	0	5	0
Dickins, B.	0	5	0
Drawbridge, Joseph G.	0	10	6
Drawbridge, T. F.	0	5	0
Ellams, George	0	10	0
Elliott, Robert John	0	10	6
Ellithorne, A. H.	0	5	0
Evans, Sons and Co.	5	5	0
Fergusson, W. and J.	0	10	6
Field, C.	0	10	6
Fleming, Mrs. Agnes	0	5	0
Fowler, George	0	5	0
Fraser, Alexander	0	5	0
Furniss, Thomas	0	5	0
Galloway, J. B.	0	5	0
Greenall, Alfred	1	1	0
Hackett, Thomas	0	10	0
Hawood, Charles	0	5	0
Hocken, Joshua	0	10	6
Hodges, E. G.	0	5	0
Hodgson, T. S.	0	5	0
Jackson, H.	0	10	6
James, John	0	5	0
Johnson, J. H. and S.	2	2	0
Jones, R. H.	0	5	0
Jordan, J. A.	0	5	0
Kirk, W. P.	0	5	0
Lee, Samuel W.	1	1	0
Lett, Arthur J.	0	5	0
McGuffie and Co.	1	1	0
Midgley, John E.	0	2	6
Morgan, H. B.	0	5	0
Parkinson, Richard	0	10	6
Parry, R.	0	5	0
Pheysey, Richard (Waterloo)	0	10	6
Richardson, Richard T.	0	10	6
Ridgway, T. E.	0	5	0
Sawden, Alfred	0	10	6
Smith, J. J. (Walton-on-the-Hill)	0	10	6
Smith, R. G.	0	5	0
Symes, Charles	2	2	0
Thomas, Robert	0	10	6
Thompson, John	1	1	0
Thompson and Capper	1	1	0
Tollitt, W.	0	2	6
Troughton, Christopher	0	10	6
Ward, J. S.	0	5	0
Warhurst, Mrs. A.	2	2	0
Williams, William	0	5	0
Wokes, T. S.	0	5	0
Woodhead, H. C.	0	10	6
Wright, William	0	5	0

Llanbyther.

Jones, J.	0	2	6

Llandilo.

Williams, W. J.	0	2	6

Llandudno.

Burton, Joseph	1	1	0
Sinclair, Mrs. M. A.	0	10	6

Llanelly.

Evans, Gwilym	1	1	0

Llangollen.

Jones, Humphrey	0	5	0

Llanidloes.

Jones, Thomas Pryce	0	2	6

Llanrwst.

Jones, Owen	0	2	6

Loddon.

Ellis, T. W.	0	10	6

London.

Adam, Miss A. M.	1	1	0
Adam, Miss J. S.	0	5	0
Adam, Miss L.	1	1	0

London—continued.

	£	s.	d.
Allden, John	1	1	0
Allen, Charles B.	3	3	0
Amoore, Lewis P.	0	10	6
Andrews, Frederick	0	10	6
Applegate, Edwin	0	10	6
Arkinstall, William	1	1	0
Ashford, H. S.	0	5	0
Atkinson, James	0	5	0
Atkinson, John G.	1	1	0
Attwood, Henry E.	1	1	0
Austin, Henry Felix	1	1	0
Babb, James	0	5	0
Bacon, Henry J.	0	2	6
Baines, Wm. H.	0	10	6
Baker, Alfred P.	0	10	6
Baker, H. W.	0	10	6
Ball, The Chemists', per Mr. W. H. Francis	15	15	0
Ball, The Junior Pharmacy, per Mr. W. H. Kerr	10	10	0
Balls, George	0	10	6
Banbury, Richard	0	5	0
Barnard, A. P.	0	5	0
Barnard, John	1	1	0
Barnes, James Benjamin	1	1	0
Barnes, James Burden	0	5	0
Barret, Edward Louis	1	1	0
Barry, Frederic	0	5	0
Bartle, W. F.	0	5	0
Bartlett, G. F. H.	0	5	0
Bartley, George A.	0	10	6
Bascombe, Frederick	0	10	6
Bascombe, William	0	5	0
Bate, Henry	1	1	0
Bateman, T. H.	1	1	0
Beasley, Frederick	0	5	0
Beddard, John	1	1	0
Bedford, C.	0	10	6
Bell, Matthew W.	1	1	0
Bell, William H.	1	1	0
Bennett, George	0	5	0
Bennett, Thomas	0	5	0
Bently, William Jas.	0	10	6
Bessell, J. W.	0	5	0
Best, James	0	10	6
Bevan, William	0	10	0
Bigg, Thomas	1	1	0
Bindloss, G. F.	0	10	6
Bingley, Richard	0	10	6
Birch, Henry C.	1	1	0
Bird, Augustus	2	2	0
Bird and Storey	1	1	0
Bird, F. C. J.	0	5	0
Bird, Robert	0	10	6
Bishop, W. M.	0	2	6
Blackman, T.	0	5	0
Blake, Charles A.	1	1	0
Bland, John	0	10	6
Bletsoe, F. F.	0	10	6
Blyth, Utton	0	5	0
Boothby, H. N.	0	5	0
Bourdas, Isaiah	1	1	0
Bowen, F. T.	0	5	0
Bowen, John T.	0	10	6
Bowen, John W.	1	1	0
Bowles, W. J.	0	5	0
Brand and Co.	1	1	0
Branford, A. J.	0	5	0
Bridges, C. W.	0	10	6
Brodribb, J. B.	0	10	6
Brookes, Samuel	0	10	6
Brooks, J.	0	2	6
Brooks, Thomas	0	2	6
Brooks, Tom	0	2	6
Broumpton, F. R.	0	2	6
Brown, Alfred James	0	10	6
Brown, Edgar M.	0	2	6
Bull, E. John	0	5	0
Bullock, J. Lloyd and Co.	2	2	0
Bunker, James	0	2	6
Burden, C. H. B.	0	5	0
Burgoyne, Burbidges, Cyriax and Farries	2	2	0
Burn, Henry	0	5	0
Burton, Percy H.	0	2	6
Bush, Arthur	0	5	0
Butler, J. A.	0	5	0
Butt, Edward Northway	10	10	0
Butterworth, John	0	5	0
Cadman, Daniel C.	1	[illegible]	0
Campbell, E. K.	0	[illegible]	0
Carteighe, Michael	1	[illegible]	0
Caseley, Thomas	0	[illegible]	0
Catterns, H. P.	0	10	6
Cawdell, George	0	10	6
Chapman, Joseph J.	0	10	6
Chapman, Walter	0	10	6

London—continued.	£	s.	d.
Charity, William	0	10	6
Chemist and Druggist, Proprietors of	5	5	0
Chesterfield, T. M.	0	5	0
Churchill, J. and A.	1	1	0
Churchyard, R. L.	0	5	0
Clapp, Edward F.	0	10	6
Clark, Thomas J.	0	10	0
Clarke, W. E.	0	2	6
Clarke, W. L.	0	5	0
Clayton, Thomas	0	5	0
Cocker and Son	0	10	6
Colchester, William M.	0	5	0
Cole, A. C.	1	1	0
Coleman, J.	0	5	0
Coles, A.	0	5	0
Coles, Ferdinand	0	10	6
Coles, J. W.	0	10	6
Collett, Chas. B.	0	5	0
Collier, Henry	0	10	6
Constance, Edward	0	10	6
Constance, Herbert E.	0	10	6
Constance, Sidney W.	0	10	6
Cook, W. R.	0	5	0
Cooper, Albert	1	1	0
Cooper, Henry	0	10	6
Cooper, H. H.	1	1	0
Cooper, R. H.	0	10	0
Cooper, Wm. Henry	0	10	6
Cooper, William Temple	0	10	6
Corbyn, Stacey and Co.	1	1	0
Cory, James	0	10	6
Cosway, Edwin C.	1	1	0
Cottrill, John W.	0	10	6
Coulson, Thomas	0	2	6
Cox, F. H.	0	2	6
Cracknell, Herbert	0	10	6
Cresswell, Frederick	0	10	6
Crosby, John	0	2	6
Crow, E. L.	0	10	6
Crowden, S. G.	0	10	6
Cryer, Henry	0	5	0
Cullen, Harry H.	0	5	0
Dampney, Richard S.	0	10	6
Darby and Gosden	2	2	0
Dart, W.	0	2	6
Davenport, Horace	2	2	0
Davenport, J. T.	2	2	0
Davies, H.	0	5	0
Davies, Llewelyn	0	2	6
Davies, Robert H.	1	1	0
Davis, F.	0	2	6
Davis, H. S. E.	0	10	6
Davy, Yates and Routledge	2	2	0
Dean, S.	0	5	0
De Peare, John Thomas	0	5	0
Dewar, Mrs. Mary Ann	0	10	6
Dickson, J.	0	5	0
Dinneford and Co.	2	2	0
Dixon, Herbert	0	5	0
Dodd, W. R.	0	10	0
Douglas, J. W.	0	2	6
Doulton and Co.	1	1	0
Drury, Sydney	0	5	0
Dukes, H.	0	2	6
Dymond, T. S.	0	5	0
Dymott, Francis	0	5	0
Dyson, William B.	1	1	0
Eade, George	0	10	6
Eade, James	0	10	6
Eastman, J. E.	0	10	6
Edwards, Charles	1	1	0
Edwards, James	0	5	0
Edwards, William Staples	0	5	0
Elliott, W.	0	5	0
Ellwood, T. A.	0	5	0
Elvey, Mrs. M. A.	1	1	0
Emsley, J.	0	10	6
Emson, William N.	0	5	0
Epps, James	1	1	0
Evans, Lescher and Webb	1	1	0
Evershed, G. S.	0	5	0
Fallowfield, Jonathan	1	1	0
Farmer, John	0	10	6
Fawssett, T.	0	5	0
Fitch, Robert Owen	0	10	6
Fox, William	1	1	0
Francis, G. Bult	1	1	0
Francis, George Baggett	1	1	0
Francis, Matthew R.	0	10	6
Francis, W. H.	0	10	6
Freeman, Frank	0	2	6
Froom, William Henry	1	1	0
Frost, John H.	0	5	0
Frost, W. T.	0	10	6
Fuge, H. D.	0	5	0
Gadd, Charles	0	10	6

London—continued.	£	s.	a.
Gadd, Robert	0	10	6
Gale, Samuel	1	1	0
Garman, C. E.	0	5	0
Garner, James	0	10	6
Garner, Thomas	0	5	0
Garnham, A. W.	0	5	0
Garrett, John	0	5	0
Gaskin, J. H.	0	2	6
Gaubert, Stephen	0	2	6
Gaunt, Rann Dolphin H.	1	1	0
Gerrard, A. W.	1	1	0
Glew, F. H.	0	5	0
Goddard, G. E.	0	5	0
Godfrey and Cooke	1	1	0
Godfrey, H. E.	0	5	0
Goff, Richard	0	5	0
Goldby, F.	0	5	0
Golding, J. F.	1	1	0
Golds, L. G.	0	10	6
Goodall, W. A.	0	5	0
Goodchild, Alfred C.	0	5	0
Goodwin, John	1	1	0
Gordelier, F. H.	0	19	0
Gorton and Sons	0	10	6
Gould, J.	1	1	0
Gradidge, James H.	0	10	6
Graham, Henry	0	5	0
Granger, Edwin John	1	1	0
Greaves, J. E.	0	5	0
Green, Samuel	0	5	0
Green, W. J.	0	10	6
Greenish, H. G.	0	10	6
Greenish, Thomas	1	1	0
Greenish, T. Edward	0	10	6
Greig, W.	0	2	6
Gristock and Co.	1	1	0
Gudgen, Frederick G.	0	15	6
Gulliver, William	1	1	0
Gulliver, W. F.	0	5	0
Haddock, James	0	5	0
Haden, W. E.	0	5	0
Haigh, W.	0	5	0
Hairsine, H. S.	1	1	0
Hall, Ralph	0	10	6
Hampson, Robert	1	1	0
Hanbury, Cornelius	1	1	0
Hannah, Charles	0	10	6
Hardy, Samuel C.	1	1	0
Harris, Frank William	0	5	0
Hart, Thomas	0	5	0
Harvey, Edward	1	1	0
Harvey, John William	0	2	6
Harvey, William	0	10	6
Hatfield, George B.	0	10	6
Hatfield, George W.	0	5	0
Haward, G. R.	1	1	0
Hawkins, Thomas	0	10	6
Hayllar, J.	0	2	6
Hearn, John	0	5	0
Hebbeler, K.	0	10	6
Henty, Henry Martin	0	5	0
Herbert, William	0	5	0
Hern, W. H.	0	5	0
Hewlett, J. C.	1	1	0
Hick, John	0	5	0
Hickey, Evan Lewis	0	10	6
Hickman, William	0	10	6
Hicks, Alexander D.	0	3	0
Higgins, James	0	10	6
Hill, Arthur B.	1	1	0
Hill, Arthur S.	2	2	0
Hill, William	0	5	0
Hillen, John	0	10	6
Hills, Thomas Hyde	10	10	0
Hills, Walter	2	2	0
Hobbs, John K.	0	5	0
Hodgkinson, George A.	0	10	6
Hodgkinson, Treacher and Clarke	2	2	0
Hodgkinson (Thomas), Prestons and King	2	2	0
Hodgkinson, William	1	1	0
Hodsoll, Thomas W. H.	1	1	0
Hogg, E. G.	0	10	6
Hogg, Robert	0	10	6
Hogwood, E.	1	1	0
Holding, J.	0	5	0
Holford, T. Constantine	0	10	6
Holl, Edmund	0	5	0
Holmes, A. J.	0	10	6
Holmes, Walter M.	0	10	6
Holroyd, A.	0	2	6
Hopkin and Williams	2	2	0
Hopkin, William King	2	2	0
Horne, John	0	5	0
Horsley, T. W.	0	10	0
Howard, E.	0	5	0
Howell, Maurice	0	10	6

London—continued.	£	s.	d.
Howse, W. F.	0	5	0
Howlett, Samuel	1	1	0
Hucklebridge, P. and W.	1	1	0
Hudson, T. F.	0	5	0
Huggins, Richard	0	10	6
Hughes, Evan	0	10	6
Hugill, John	1	1	0
Hugill, John H.	1	1	0
Humble, J. B.	0	5	0
Humphreys, G. R.	0	2	6
Humphreys, Richard	0	10	6
Hunt, Charles	1	1	0
Huskisson, Henry Owen	2	2	0
Hyne, Harry	0	5	0
Hyslop, John Cahill	1	1	0
Icke, Henry S.	0	10	6
Idris and Co.	2	2	0
Ince, Joseph	1	1	0
Ingham, John	0	2	6
Ingram and Royle	1	1	0
Ive, William	1	1	0
ditto (donation)	5	5	0
Izod and Son	1	1	0
Jackson, Charles	0	10	6
Jackson, Christopher	0	10	6
Jameson, W. G., jun.	1	1	0
Jarvis, John S.	0	10	6
Jenkins, Henry	1	1	0
Jenkins, Thomas	0	10	6
Jobson, Thomas	0	10	6
Johnston, W.	0	2	6
Johnson and Sons	1	1	0
Jones, Edwin	0	5	0
Jones, Henry Stevens	0	5	0
Jones, John H.	0	10	6
Jones, T. P.	1	1	0
Jones, William	0	10	6
Jones, William	0	5	0
Jozeau, G.	1	1	0
Keeling, A. G.	0	5	0
Keer, Mrs. I. S. Clarke	0	10	6
Keer, Thomas H.	0	10	6
Kent, Thomas Ramsey	0	10	6
Kerr, T.	0	5	0
King, Mrs. E. B.	0	10	6
King, Henry	0	10	0
King, J. H.	0	5	0
Kingan, D.	0	10	6
Kingsford, Frederick	1	1	0
Kirk, Snowden	0	10	6
Kitchin, J.	0	5	0
Langley, Frank C.	0	5	0
Laws, John	0	10	6
Layng, R. C.	0	5	0
Leake, Thomas W.	0	10	6
Legg, H. A.	0	10	6
Lescher, Joseph S.	1	1	0
Lewinton, Alexander B.	1	1	0
Lewis, T.	0	2	6
Lidwell, J. E.	0	10	6
Lister, W. B.	1	1	0
Littlejohn, A.	0	5	0
Llewhelin, Ivor V.	0	2	6
Lloyd, Isaac T.	0	5	0
Lockyer, J. E.	0	2	6
Long, Henry	1	1	0
Long, Herbert H.	0	5	0
Longley, Charles	0	2	6
Lorimer and Co.	1	1	0
Lowe, William E.	2	2	0
Luxmoore, C. M.	0	10	6
Lyon, James	0	10	6
MacCrindle, Thomas	1	1	0
McDiarmid, [illegible]	0	10	6
Macdonald, Alexander	0	10	6
McDougall, James	0	2	6
MacEwan, Pete.	1	1	0
MacGeorge, William	0	10	6
Maitland, P. C.	0	10	6
Maizey, E.	0	10	6
Makepeace, A. J.	0	2	6
Manley, W. F.	0	10	6
Marks (Henry) and Sons	1	1	0
Marsh, E. R.	0	10	6
Marston, John Thomas	0	10	6
Marten, Frederic	0	5	0
Martin, T. C. W.	0	10	6
Martindale, William	1	1	0
Mason, H. C.	1	1	0
Mathews, Henry	1	1	0
Mathews, J. H.	1	1	0
Matter[illegible]n, J. K.	1	1	0
Matthews, C. W.	0	10	6
Matthews, E. S.	0	10	6
Matthews, J.	0	10	6
Matthews, J. H.	0	5	0
[illegible]aw, Charles	1	1	0

London—continued.	£	s.	d.
Maw, Charles (donation)	65	0	0
Maw, C. Trentham	1	1	0
Maw, Son and Thompson	2	2	0
Maxwell, P. H.	0	10	6
Maynard, H. R.	0	10	6
Meggeson and Co.	1	1	0
Mellin, Charles J.	0	5	0
Michie, Charles C.	0	5	0
Miles, C. J.	0	10	6
Miller, Cecil B.	0	5	0
Miller, W. P. F.	0	5	0
Millhouse, H. H.	0	5	0
Minshull, Flora	0	5	0
Minshull, Rose C.	1	1	0
Moore, John	0	5	0
Moore. J. S.	0	5	0
Morrell, Thomas	0	5	0
Morris. E. G.	0	5	0
Morrison, J. W. T.	0	10	6
Moss, John and Co.	1	1	0
Moss, Thomas A.	0	2	6
Mundy, Alfred O.	0	10	6
Mutch, John Pratt	0	5	0
Myers, William	0	10	6
Naylor, W. A. H.	0	10	6
Neale, J.	0	5	0
Nesme, A. J.	0	5	0
Newton, T. A. C.	1	1	0
Newzam, Henry Samuel	0	10	6
Nicholls, Reginald E.	0	10	6
Nicholson, Thomas T.	0	5	0
Nind, George	0	10	6
Ninnis, T. M.	0	5	0
Ord, Septimus W.	0	5	0
Padman, Dr. John	0	10	6
Page, R. S.	0	5	0
Palmer, Francis	0	10	6
Parker, F. P.	0	10	6
Parker, Robert Henry	0	10	6
Parker, W. H.	0	5	0
Parkes, J. C.	0	10	6
Parkes, J. P.	1	1	0
Parkinson and Son	1	1	0
Parrott, Joseph	0	10	6
Parry, C. D.	0	5	0
Parsons, G. H.	2	2	0
Passingham, G. W.	0	10	6
Pattison, George	1	1	0
Peacock, George	0	5	0
Peat, Joseph	0	5	0
Peck, F. W.	0	10	6
Peel, Alfred	0	10	6
Pellew, A.	0	10	6
Penrose, A. W.	1	1	0
Perodeau, E. G.	0	5	0
Peters, D.	0	5	0
Pettinger, Elmer	0	5	0
Pharmacy Club (per Richard Bremridge, Hon. Sec.)	10	10	0
Phillips, A. J.	0	5	0
Phillips, A. W.	0	5	0
Philpott, F. W.	0	5	0
Pickard, William	2	2	0
Pierce, R. W. C.	0	5	0
Pinchen, W. J.	0	5	0
Pinyon, William	0	10	6
Plaister, W. J.	1	1	0
Pond, B. C.	0	5	0
Ponting, F. H.	0	5	0
Portway, A. C.	0	5	0
Portway, J. D.	0	10	6
Potts, Robert A.	1	1	0
Powell and Sons	1	1	0
Powell, T. H.	0	10	6
Preston, Richard	0	10	6
Pretty, Charles	0	5	0
Price, J. T.	0	2	6
Price, Robert John	0	2	6
Prichard. Edward	1	1	0
Prime, Thomas R.	0	10	6
Procter, R.	0	5	0
Puntan, H. H. C.	0	2	6
Radermacher, C. J.	0	10	6
Ragg, William	1	1	0
Ragg, W. W.	0	10	0
Reed, Charles W.	0	10	6
Rees, Harding	1	1	0
Rees-Williams, J. J.	0	5	0
Rendle, W. J.	0	5	0
Reynolds, R. J.	1	1	0
Richards, Edwin	0	10	6
Richardson, John	0	5	0
Ridley, C. H.	0	5	0
Ridley, E. H.	0	5	0
Rigden, George	0	2	6
Roach, H. W.	1	1	0
Roach, Pope	1	1	0

London—continued.	£	s.	d.
Robertson, George	0	10	6
Robeson, C. B.	0	5	0
Robinson, J.	0	5	0
Robinson, R. A.	0	10	6
Robinson, William P.	0	10	6
Rogers, James	0	10	6
Rose, Alfred	1	1	0
Rouse, F. W.	0	10	6
Rowntree, Thomas	0	10	6
Rundle, C.	0	5	0
Rutter, John	0	10	0
Sadler, William	0	10	6
Sadler, William, jun.	0	10	6
Sainsbury, S.	1	1	0
Salter, W. A.	0	5	0
Sanders, Francis T.	0	5	0
Sandford, Geo. W.	2	2	0
Sandy, Frederick William	0	10	6
Sanger and Sons	2	2	0
Sangster, Arthur	1	1	0
Saul, J. E.	1	1	0
Saunders, C.	0	10	6
Savory and Moore	3	3	0
Sayers, W. C.	0	10	6
Scoley, Thomas E.	0	10	6
Sedcole, J. W.	0	10	6
Sell, W. H.	0	10	6
Sewell, T. A. W.	0	5	0
Shacklock, J. H.	0	10	6
Shapcott, W. H. P.	0	2	6
Sharman, Wm.	0	10	6
Shaw, E. H.	0	2	6
Shaw, J. W.	0	10	6
Shephard. Thomas F.	0	10	6
Shepley, Frederick Thos.	0	5	0
Sherburn, Thomas	0	10	6
Sherwood, N.	0	10	6
Shields, R. H.	0	5	0
Shirley, S. S.	1	1	0
Shone, O. E.	0	5	0
Sibthorp, S. J. K.	0	2	6
Silverlock, Henry	5	5	0
Silvers, Francis T.	0	10	6
Slack, Josiah W.	0	10	6
Slator, Henry	0	5	0
Smart, W.	0	10	6
Smith, Fuller	0	10	6
Smith, Harry J.	0	5	0
Smith, James W.	0	7	6
Smith, John Ord	1	1	0
Smith, Percy John	1	1	0
Smith, William	0	10	6
Smith, William	0	10	6
Smith, William Frederick	1	1	0
Smith, William L.	0	10	6
Snell, Charles H.	0	10	6
Snell, Miss Marie de Vere	0	2	6
Snow, G. F.	0	2	6
Spurling, W.	0	10	6
Spyer, Newton	0	10	6
Squire and Sons	3	3	0
Stacy, Frederick	0	5	0
Stacey, Samuel Lloyd	1	1	0
Stamp, Edward B.	0	10	6
Stansfield, Richard	0	5	0
Starkie, Richard S.	1	1	0
Stenson, Joseph	0	5	0
Stephens, Henry I.	0	5	0
Stickland, W. H.	1	1	0
Stoneham, Philip	0	10	6
Strachan, John	0	10	6
Stratton, William	0	2	6
Streater, James H.	0	10	0
Strongitharm, W. G.	0	5	0
Strother, C. J.	0	10	6
Students' Critic	1	0	0
Sugden, W. A.	0	5	0
Summers, James R.	0	10	6
Suttar, J.	0	3	2
Swift, Francis	0	10	6
Symons, William H.	1	1	0
Tanner, A. E.	0	10	6
Taplin, William Gilbert	1	1	0
Taubman, Robert	0	10	6
Taylor, Edward	0	2	6
Taylor, George S.	1	1	0
Taylor, Horatio	0	10	6
Taylor, John	0	10	6
Taylor, Peter	0	5	0
Taylor, W. (Woolwich)	0	2	6
Tebbutt, Edwin	1	1	0
Temple, C. H.	0	2	6
Tench, S. E.	0	5	0
Thatcher, R.	0	2	6
Thomas, Harry A.	1	1	0
Thompson, Arthur S.	0	5	0
Thompson, Henry	0	10	6

London—continued.	£	s.	d.
Thompson, Henry Ayscough	1	1	0
Thompson, John	1	1	0
Thompson, R. W.	0	5	0
Thorn, John James	1	1	0
Thrower, E. A.	0	2	6
Tijou, Tom	0	2	6
Tingle, Miss Ellen	0	5	0
Tomlinson, Thomas	1	1	0
Tompsett, Leighton S.	0	5	0
Toon, Lionel E.	0	5	0
Trask, Thomas	1	1	0
Treharne, F. G.	0	5	0
Trick, William B.	0	10	6
Troke, Charles	1	1	0
Trotman, Alfred C.	0	10	6
Truman, F. W.	1	1	0
Truman, H. V.	0	10	6
Tugwell, Ernest H.	0	10	6
Tugwell, William H.	0	10	6
Turner, Charles E.	0	10	6
Turner, Edward A.	1	1	0
Turner, Thomas	0	5	0
Tyrer, Peter	0	10	6
Upjohn, Francis W.	0	5	0
Van, Frederick W. S.	0	5	0
Vialls, J. B.	1	1	0
Vincent, P.	1	1	0
Walker, Byatt A.	0	5	0
Walker, Charles	0	5	0
Wallbridge, H. A.	0	5	0
Wallis, G.	0	5	0
Wallis, John T. W.	0	10	6
Wallis, Owen	0	10	6
Want, W. P.	0	5	0
Warren, F. W.	0	10	6
Warren, William	0	10	6
Warrick Brothers	1	1	0
Wastie, Francis	1	1	0
Watson, William	0	10	6
Watts, Edward	0	5	0
Watts, J. N.	1	1	0
Wavell, Edward	1	1	0
Wegg, W. N.	0	5	0
Wells, Thomas	0	5	0
West, Charles	0	10	6
Weston, Samuel John	1	1	0
Westrup, Joseph B.	0	10	6
Whear, W.	0	2	6
Whiffen, Thomas	5	5	0
Whigham, Robert L.	0	5	0
White, Charles	1	1	0
White, Charles E.	0	5	0
Whittle, Elias C. C.	0	5	0
Widgery, John	0	5	0
Wiggins, Henry	0	10	6
Wigginton, Alfred	0	10	6
Wilkinson, Benjamin John	0	10	6
Wilkinson, Robert	0	5	0
Wilkinson, William	0	10	6
Will, William W.	0	5	0
Willats, Richard	0	5	0
Williams, Alfred	0	5	0
Williams, Henry	2	2	0
Williams, Hugh	0	5	0
Williams, J.	0	5	0
Williams, J. W.	1	1	0
Williams, T. R.	0	2	0
Williams, Stephen	0	5	0
Willows, Francis and Butler	3	3	0
Wilson, James	1	1	0
Wilson, Thomas W.	0	10	6
Wink, J. A.	1	1	0
Wisken, Robert	0	10	6
Wodderspoon and Co.	1	1	0
Wood, C. H.	0	10	6
Wood, Jacob	1	1	0
Woodland, John	1	1	0
Woollings, Frank	0	2	6
Wooster, J. R.	1	1	0
ditto (donation)	5	5	0
Wootton, Alfred C.	2	2	0
Worsley, A. G.	0	5	0
Wretts, J. R.	0	10	6
Wright, Layman and Umney	2	2	0
Wyatt, Francis J.	0	10	6
Wybrant, A.	0	5	0
Wylde, George	0	10	6
Yates, Robert	1	1	0
Yates, Samuel P.	0	5	0
Yeatman, F. J.	0	2	6
Young, George	0	5	0

Long Bennington.

Bemrose, John	0	10	6

Long Eaton.

White, J. T.	0	5	0

Longton.

	£	s.	d.
Hemming, G. T.	0	5	0
Prince, Arthur G.	0	10	0

Looe (Cornwall).

Pond, John	0	5	0

Lossiemouth.

Bremner, James	0	5	0

Loughborough.

Baldwin, G. J.	0	2	6
Jones, C.	0	2	6
Scrase, Richard	0	5	0

Louth.

Moody, S. W.	1	1	0
Smith, William	0	2	6

Lowestoft.

Chaston, Anna Maria	0	10	6
Good, Thomas	0	15	0
Jeacock, F. D.	0	2	6
Moverley, Robert	0	10	6

Ludlow.

Marston, Alfred	0	5	0
Nickson, James	0	5	0
Smith, F. W.	0	2	6
Woodhouse, George	0	5	0

Luton.

Chantler, R. P.	0	5	0
Duberly, G. S.	0	5	0
Webb, John H.	0	2	6

Lutterworth.

Brown, Thomas	0	10	6

Lyme Regis.

Henley, George	0	5	0

Lymington.

Allen, Adam U.	0	5	0
Badcock, Henry	0	5	0

Lymm.

Evans, Isaac H.	0	5	0
Henshall, James	0	5	0

Lytham.

Hartley, John	0	7	6

Macclesfield.

Bates, William I.	0	10	6
Bower, John	0	5	0
Charge, A. W.	0	5	0
Cooper, Thomas	0	5	0
Duncalf, Thomas H.	0	10	6
Wood, Richard	0	10	6

Macduff.

McMurtrie, John	0	5	0

Machynlleth.

Davies, Hugh	0	2	6
Rees, E.	0	5	0

Maidenhead.

Barry, Thomas S.	0	10	6
Cottingham, Joseph J.	0	5	0
Walton, Ralph	0	10	6

Maidstone.

Anning, A.	0	5	0
Corfe, Alfred	0	5	0
Rogers, William	0	5	0
Rowcroft, Albert E.	0	5	0
Simpson, John W. G.	0	10	6
Stonham, Thomas G.	0	10	6
Toone, A. H.	0	5	0
Whitbread, H.	0	5	0

Malden (Essex).

Crick, George E.	0	10	6
Elsey, Charles	0	5	0
Wallworth, David	0	10	6

Malton (Yorks).

Buckle, James	0	5	0
Harrison, William	0	10	6
Laverack, W. H.	0	5	0

Malvern.

Coldwell, David B.	0	10	6
Fox, T.	0	5	0

Malvern Wells.

Clark, Edward J.	0	5	0
Wakefield, Cecil H.	1	1	0

Manchester.

	£	s.	d.
Balmforth, A.	1	1	0
Barlow, A.	0	2	6
Bates, Frederic W.	0	5	0
Bell, James	0	2	6
Bell, Joseph	0	5	0
Benger, F. Baden	1	1	0
Bew, John	1	1	0
Billington, John	0	2	6
Blain, Alfred L.	0	5	0
Blyton, John	0	10	6
Boor, Frederick	0	10	6
Booth, William G.	0	10	6
Bransby, C. K.	0	2	6
Breadner, C. G.	0	5	0
Brooks, Joseph	1	1	0
Broughton, Thomas	0	2	6
Brown, William Scott	1	1	0
ditto (donation)	100	0	0
Bullock, A. H. (Salford)	0	2	6
Burnet, G.	0	2	6
Bushby, Thomas	0	5	0
Carruthers, Annie	0	2	6
Carter, William	0	10	6
Cocker, J. D.	0	2	6
Coulding, J. J.	0	2	6
Cowpe, M.	0	2	6
Dale, John	0	2	6
Darling, William	1	1	0
Dawson, Robert	0	5	0
Denton, J. (Salford)	0	5	0
Eatough, J. S.	0	2	6
Edwards, G.	0	5	0
Fairbrother, D.	0	2	6
Gardner, E. (Salford)	0	2	6
Gavin, Thomas	0	10	6
Gibbons, Thomas G.	1	1	0
Gibbons, Walter	0	10	6
Gibson, Robert	1	1	0
Glanville, R.	0	5	0
Gourlay, H. H.	0	2	6
Gourlay, R. G.	0	2	6
Hall, Henry Stacey	0	5	0
Harding, E.	0	5	0
Harrop, J. H.	0	5	0
Hart, James	1	1	0
Hatch, J. O.	0	5	0
Hedley, J.	0	2	6
Hogg, J. A.	0	2	6
Holt, H. C.	0	2	6
Holt, John	0	5	0
Hughes, Evan G.	0	10	0
Inglis, H.	0	5	0
Jackson, F.	0	10	6
Jackson, George	0	10	6
Jackson, Thomas	0	10	6
Jeans, Alfred	0	2	6
Johnson, W. H. (Salford)	0	10	6
Jones, John J.	0	2	6
Jones, Joseph	0	2	6
Jones, P. V.	0	5	0
Kemp, Harry	0	5	0
Lane, William	0	10	6
Leech, Robert	0	5	0
Lord, John (Salford)	0	5	0
Mansergh, W.	0	5	0
Marsden, Thomas B. (Withington)	0	10	6
Marsden, W.	0	5	0
McCormick, F. H.	0	5	0
Middleton, C.	0	2	6
Morris, J. L.	0	5	0
Mundey, H.	0	5	0
Nuttall, R. H.	1	1	0
Osborne, T. C. E.	0	2	6
Paine, Standen	1	1	0
Pickup, Robert L.	0	10	6
Pidd, Arthur J.	0	10	6
Pigot, Samuel	0	2	6
Pratt, G. W.	0	5	0
Ritchie, T.	0	2	6
Ritson, J.	0	2	6
Roberts, W. R.	0	5	0
Royle, John	0	5	0
Sanderson, G. C.	0	5	0
Scaife, Samuel	0	10	6
Smith, E.	0	5	0
Standring and Co.	1	1	0
Sugden, Samuel	0	10	6
Summer, T.	0	2	6
Sutcliffe, C. H.	0	5	0
Swinn, Charles	1	1	0
Taylor, J. J.	0	2	6
Teasdale, C.	0	10	6
Terry, Thomas (Withington)	0	5	0
Tucker, C. H.	0	5	0
Turner, W. S.	0	10	6
Twemlow, Richard	0	10	6
Vernon, A.	0	2	6

Manchester—continued.

	£	s.	d.
Walton, D.	0	2	6
Waugh, J. (Salford)	0	5	0
Wealthall, Alfred	0	10	6
West, Thomas	0	5	0
Westmacott, George H.	0	10	6
Wheeldon, James	0	5	0
Whitaker, T.	0	5	0
Whittaker, Ellis (Salford)	0	10	6
Whitfield, C. (Salford)	0	5	0
Wild, John	0	5	0
Wilkinson, George	0	5	0
Wilkinson, William	0	10	6
Williams, J. B.	0	15	6
Wood, G. E.	0	5	0
Woolley, Sons and Co.	5	5	0
Wright and Barnaby	1	1	0
Yates, Ebenezer	0	5	0

Mansfield.

Adams, Benjamin	1	1	0

March.

Davies, P. H.	0	5	0
Vawser, Jesse	0	5	0

Margate.

Baily, John	0	10	6
Candler, Joseph T.	0	10	6
Gale, Henry	0	10	6
Harvey, William S.	0	10	6
Pettman, R.	0	10	6
Stimpson, George	1	1	0
Wootton, Edward S.	0	10	6

Market Drayton.

Cooke, William	0	5	0
King, William George	1	1	0

Market Harborough.

Adams, H. G.	0	5	0
Bragg, W. B.	0	5	0
Deacon, Fanny E. (Fleckney)	0	5	0

Marton (New Zealand).

Wilton, M. H.	1	1	0

Maryport.

Cockton, John	0	5	0

Masham (Yorks).

Barker, Mathew M.	1	1	0

Mayfield.

White, Edward A.	0	5	0

Melbourne (Victoria).

Davies, E. C. J.	0	10	0
Plowman, Sidney	1	1	0
Woolnough, H. A.	0	10	6

Melton Mowbray.

Attenburrow, Jas.	0	5	0
Betts, W.	0	5	0
Gill, Josiah	0	5	0
Wing, G. N.	0	5	0

Mentone (France).

Gilson, C. B.	0	5	0

Middlesborough.

Buck, Thomas	0	5	0
Hume, William A.	0	10	0
Sowerby, R.	0	5	0
Taylor, H. H.	0	5	0
Taylor, William R.	0	5	0

Middlewich.

Holland, H.	0	5	0

Millom.

Roberts, John L.	0	2	6

Minchinhampton.

Simpkins, John	0	10	6

Mirfield (Yorks).

Crook, Charles	0	5	0

Monmouth.

Marsh, G. W. F.	0	10	6

Montrose.

Burrell, Thos.	0	10	0
Davidson, A.	0	5	0

Morpeth.

Davidson, T. R.	0	5	0
Marshall, G. T.	0	5	0
Schofield, F. E.	0	5	0

Morthoe.

	£	s.	d.
Compton, A.	0	10	6

Murrayfield (Midlothian).

Baildon, H. B.	1	1	0

Mussoorie (India).

Samuel, James B. and Edward	1	1	0

Nantwich:

Manley, Henry (Aston)	0	2	6

Nelson.

Collins, M. A.	0	5	0

Newark.

Bennett, William	0	5	0
Cherrington, G. W.	0	5	0
Cooling, W. J.	0	10	6
Field, W. C.	0	5	0
Fisher, Harry	0	5	0
Foster, H. P.	0	5	0
March, William	0	5	0
Taylor, John, and Son	0	10	0

New Barnet.

Young, Robert Fisher	0	10	6

New Brighton.

Rose, Charles	0	5	0
Walker, Joseph	0	5	0

New Brompton (Kent).

Willis, Henry J.	0	5	0

Newbury.

Davis, Henry J.	0	5	0
Hickman and Metcalf	0	10	6
Pratt, Thomas H.	0	10	6

Newcastle Emlyn.

Rees, D.	0	5	0

Newcastle-on-Tyne.

Arrowsmith, L.	0	2	6
Bolan, John	0	10	6
Coates, John M.	0	10	6
Cormack, G.	0	5	0
Coxon, I.	0	2	6
Dean, E.	0	2	6
Forster, J. R.	0	5	0
Frater, G.	0	10	0
Gatward, O.	0	5	0
Ismay and Sons	0	10	6
Johnstone, W. H.	0	2	6
Marley, William	0	10	6
Martin, J.	0	5	0
Martin, N. H.	1	1	0
Matthews, J.	0	10	6
Owen, William	0	10	6
Oxen, D. H.	0	5	0
Park, F.	0	5	0
Proctor, Son and Clague	1	1	0
Proctor, William	0	5	0
Rheeder, T.	0	5	0
Richardson, Alexander	0	5	0
Roberts, J.	0	10	6
Spargo, H.	0	5	0
Stuart, Charles E.	0	10	6
Swan, J. W.	1	1	0
Ward, Benjamin	0	5	0
Watson, Mason	0	10	6
Weddell, G.	0	10	6
Wilkinson, T. T.	0	5	0
Wing, A. J.	0	5	0
Wright, Alfred	0	10	6

Newcastle-under-Lyme.

Croydon, E. H.	0	10	6
Gould, J.	0	5	0
Heathcote, Thomas S.	0	10	6
Poole and Son	0	10	6

Newhaven (N.B.).

Miller, Alexander S.	0	2	6
Noble, Alexander	0	2	6

Newhaven (Sussex).

Granger, Harold	0	5	0

Newmarket.

Barrow, Frank A.	1	1	0
Rogers and Co.	0	10	6

Newport (Isle of Wight).

Millidge, Alfred	0	5	0
Shepperd, William J.	0	5	0

Newport (Mon.).

	£	s.	d.
Atkins, A. E.	0	5	0
Evans, David	0	5	0
Faulkner, H.	0	5	0
Garrett, T. P.	0	5	0
Gratte, Henry J.	0	5	0
Paine, Charles	0	10	6
Phillips, James W.	0	5	0
Seys, James A.	0	5	0
Smith, Albert	0	5	0
Young, John	0	10	6

Newport Pagnell.

Taylor, F. W.	0	5	0

Newport (Salop).

Picken, Thomas William	0	5	0

Newton Abbot.

Stiling, John E.	0	10	6
Wright, W.	0	5	0

Newton Stewart.

Keith, John	0	2	6

Newtown (Mont.).

Morgan, Richard	0	10	6

Norbiton.

Greenwood, J.	0	10	6

Northallerton.

Fairburn, Joseph	0	10	6
Squince, J. A.	0	5	0

Northampton.

Ashford, Evan Charles	0	5	0
Barry, James	1	1	0
Bingley, John	0	10	6
Clower, John	0	5	0
Kirby, Frederick	0	5	0
Mayger, William D.	0	10	6
Negus, Samuel T.	0	5	0
Sindall, J. W. (Executors of)	0	2	6

Northfleet.

Lucas, Joseph M. M.	0	5	0

North Kelsey (Lincs).

Dixon, James	0	6	8

North Walsham.

Bailey, George Wm.	0	5	0

Northwich.

Clough, John	0	10	0
Deakin, J. W.	0	5	0
Humphreys, Griffith	0	5	0
Lee, William	0	5	0

Norwich.

Betts, George	0	10	6
Caley, Albert J.	0	10	6
Corder, Edward	0	10	6
Corder, Octavius	1	1	0
Cossey, John	0	5	0
De Carle, H. E.	0	5	0
Eldridge, J. H.	0	5	0
Gardiner, W.	0	5	0
Hayhoe, W.	0	5	0
Heaver, Arthur W.	0	5	0
King, H. A.	0	5	0
Mallett, H. P.	0	5	0
Mason, Philip H.	0	10	6
Nuttall, Edwin	0	10	6
Pitts, W. C.	0	5	0
Robinson, James	0	5	0
Smith, Joseph de Carl, jun.	0	10	6
Squirrell, M. P.	1	1	0
Sutton, Francis	0	10	6
Taylor, H. E.	0	5	0
Thompson, H.	0	5	0
Watson, J. E. H.	0	10	6

Nottingham.

Dadley, Elijah	0	10	6
Edgson, Hugh	0	10	6
Fletcher, Thomas B.	0	5	0
Flowerdew, W. C.	0	2	6
Lumby, Fred.	0	5	0
Manfull, H. J.	0	5	0
Middleton, A.	0	5	0
Newball and Mason	1	1	0
Parker, W. H.	0	10	0
Pearson, Edward	1	1	0
Rayson, J. T.	0	5	0
Robinson, Joseph	0	5	0
Shippam, Henry	0	2	6
Smithurst, John	0	5	0
Taylor, Thomas C.	0	10	6
Watkinson, Thos.	0	10	6

Nuneaton.

	£	s.	d.
Iliffe, George	0	5	0
Lester, Henry	0	5	0

Oban (N.B.).

Lawrence, S.	0	5	0
Robertson, A.	0	2	6

Odiham.

Woodman, George	0	5	0

Oldbury.

Homes, Joseph P.	0	5	0

Oldham.

Andrew, J. H.	0	2	6
Bagshaw, Henry B.	0	10	6
Bagshaw, William	0	10	6
Bates, Henry	0	10	6
Bates, Hiram	0	5	0
Berry, Thomas	0	5	0
Braddock, George	1	1	0
Brelsford, James	0	10	6
Geddes, William	0	5	0
Glover, J.	0	2	6
Hargraves, H. L.	0	10	6
Haslop, William	0	5	0
Hurst, James	0	5	0
Inglis, W. K.	0	2	6
Lees, James	0	2	6
Lord, Robert B.	0	5	0
Tomlinson, A. G.	0	5	0
Wilson, Alexander G.	0	5	0

Old Radford.

Bully, A. E.	0	5	0

Oswestry.

Evans, John	0	5	0
Roberts, William Carey	0	2	6
Smale, Mary E.	0	5	0
Smale, Richard B.	0	5	0
Vaughan, David	0	5	0

Otley (Yorks).

Lockwood, T.	0	5	0
Pratt, Richard M.	0	10	6

Oxford.

Bloxham, W. E.	0	5	0
Clayton, C.	0	2	6
Court, G. F.	0	5	0
Druce, George C.	0	10	6
Hill, James H.	0	5	0
Jenkins, Alexander	0	5	0
Prior, George T.	0	10	6
Squire, James	0	5	0
Thurland, Henry	0	10	6
Walsh, Edward	0	10	6

Paignton.

Riches, F. F.	0	2	6
Riches, T.	0	5	0
Sherriff, George	0	5	0

Paisley.

MacCowan, R. T.	0	5	0

Partick (N.B.).

McNicol, John	0	5	0
Rait, Robert C.	0	10	6

Pau (France).

Jarvis, John	1	1	0

Paulton (Somerset).

Bush, Thomas	0	5	0

Pembroke Dock.

Bowling, J. H.	0	2	6
Laen, William	0	5	0

Pendleton.

Jeans, Thomas R.	0	5	0
Robinson, B.	0	5	0

Penrith.

Redfern, Tom	0	10	0

Penzance.

Buckett, A. H.	0	5	0
Shakerley, Benjamin	0	5	0
Symons, N. H.	0	5	0

Pershore.

Smith, Arthur W.	0	5	0

Perth.

Donald, David	0	7	6

Peterborough.	£	s.	d.
Bloodworth, Thomas	0	2	6
Bodger, J. W.	0	2	6
Booth, Samuel	0	2	6
Bright, Richard H. D.	0	2	6
Carlton, Arthur	0	10	6
Dye, C. P.	0	2	6
Heanley and Saunders	0	10	6
Knight, W. T.	0	10	6
Pearson, John H.	0	5	0
Sturton and Sons	0	10	6
Turner, R. P.	0	2	6
Whitwell, Ewen	0	5	0
Petersfield.			
Nichols, Frederic B.	0	5	0
Petworth.			
Edgar, F. G.	0	5	0
Pinner.			
Wilkinson, T.	1	1	0
Plymouth.			
Adams, W. T.	0	5	0
Allen, Joseph	0	10	6
Bailey, John H.	0	5	0
Balkwill, A. P.	2	2	0
Barge, John	0	2	6
Cocks, James	0	5	0
Foster, F. H.	0	10	0
Goodwin, Medmer	0	10	6
Hearder, H. P.	0	10	6
Hetherington, A. H.	0	5	0
Hunt, F. W.	0	10	6
Luke, R. S.	0	5	0
Maitland, F.	0	5	0
Maurice, James	2	2	0
Park, Charles J.	0	10	6
Roper, R. F.	0	5	0
Sloggett, Thomas C.	0	5	0
Turney, Samuel B.	0	5	0
Weary, C. T.	0	5	0
Woods, W. H.	0	5	0
Woods, William	1	1	0
Pocklington.			
Boyden, John A. C.	0	2	6
Pontefract.			
Bratley, William	0	5	0
Hodgson, George	0	5	0
Pontlottyn.			
Roberts, W.	0	5	0
Pontypool.			
Ford, Edward B.	0	10	6
Pontypridd.			
Arnott, Daniel	0	2	6
Cule, Taliesin	0	10	6
Jones, J. P.	0	10	6
Prothero, G. R.	0	2	6
Poole.			
Atkins, T. W.	0	5	0
Pomeroy, F. T.	0	5	0
Port Elizabeth (Cape Colony).			
Willet, John A.	0	10	6
Perth.			
Davies, Thomas	0	5	0
Evans, Mrs. Annie	0	5	0
Porthcawl.			
Thomas, J. J.	0	5	0
Portland.			
Childs, Joseph L.	0	5	0
Porto Alegre (Brazil).			
Hallawell, J.	1	1	0
Portobello.			
Nesbit, John	1	1	0
Portsmouth.			
Bailey, H. H.	0	2	6
Brewis, T.	0	5	0
Mumby, Charles and Co.	1	1	0
Portsoy.			
Clark, James	0	2	6
Port Talbot.			
Loveluck, G. D.	0	2	6
Williams, Moses	0	5	0
Poulton-le-Fylde (Lancs.).			
Blade, E.	0	5	0

Preston.	£	s.	d.
Arkle, C. A.	0	2	6
Parker, Thomas	0	5	0
Pemberton, William	0	2	6
Sharples, George	0	5	0
Ramsey (Hunts.).			
Palmer, Frederick W.	0	10	6
Ramsgate.			
Franks, Alfred	0	5	0
Morton, Henry	0	5	0
Pavey, H. J.	0	5	0
Puckey, W.	0	5	0
Saunders, Charles J. H.	0	2	6
Thomas, H.	1	1	0
Reading.			
Bradley, Charles	0	10	6
Butler, B. H.	0	5	0
Cardwell, E.	0	10	6
Cave, J. R.	0	2	6
Coles, S. J.	0	5	0
Craft, James	0	5	0
Cross, John	0	2	6
Hayward, S.	0	2	6
Hayward William G.	0	5	0
Knowles, J. H.	0	5	0
Rowell, John C.	0	5	0
Tunbridge, Frederick	0	5	0
Young, J. M. (Theale)	0	5	0
Redditch.			
Moule, William	0	5	0
Redhill.			
Ralling, Ernest L.	0	10	6
Sillitoe, F. S.	1	1	0
Reepham.			
Cripps, Johnson	0	10	6
Reigate.			
Sargant, J.	0	10	6
Retford.			
Baker, William	0	10	6
Westbrook, Dr. C.	1	1	0
Rhyl.			
Lawrence, George R.	1	1	0
Rhymney.			
Dixon, Franklin	1	1	0
Richmond (Surrey).			
Bletsoe, John	0	10	6
Hornby, Alfred	0	10	6
Melvin, G.	0	2	6
Mumbray, R. G.	0	10	6
Thacker, William	1	1	0
Ripon.			
Parkin, J. B.	0	10	6
Thornley, F.	0	5	0
Rochdale.			
Bamford, J. W.	0	5	0
Hadfield, James	0	5	0
Highley, William	0	5	0
Kerr, William	0	2	6
Mason, Arthur	0	5	0
Partington, William	0	2	6
Porter, T.	0	5	0
Taylor, Edward	0	5	0
Whittaker, J. W.	0	2	6
Wood, John	0	2	6
Rochester.			
Brown, A. H.	0	2	6
Brown, Hugh S. F.	0	2	6
Cowan, Frank	0	5	0
Hewitt, Joseph S.	0	5	0
Watts, G. W.	0	5	0
Rochford.			
Harrington, A. L.	0	2	6
Rock Ferry.			
Dutton, H. O.	1	1	0
Roehampton.			
Swain, James	0	5	0
Rome.			
Barrass, T. E.	0	5	0
Romford.			
Lasham, John W.	0	10	6
Ross.			
Matthews, T. A.	0	5	0

Rothbury.	£	s.	d.
Farrage, Robert	0	10	6
Rotherfield.			
Field, William	0	5	0
Rotherham.			
Bradshaw, C. H.	1	1	0
Horsfield, J. M.	0	5	0
Rothesay.			
Duncan, William	0	5	0
Macintosh, Archibald	0	5	0
Rugby.			
Clerke, W. B.	0	5	0
Ruthin.			
Magin, Arthur E.	0	2	6
Rouw, T. J.	0	5	0
Ryde (Isle of Wight).			
Dixon, Henry	0	10	6
Gibbs, William	0	10	6
Pollard, Henry H.	0	10	6
Smith, Tenison	0	10	6
Smith, William	0	5	0
Rye (Sussex).			
Horrell, W. H. D.	0	2	6
Waters, William A.	0	10	6
Saffron Walden.			
Hutchin, W. F.	0	5	0
Machon, H.	0	15	6
St. Albans.			
Allenby, Henry	0	2	6
Ekins, Arthur E.	0	10	6
St. Andrews.			
Bruce, A. K.	0	10	6
Govan, Alexander	0	10	6
Kirk, John J.	0	2	6
St. Austell.			
Bice, James	0	5	0
St. Bees.			
Broomfield, R. W.	1	1	0
St. Clears.			
Johns, John	0	2	6
Williams, Evan	0	10	6
St. Davids.			
David, Albert	0	2	6
St. Day.			
Corfield, Charles	0	10	6
St. Helens.			
Cotton, J. C.	0	10	6
Harrison, James	0	5	0
Sherlock, Thomas	0	5	0
St. Just.			
Wearing, John	0	2	6
St. Leonards. See Hastings.			
St. Neots.			
Mellor, J. G.	0	5	0
Wise, James	0	5	0
Sale.			
Smith, Allen	0	5	0
Salisbury.			
Atkins, Samuel Ralph	1	1	0
Atkins, William R.	0	10	6
Hardy, R. E.	0	5	0
King, L. W.	0	5	0
Newton, J. W.	0	10	6
Orchard, E. J.	0	10	6
Rowe, J.	0	5	0
Saltash.			
Mathew, William H.	0	5	0
Saltburn-by-the-Sea.			
Taylor, William	0	10	6
Sandbach.			
Gee, G. H.	0	2	6
San Remo (Italy).			
Squire, Frank R.	1	1	0
Sandgate.			
Jenner, William M.	0	5	0
Kennett, E.	0	2	6
Sandown (Isle of Wight).			
Cocksedge, H. B.	0	10	6

Sandwich.

	£	s.	d.
Baker, Frank	0	10	6
Dixon, William (Ash)	0	5	0
Woodruff, A. E. (Eastry)	0	5	0

Scarborough.

Chapman, Henry	0	10	6
Clare and Hunt	1	1	0
Cuttle, Arthur E.	0	2	6
Hill, R. M.	0	2	6
Hughes, John E.	0	10	6
Jones, Alfred	0	5	0
Jones, C.	0	2	6
Simms, R. J.	0	2	6
Smith, John F.	0	5	0
Whitfield, John	1	1	0

Seacombe.

Hinkley, E.	0	2	6
Holt, Richard W.	0	5	0

Seaham Harbour.

Storey, W.	0	5	0

Seaton.

Skinner, A. J. P.	0	5	0

Selkirk.

Dunn, Thomas	0	5	0

Settle.

Shepherd, J. W.	0	10	

Shanklin (Isle of Wight).

Brown, Andrew Henry	0	10	6
Deeks, W. T.	0	10	6

Sheepshed.

Moore, Thomas	0	5	0

Sheerness.

Hills, William	0	2	6
Prosser, David	1	1	0
Rayner, William	0	5	0

Sheffield.

Basker, J. P.	0	2	6
Bonnett, F.	0	2	6
Bradwall, J. H.	0	5	0
Carr, George	0	5	0
Clayton, William	0	10	6
Cubley, G. A.	0	10	6
Dobb, J. T.	0	10	6
Dunnill, G. H.	0	5	0
Eardley, J. F.	0	5	0
Ellinor, George	0	10	6
Elliott, John G.	1	0	0
Eyre, S.	0	5	0
Fox, A. R.	0	10	6
Froggatt and Son	0	5	0
Furness, Joseph M.	0	5	0
Grierson, G. A.	0	5	0
Harrison, Thomas M.	0	5	0
Hewitt, J. P.	0	5	0
Ibbitt, H. E.	0	2	6
Jepson, Xeno	0	2	6
Lowe, S. P.	0	5	0
Marshall, J.	0	5	0
Miller, John T.	0	5	0
Miner, M. T.	0	2	6
Morrison, C. O.	0	5	0
Newsholme, G. T. Wilkinson	1	1	0
Owen, W.	0	5	0
Preston, Job	0	10	6
Priestley, Henry	0	10	6
Radford, Charles	0	5	6
Reckless, W.	0	10	6
Salisbury, John M.	0	10	6
Stevenson, W.	0	5	0
Turner, J.	0	5	0
Ward, William	0	10	6
Watson, H. G.	0	5	0
Watson, Robert W.	0	10	6
Watts, J.	0	5	0
Wiles, Edwin	0	5	0

Shepton Mallet.

Fudgé, Charles William	0	5	0

Shields, North.

Burn, Thomas	0	2	6
Gibson, James	0	10	6
Hogg, Joseph F.	0	2	6
Irvin, W. G.	0	2	6
Kirkness, R.	0	5	0

Shields, South.

Forrest, Robert	0	10	6
Noble, John	0	5	0
Walker, James	0	2	6

Shrewsbury.

	£	s.	d.
Adams, William	1	1	0
Blunt, T. P.	1	1	0
Cross, A. R.	0	5	0
Cross, William G.	3	3	0
Gouldbourn, William	0	10	6
Pattison, H.	0	5	0
Perkins, Christopher	0	5	0
Pyefinch, John	0	5	0
Salter, Benjamin	1	1	0
Salter, Joseph B.	1	1	0

Sidmouth.

Chessall, Rowland	0	5	0

Silverdale.

Wilson, Edward	0	5	0

Sittingbourne.

Cocking, T. S.	0	5	0
Gordelier, William G.	1	1	0

Sleaford.

Harrison, T. E.	0	5	0
Spyvee, W.	0	2	6
Wood, J. R.	0	5	0

Slough.

Elliman, Sons and Co.	1	1	0
Griffith, Richard	0	10	6

Smallthorne.

Fletcher, Thomas	0	10	6

Snaith.

Bean, John	0	10	6

Southam.

Archer, Thomas	0	2	6

Southall (Middlesex).

Diggens, E. D.	0	5	0

Southampton.

Alderslade, W.	0	5	0
Bates, William	0	5	0
Bishop, Samuel	0	5	0
Borchert, Heinrich T. G.	1	1	0
Chipperfield, R.	1	11	6
Dawson, Oliver R.	0	10	6
Fletcher, J. B. (Totton)	0	5	0
Hughes, J. H.	0	5	0
Madge, James C.	0	10	6
Mumford, Alfred	0	10	6
Randall, William B.	1	1	0
Rubie, J. T.	0	5	0
Spearing, James	0	10	6
Wedge, George D.	0	2	6

Southend.

Dawson, George R.	0	5	0
Wright, Mrs. G.	0	10	6

South Molton.

Swingburn, Richard H.	0	10	6

Southport.

Adams, C. M.	0	5	0
Ashton, William	1	1	0
Ball, Henry	0	5	0
Elliott, Stephen J.	0	2	6
Gill, Hugh	0	5	0
Gullett, Mrs.	0	5	0
Hay, David	0	5	0
Horsefall, John	0	10	6
Mainwaring, R.	0	10	6
Merchant and Co.	0	5	0
Neame, H. A.	0	2	6
Radley, William V.	0	10	6
Righton, James	0	10	6
Round, Frederick	1	1	0
Surr, Edward	0	10	6
Whitworth, James	0	10	6
Wilding, G. I.	0	10	6
Wimpenny, James M.	0	5	0
Winter, William	0	10	6

Southsea.

Callaway, L.	0	10	6
Childs, James L.	0	10	6
Cruse, Thomas H.	1	1	0
Deacon, F. G.	0	5	0
Ford, H. S.	0	5	0
Gossling, W. R.	0	5	0
Sangster, John G.	0	5	0
Trist, R.	0	5	0

South Stockton.

Ronchetti, T. A.	0	5	0

Southwell.

	£	s.	d.
Downing, J. H.	0	10	0

Southwold.

Critten, Robert P.	0	2	6

Spalding.

Bell, E. W.	0	5	0
Branston, J. W.	0	5	0
Donington, R.	0	5	0
Steeper, Samuel	0	5	0

Spennymoor.

Burdon, Thomas A.	0	5	0

Spilsby.

Rainey, J. J.	0	5	0

Stafford.

Averill, Henry Alcock	0	10	6
Averill, John	0	10	6
Spilsbury, James	0	5	0
Viggars, G. D.	0	2	6

Stamford.

Dickinson, Frederick	0	10	6
March, Frederick	0	5	0

Stevenage.

Fresson, Lewis Francis	0	10	6

Stockport.

Arnfield, J. C.	0	5	0
Dodge, William	0	10	6
Johnson, Thomas J.	0	5	0
Kay Brothers	2	2	0
Orton, W. B.	0	5	0
Sidley, Thomas I.	0	10	6
Towle, Samuel	0	2	6

Stockton-on-Tees.

Bainbridge, Robert R.	0	2	6

Stoke Ferry.

Newsam, W. H.	0	5	0

Stoke-on-Trent.

Adams, Frank	0	10	6
Adams, William H.	0	10	6
Guest, George C.	0	2	6
Harris, Robert H.	0	5	0
Jones, John	0	10	0
Smith, Arthur H.	0	10	6
Wilson, Clement Fisher	0	10	6

Stoke (Surrey).

Ratheram, William	0	5	0

Stone (Staffs).

Slater, Thomas	0	10	6
Slater, Thomas, jun.	0	5	0

Stonehouse (Devon).

Davey, H. D.	0	2	6
Netten, Henry J. T.	0	5	0

Stony Stratford.

Cox, Julia Jane	0	10	6
Robinson, William H.	0	10	6

Stourbridge.

Biggs, F. W.	0	2	6
Burgess, William	0	5	0
Loverock, Henry	0	5	0
Selleck, W. R.	0	5	0

Stourport.

Twinberrow, J.	0	10	0

Stowmarket.

Gostling, George J.	1	1	0
Simpson, Robert G.	0	5	0
Wilson, Thomas	0	5	0

Stradbroke.

Foulsham, Harry B.	0	5	0

Stratton.

Pickard, Henry	0	5	0

Strood.

Picnot, Charles	1	1	0

Stroud.

Coley, Samuel J.	0	10	6

Sunbury-on-Thames.

Price, J.	0	5	0

Sunderland.

Aslin, John	0	5	0
Aslin, William	0	2	6

Sunderland—continued.	£	s.	d.
Bowman, S.	0	2	6
Fairman, George P.	0	10	6
Harrison, John	0	10	6
Harrison, W. B.	0	5	0
Mitchinson, John	0	5	0
Ranken, Charles	0	5	0
Scott, W.	0	5	0
Surbiton.			
Arfield, William	0	5	0
Lowe, Charles	0	10	6
Sutton (Cheshire).			
Dangerfield, W. H.	0	5	0
Sutton-in-Ashfield.			
Briggs, G. W.	0	5	0
Swaffham.			
Bell, Frederick R.	0	5	0
Christopherson, Fred	0	5	0
Finch, Jacob	0	10	6
Swansea.			
Atkins, John	0	5	0
Davies, J. M.	0	5	0
Davies, John (31, High Street)	0	5	0
Davies, John (75, Oxford Street)	0	2	6
Davies, John (Walters Road)	0	10	6
Davies, William	0	5	0
Evans, D.	0	2	6
George, William	0	10	6
Grose, Nicholas M.	1	1	0
Hughes, James	0	5	0
Jones, Moses	0	10	6
Keall, F. P.	0	10	6
Lloyd, John W.	0	5	0
Lowther, H. R.	0	5	0
Rees, Daniel	0	5	0
Richards, J.	0	5	0
Roberts, J. K.	0	5	0
Thomas, L.	0	5	0
Trick, M.	0	5	0
Williams, J. T.	0	10	6
Yorath, C.	0	5	0
Swindon.			
Green, John	0	5	0
Tarporley.			
Aston, Walter	0	5	0
Taunton.			
Copestake, H. H.	0	5	0
Hambly, Charles J.	0	5	0
Kirkpatrick, Mrs.	0	5	0
Tavistock.			
Doble, H. T.	0	5	0
Gill, William	0	2	6
Teignmouth.			
Cocking, Frederick J.	0	5	0
Evans, Joseph J. O.	0	5	0
Maunder, William	0	5	0
Tenbury.			
Slade, John	0	10	6
Tenby.			
Davies, Moses P.	0	5	0
James, George	0	5	0
Williams, William	0	10	6
Tewkesbury.			
Barlow, G. R.	0	2	6
Willes, D. T. (Bredon)	0	2	6
Thame.			
Tame, Thomas	0	5	0
Thirsk.			
Ayre, George	0	10	6
Ayre, Henry	0	2	6
Thornhill (N.B.).			
Fingland, James	0	5	0
Thornton Heath.			
Knott, Samuel	0	5	0
Thrapston.			
Pars, R. C.	0	10	6
Ticehurst.			
Corke, Edward	0	10	6
Titchfield.			
Smith, W. O.	0	10	6

Tiverton.	£	s.	d.
Havill and Son	0	5	0
Rossiter, Thomas E.	0	5	0
Tritton, C. E.	0	5	0
Todmorden.			
Maddock, H.	0	5	0
Stevenson, W.	0	2	6
Topsham.			
Ellis, Frederick	0	2	6
Torquay.			
Bathe, William	0	5	0
Bridgman, William Louis	0	5	0
Cocks, John W.	0	5	0
Guyer, James B.	0	10	6
Horton, Thomas	0	5	0
Knight, Benjamin	0	5	0
Moon, G. W.	0	5	0
Ness, Thomas H.	0	5	0
Shapley, Charles	0	10	6
Sloman, Richard	0	10	6
Stammwitz, Louisa	0	10	6
Taylor, John	0	10	6
Tomlin, J. P.	0	5	0
Waymouth, T. S.	0	5	0
Totnes.			
Butland, Charles	0	5	0
Cooke, E. H.	0	2	6
Morse, C. H. Stafford	0	5	0
Tredegar.			
Phillips, Charles L.	0	10	6
Tregaron.			
Jones, T.	0	2	6
Truro.			
Anstey, J. U.	0	5	0
Bucher, W. H.	0	5	0
Feaver, Samuel	0	13	0
James, Hamilton	0	5	0
Percy, Thomas B.	0	10	0
Tunbridge.			
Millidge, Thomas E.	0	10	6
Wardley, S. F.	0	10	6
Tunbridge Wells.			
Arnold, Spencer	0	10	6
Batting, Thomas G.	0	10	6
Cheverton, George	1	1	0
Dunkley and Rogers	1	1	0
Howard, George W.	0	10	6
Howard, Richard	0	10	6
Sells, Robert J.	0	10	6
Thompson, G. A.	0	5	0
Wells, A. J.	0	5	0
Whitrow, Benjamin	0	10	0
Williams, James	0	10	6
Tunstall.			
Keightley, Joseph	0	5	0
Tutbury.			
Green, Isaac	0	5	0
Twickenham.			
Alexander, William	0	5	0
Bishop, Thomas	1	1	0
Peake, Henry F.	0	5	0
Shelley, Henry	0	10	6
Tynemouth.			
Atkinson, Joseph	0	5	0
Uckfield.			
Farr, E. H.	0	10	6
Ulverston.			
Willan, Robert	0	10	6
Upton-on-Severn.			
Gibbs, John	0	10	6
Urmston.			
Duncalf, Richard	0	5	0
Uttoxeter.			
Woodward, H.	1	1	0
Woolrich, Charles B.	0	10	6
Ventnor (Isle of Wight).			
Littlefield, J. W.	1	1	0
Nicholls, A. L.	0	2	6
Smith, C. A.	1	1	0
Weston, Charles	1	1	0

Wadebridge.	£	s.	d.
Philp, J.	0	5	0
Wakefield.			
Cardwell, James	0	5	0
Chaplin, John Lambert	0	10	6
Duffin, Thomas	0	10	6
Moorhouse, Walter	0	5	0
Pollard, William	0	5	0
Saville, George	0	10	6
Smith, G. E.	0	10	6
Thornton, E.	0	5	0
Wice, J. H.	0	10	6
Wallingford.			
Ashmall, George	0	5	0
Payne, Sidney	1	1	0
Upton, Eustace J.	0	10	6
Wallington.			
Knowles, R.	0	5	0
Wood, Edward	0	10	6
Walmer.			
Wood, Henry	0	5	0
Walsall.			
Bayley, C.	0	10	6
Elliott, George	0	5	0
Grove and Son	0	5	0
Morris, J. O.	0	5	0
Thorp, J.	0	2	6
Walsham-le-Willows.			
Harrington, Arthur	0	5	0
Waltham Abbey.			
Griffiths, J. M.	0	10	6
Marshall, A.	1	1	0
Walton-on-Thames.			
Power, William	0	5	0
Ware.			
Medcalf, Benjamin	0	10	6
Medcalf, Benjamin Pearce	0	10	6
Wareham.			
Harman, E. S.	0	5	0
Marshallsay, R. J.	0	5	0
Randall, Thomas	0	10	6
Warrington.			
Young, John R.	0	10	0
Watchet.			
Daymond, Samuel	0	2	6
Watford.			
Chater, Edward M.	1	1	0
Chater, Matthew Taylor	1	1	0
Cottle, Alfred James	0	5	0
Curtis, H. E.	0	5	0
Maries, H. D.	0	5	0
Parrott, W. S.	0	10	6
Wath-upon-Dearne.			
Hick, Allan	0	10	6
Watton.			
Pechey, T. P.	0	5	0
Vincent, Lacey A.	0	10	6
Weaverham.			
Manifold, John J.	0	10	6
Wednesbury.			
Gittoes, Samuel J.	0	10	6
Wellingborough.			
Smith, John T.	0	2	6
Wellington (New Zealand).			
Ridd, A. H.	0	2	6
Wellington (Somerset).			
Gregory, Walter	0	5	0
Windeatt, G. J.	0	5	0
Wells (Norfolk).			
Rump, Robert R.	0	10	6
Wells (Somerset).			
Manning, Richard James	0	10	6
Slater, Jonathan	0	5	0
Welshpool.			
Griffiths, Thomas	0	5	0
Welton.			
Myers, George Henry	0	5	0

	£	s.	d.
Westbury.			
Paine, Charles	0	2	6
Westgate-on-Sea.			
Bessant, Frederick R.	0	10	6
West Malling.			
Stedman, Richard B.	0	5	0
Stedman, Walter	0	2	6
Weston-super-Mare.			
Cooper, John	0	5	0
Duckett, F. W.	0	10	6
Hall, E.	0	5	0
Parkes, Harry C.	0	10	6
Pumphrey, Arthur	0	5	0
Watson, J. W.	0	5	0
Weybridge.			
Griffin, Thomas	0	10	6
Weymouth.			
Burgess, J.	0	5	0
Groves, Thomas B.	0	10	6
Smith, E. M.	0	10	0
Stedman, S. S.	0	10	0
Targett, Charles G.	0	5	0
Whitby.			
Corner, Thomas B.	0	10	6
Frank, John	1	1	0
Stevenson, John	0	10	6
Whitehaven.			
Wilson and Kitchin	1	1	0
Whitley (Yorks).			
Whitehead, G.	0	2	6
Whitstable.			
Arrowsmith, G. W. T.	0	5	0
Wisk (N.B.).			
Miller, Kenneth	0	5	0
Wigan.			
Ball, Edwin	0	5	0
Dawson, F. R.	0	5	0
Kellett, Richard E.	0	5	0
Phillips, Jonathan	0	5	0
Wimbledon.			
Butler, E. D. Barry	0	10	6
Dowdeswell, Jonathan	0	5	0
Pooley, John D. S.	0	10	6
Spencer, W. G.	0	5	0
Winchester.			
Barratt, F. J.	0	5	0
Knight, George E. Moses	0	5	0
Powell, Edward F.	0	10	6
Winchfield.			
Machin, W. G.	0	5	0
Windsor.			
Collins, Henry G.	0	5	0
Duckworth, A.	0	5	0
Grisbrook, Edward	0	5	0
Harmer, J. D.	0	5	0
Parker, C.	0	2	6
Russell, Charles J. L.	0	10	6
Wood, Robert	0	5	0
Wingate.			
Cross, John T.	0	10	0
Wingham.			
Palmer, Henry B.	0	5	0
Winshill.			
Green, W.	0	2	6
Winslow.			
Parrett, Edward	0	5	0
Wisbeach.			
Allen, H.	0	5	0
Wilson, J. H.	1	1	0
Witham.			
Green, Robert P.	0	10	6
Witney.			
Purdue, Thomas	0	5	0
Wokingham.			
Spencer, Thomas	0	10	6
Wolverhampton.			
Banks, C. H.	0	5	0
Burnett, C. C.	0	5	0
Cannell, William	0	10	6
Fleeming, W.	0	5	0
Gibson, F. J.	0	10	6
Hamp, John	0	5	0
Stanway, Edward Thomas	0	10	6
Weaver, Alfred C.	0	10	6
Woodbridge.			
Betts and Son	0	5	0
Woolston (Hants).			
Pell, John	0	5	0
Worcester.			
Addis, T. J.	0	2	6
Blunt, L.	0	2	6
Briggs, A. E.	0	2	6
Ferneley, Charles	0	10	6
George, Henry	0	10	6
Hall, Frederick J.	0	5	0
Hill, W. H.	0	2	6
Worcester—continued.	£	s.	d.
Hinks, John	0	10	6
Horniblow, W. T.	0	5	0
Judson, T. B.	0	2	6
Kitson, E. J.	0	10	0
Lee, C. W. (donation)	50	0	0
Price, W. C.	0	2	6
Silk, Thomas	0	5	0
Steward, John A.	0	10	6
Storm, E. B.	0	5	0
Virgo, Charles	1	1	0
Workington.			
Birkett, F. J.	0	2	6
Mason, Joseph R.	0	5	0
Worksop.			
Baxter, George	0	5	0
Jones, George W.	0	5	0
Worthing.			
Berry, H. J.	0	2	6
Burt, James	0	5	0
Cortis, A. B.	0	5	0
Frost, William	0	10	6
Gulliver, W. I.	0	10	6
Wyke.			
Drake, William	0	5	0
Wymondham.			
Skoulding, William	0	5	0
Yarm.			
Reed, George	0	5	0
Yarmouth.			
Arthur, John	0	5	0
Clows, John E.	0	10	6
Mornement, H. J.	0	5	0
Poll, W. S.	0	2	6
Pratt, Edward J.	0	10	6
Richmond, A. E. (donation)	5	5	0
Steward, Alfred	0	5	0
Williams, C. E.	0	2	6
Yaxley.			
Farr, Joseph	0	10	6
Yeadon.			
Blatchley, Thomas	0	10	6
York.			
Batty, Thomas	0	10	6
Coates, Henry	0	5	0
Lupton, J. A.	0	2	6
Parker, Thomas	0	10	6
Saville, John	1	1	0
Sowray, J.	0	5	0
Wisker, R. H.	0	2	6

ANONYMOUS DONATIONS AND SUBSCRIPTIONS.

	£	s.	d.
S. J. B.	2	2	0
Salisbury	0	2	6
R. T. H.	0	10	6

LEGACIES.

Williams, John	100	0	0
Forrest, Richard	19	19	0

"THE MONTH."

Duboisine.

As some uncertainty appears to exist as to the identity of the basic substance met with in commerce under the name "duboisine," it may prove useful just now to recapitulate the principal points in its history. In April, 1874, Mr. Gerrard described at an evening meeting of the Pharmaceutical Society a mydriatic alkaloid that he had separated from the leaves of the Australian *Duboisia myoporoides*, which was provisionally named "duboisine" (*Pharm. Journ.*, [3], viii., 787). Six years later Professor Ladenburg examined a sample of "duboisine sulphate" obtained from Merck of Darmstadt, and came to the conclusion, based principally on the properties of the gold salt, that the alkaloid contained in that sample was in every way identical with hyoscyamine (*Berichte*, xiii., 257; *Pharm. Journ.* [3], x., 789). Subsequently, it having been asserted that duboisine differed from hyoscyamine in its physiological action, Professor Ladenburg was induced in 1887 again to take up the subject, and the result of his examination of a new sample, obtained from Merck as "duboisine," led him to the conclusion that the alkaloid he had to do with in this case was identical with hyoscine, a base that had been found in the mother liquor obtained in the manufacture of hyoscyamine, and described shortly after the appearance of his previous paper (*Berichte*, xx., 1661; *Pharm. Journ.*, [3], xvii., 1049). A certain amount of mystification was here introduced into the subject by mistranslations of this paper which appeared in the 'Year-Book of Pharmacy,' (1888, p. 62) and the *Journal of the Chemical Society* (Abstracts, 1887, p. 740), in which Professor Ladenburg was incorrectly represented as stating that the alkaloid examined by him on the second occasion was identical with hyoscyamine. Professor Ladenburg, in fact, said expressly that in the second sample no hyoscyamine could be detected, nor any other alkaloid than hyoscine. He suggested, however, that probably the different result was due to some variation in the method of preparation, and that this is the true explanation is rendered probable by some information furnished by Messrs. Schering and Co., in response to inquiries on the subject, which has been kindly placed at our disposal by Messrs. Zimmermann. Messrs. Schering state that a short time ago they worked a quantity of *Duboisia myoporoides* leaves for "duboisine," and obtained a pure base in the form of a brownish thick liquid, the sulphate of which corresponded exactly and in every respect to the properties of sulphate of hyoscyamine. This they consider confirms the statement of Ladenburg, from which it would appear that they are not acquainted with the Professor's later paper. Moreover, it may be remarked that pure hyoscyamine is described by him as a crystalline solid. Messrs. Schering add that hyoscine was obtained from the mother liquor of the "duboisine sulphate," as well as from that of hyoscyamine sulphate worked from belladonna root. It seems probable, therefore, that as *Duboisia myoporoides*, like belladonna and henbane, contains both hyoscyamine and hyoscine, the products obtained from it and sent out under the name "duboisine" may consist of the one or the other base, either exclusively or in preponderance, according to the method of preparation.

Scopolia atropoides.

A communication upon the constituents of *Scopolia atropoides*, by Dr. Siebert, a pupil of Dr. E. Schmidt, of Marburg, appears in the new number of the *Archiv der Pharmacie* (Feb. 20, p. 139). It will be remembered that this name was quoted by Mr. Holmes in his recent paper (before, p. 469), as a synonym for *Scopola carniolica*, but in the absence of information as to the plant examined by Dr. Siebert, beyond the statement that the materials were obtained from gardens at Karlsruhe and Marburg, it cannot be said positively that it is identical with the subject of Professor Dunstan's recent investigation, though this seems very probable. Dr. Siebert reports that he obtained hyoscyamine from both the leaves and the roots. Atropine was also obtained in relatively small quantity, but it is thought that it may possibly have been a product of alteration. Hyoscine could not, from want of material, be isolated in a state of chemical purity, but in a footnote it is stated that pure hyoscine aurochloride was subsequently obtained by Dr. Siebert in working upon "Hungarian scopolia root." In another footnote Dr. Schmidt, referring to the previously reported occurrence of atropine, together with hyoscyamine and hyoscine, in *Scopolia japonica* root, says that in working upon a fresh quantity of roots under different conditions, he obtained only a very small quantity of atropine in the last mother-liquor from the other gold salts, so that probably it was a product of alteration. The other constituents observed by Dr. Siebert in *Scopolia atropoides* were scopoletin, the fluorescent body found also in the roots of belladonna, henbane and *Scopolia japonica*, together with betaine and choline.

Anisodus luridus.

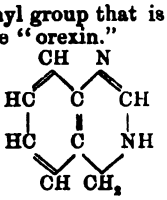
Dr. Siebert also reports some interesting results of an investigation of the *Anisodus luridus*, a Himalayan Solanaceous plant, which seem to indicate that the degree of development of the plant may have an important relation to the quantity and nature of the alkaloids occurring in it (*Archiv*, Feb. 20, p. 145). From flowering plants he reports that he obtained, by fractional precipitation of an acidulated liquid with gold chloride, a "not inconsiderable quantity of hyoscyamine," but no atropine or hyoscine, while from plants collected when the seed had ripened, only a very small quantity of atropine could be isolated under the same conditions and no hyoscyamine. The failure to detect hyoscine is thought to be possibly due to insufficiency of the material used.

Crystallized Hyoscine.

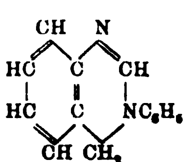
In a footnote to the former of these papers (*Archiv*, Feb., p. 142) Dr. Schmidt repeats the statement made by him a few months since at Heidelberg, as to the preparation of crystallized hyoscine. He says that Herr Bender has presented him with a sample of hyoscine in well-formed crystals, as well as some hyoscine hydrobromide in splendid well-formed crystals, 1·5 cm. long, 1 cm. broad, and nearly 1 cm. thick. The hyoscine is said to have been obtained in the working of about a hundred kilograms of *Scopolia atropoides* roots, and is to form the subject of a future communication.

Orexin.

Another complex chemical compound has during the past month made its appearance as a candidate for a place in the materia medica, the claim of the new comer, for a wonder, not being that it is an antipyretic or an analgesic, but a stomachic and appetite-producer, for which reason it has been named "orexin." As there are signs that the virtues of this compound will not be hidden under a bushel, some information as to its nature may be useful in the event of interest in it being aroused. Orexin is one of a series of compounds recently prepared synthetically by Messrs. Paul and Busch (*Berichte*, xxii., 2683). It is described as being a derivative from chinazolin, a term applied to a compound represented by a structural formula differing from that of chinoline in having two CH groups of a naphthalene ring replaced by N, instead of one. In dihydrochinazolin there is an imide group, the hydrogen of which is replaceable by an alkyl group, and it is the compound in which the substitution is effected by a phenyl group that is now put forward under the name "orexin."



Dihydrochinasolin.



Phenyldihydrochinazolin or Orexin.

In practice this compound is manufactured by heating the sodium compound of formanilid with the corresponding quantity of o-nitrobenzylchloride, and after purification of the resulting o-nitrobenzylformanilid reducing it to phenyldihydrochinazolin by means of zinc dust in acetic solution. The hydrochloride of this base,—orexine hydrochloride,—with which the clinical experiments appear to have been made, is stated to be produced in needles containing two equivalents of water of crystallization, which is gradually given off in an exsiccator, the crystals becoming efflorescent; the melting-point of the hydrated crystals is 80° C., that of the anhydrous 221°. When laid upon the tongue the compound tastes slightly bitter and leaves an intense burning sensation; it also irritates powerfully the mucous membrane of the nose. In ether it is insoluble, but it is readily soluble in hot water and in alcohol, and for this reason the hydrochloride is preferable in dispensing to the free base, which is almost insoluble in water. From an aqueous solution of the hydrochloride the base is separated by alkalies as an oily precipitate that afterwards crystallizes. Orexin hydrochloride is reported to have been used by Professor Penzoldt in thirty-six clinical cases, in most of which appetite is said to have been induced and the digestion stimulated. In the case of healthy persons the appetite is stated to increase immediately after the first dose, but with most patients the improvement is manifest only after some days. The formula recommended for administration is 2 grams of orexin hydrochloride made up with extract of gentian and althæa powder into twenty pills, gelatin-coated, three to five of which are to be taken once or twice daily with a large glassful of meat broth, a considerable quantity of liquid being required on account of the pungent properties of the compound.

Analgesia and Exalgin.

In a clinical lecture delivered at the Royal Infirmary, Edinburgh, Professor T. R. Fraser has published some interesting information *à propos* the analgesic action of methylacetanilid, or exalgin (*Brit. Med. Journ.*, Feb. 15, p. 344). In his preliminary remarks he pointed out that pain is a sensation which, for its appreciation, does not require that all parts of the cerebro-spinal nervous system, nor even that all the sensory ganglia in the brain, nor all the fibres of a sensory nerve should be involved. It follows, therefore, that for its removal it might be equally unnecessary that change should be produced in more than one or a few of the nerve fibres concerned in its manifestation. In some diseases of the nervous system common or general sensibility may be retained, while in the same region the appreciation of excitations that usually cause pain may be absent; in fact, analgesia may be present while tactile or thermal sensibility is retained. This suggests that a pharmacological modification of a physiological condition, equally with a pathological modification, might remove pain by acting on the special nerve fibres or on the special centres by which painful impressions are conducted or appreciated. Indeed, such pharmacological analgesia has been recognised as producible by several chemical compounds, but generally this property is overborne by other qualities of the compound, the doses required of antipyrin and antifebrin, for instance, to produce analgesic effect being usually so large as to involve serious inconvenience and even danger. But the compound of antifebrin, or acetanilid, with methyl, known as methylacetanilid, or exalgin, is claimed to remove pain even when administered in doses too small to produce dangerous symptoms, and with a view of testing this claim Professor Fraser has made a large number of trials. Exalgin was administered fifty-two times in neuralgic affections, ranging from facial neuralgia to cardiac angina, and on only four occasions did it fail to give relief. The doses given were half-a-grain or a grain, the relief occurring as a rule most promptly and lasting longer when the larger dose was given. In cases where the pain was not likely to be removed by any substance that did not produce general narcotism, such as carcinoma of the liver, aneurysm of the aorta and lumbar abscess, exalgin was of no use. But Professor Fraser thinks that although the analgesic power of exalgin is not very great, it may take a useful and important place among the remedies by which pain is relieved, on account of the freedom of its action from the disturbances and inconveniences associated with the action of nearly all other pain-subduing agents.

Exalgin, Phenacetin, and Antifebrin.

According to Herr Hirschsohn exalgin is readily distinguishable from phenacetin and antifebrin by treatment of one gram with two c.c. of chloroform, which dissolves the exalgin completely, but leaves the other two undissolved (*Pharm. Zeit. Russl.*, Jan. 14, p. 17). Antifebrin in aqueous solution gives, with bromine water, a bromine compound, differing therein from exalgin and phenacetin. Further, chloroform solution of exalgin with ten volumes of petroleum ether forms a clear mixture, whilst a solution of phenacetin or antifebrin is turbid under the same condition. Herr Hirschsohn says that this method allows of the detection of an admixture of 20 per cent. of acetanilid or 10 per cent. of phenacetin with exalgin.

It has already been pointed out (*Pharm. Journ.*, xix., 861) that antipyrin increases the solubility of quinine, and it is now stated that it exercises a similar influence upon caffeine (*Répertoire*, Feb. 10,

Antipyrin and Caffeine.

p. 5). M. Crinon reports that it suffices to add to caffeine a slightly superior weight of antipyrine to render it soluble in the cold, and that if heat be employed 50 centigrams of caffeine may be made to dissolve in 10 c.c. of water if 75 centigrams be added, the solution remaining clear on cooling.

Coffee and Bacteria.

In some experiments upon the dietetic and food value of coffee Herr Lüderitz has tested its behaviour towards pathogenic and non-pathogenic bacteria (*Pharm. Centr.*, Feb. 20, p. 106). He reports that he found all the bacteria experimented on to be retarded in their development in nutritive gelatine by relatively small quantities of aqueous infusion of coffee (10 g. coffee to 90 g. water), but the power of resistance manifested by the different species varied. Caffeine seemed to possess some antibacterial power, but it was so slight that its influence in the action of the infusion must be inconsiderable. It is rather to the empyreumatic substances formed in the roasting of the coffee, which have been termed collectively "caffeon," that Herr Lüderitz attributes the essential antibacterial action. In commenting upon this note the editor of the *Pharmaceutische Centralhalle* recalls the fact that fresh raw meat enclosed in the powder of roasted coffee can be dried without the least appearance of putridity.

Belladonna Poisoning and Pilocarpine.

Dr. McGowan reports the successful treatment of a case of belladonna poisoning with pilocarpine (*Brit. Med. Journ.*, Feb. 22, p. 420). The patient when first seen by him appeared to be at the point of death, having four hours previously swallowed a large tablespoonful of linimentum belladonnæ, B.P., in mistake for a dose of a mixture. Apomorphine having failed to produce vomiting, and nothing having the odour of belladonna being removed by the stomach-pump, one-third of a grain of pilocarpine was injected hypodermically, and a similar quantity five hours afterwards when partially recovered, strong coffee and other stimulants being also administered. No perspiration followed the use of the pilocarpine.

Resorcin as an Antivomicum.

Resorcin has hitherto been understood to be liable to provoke vomiting when administered. But according to Dr. Andeers, confirmed by several other observers, the emetic properties are dependent upon the presence of impurities, while chemically pure resorcin is one of the most effective of antivomica, whatever may be the cause of the emesis (*Zeit. österr. Apot.-Ver.*, Dec. 20, p. 649). Unfortunately, nothing is said as to the dose or manner of administration.

Menthol.

The use of menthol as an antiseptic as well as an anodyne appears to be increasing, and from the fact that it is probably the least injurious of all known antiseptics it is likely to come still more into use as such. Menthol has also been used in the vomiting of pregnancy with success. In the *Therapeutische Monatshefte* Dr. Weiss states that he gave it to a patient who for three weeks had vomited soon after taking every meal, and that the patient was not again sick. He gave a teaspoonful hourly of a mixture composed of 15 grains of menthol, 6 drachms of rectified spirit and an ounce of syrup.

Pilocarpine.

Witkowski (*Therap. Gaz.*, Jan., p. 46) considers pilocarpine to be almost a specific in jaundice, so much so, indeed, that if after treatment, lasting from ten to sixteen days, the jaundice does not disappear, he would attribute it to malignant disease. In one patient, who had suffered for four years, one-sixth of a grain of pilocarpine subcutaneously injected once or twice daily for three weeks caused the disappearance of the jaundice for the three years whilst under observation. Thirty analogous cases treated in a similar manner were followed with equally satisfactory results. The only cases in which it did not succeed were when the jaundice was accompanied by a tumour in the liver. He therefore recommends its use in all cases where the condition of the heart will permit it.

Solanum Carolinense.

Dr. J. L. Napier reports several cases in which cures were effected, or good results were obtained, by the use of a "20 per cent. tincture" made from the berries of the *Solanum Carolinense*. The dose given varied from ten drops to a drachm, according to age, the drug being given until the physiological effect, drowsiness, was produced. A woman who had suffered from epilepsy most of her life was apparently cured by the administration of a tablespoonful of the tincture three times a day (*Therap. Gaz.*, p. 71).

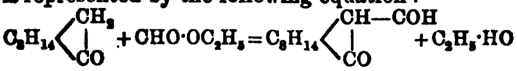
Maqui Berries.

The Kew *Bulletin* for February (p. 35) contains a note on the use of maqui berries for colouring wine. These fruits are the product of a small evergreen tree or shrub of the linden order (Tiliaceæ), *Aristotelia Maqui*. A wine is made in Chili from the berrie by mixing them with grapes, but the greenish white berries of a variety of the plant, and not the ordinary dark purple berries, are preferred for this purpose. The fruits are also eaten fresh or preserved. During the last few years large quantities of the maqui berries have been exported from Chili, chiefly to France, for the purpose of colouring wines, for which elderberries had been used previously. In 1884 France imported 500 kilos, in 1886 115,600 kilos, in 1887 315,774 kilos. This new coloring matter is therefore obviously worthy of chemical examination, if only with the view of obtaining some distinctive test for its presence in wines.

Robinia pseudacacia.

The bark of the *Robinia pseudacacia*, commonly known in England as the "cassia," or acacia tree, has been the subject of a chemical investigation by Professor F. B. Power and J. Cambier, in consequence of the report of its poisonous character (*Pharm. Rundsch.*, Feb., p. 30). They have found in it an alkaloid agreeing with the isocholine of Brieger in the permanence of its hydrochlorate in the air, but with neurine in being precipitated by tannic acid. The poisonous character of the bark, however, appears to be due to an albumenoid, which is tasteless, soluble in water, and coagulated by heat, with complete loss of its toxic properties. It is precipitated by solution of potassiobismuthic iodide. Dissolved in glacial acetic acid it gives on the addition of sulphuric acid a handsome violet colour. It differs from the globulins in being readily soluble in water, and from the peptones in being coagulated by heat and in being precipitated from its acidulated solution by potassium ferrocyanide. It is therefore designated as phytalbumose.

Camphor Aldehyd. According to a German patent taken out by Meister, Lucius and Brüning, camphor combines with formic ether in the presence of sodium or sodium ethylate, and with the elimination of ethyl alcohol, to form camphor-aldehyd or formyl camphor, a compound that it is proposed to make a starting point for other products to be introduced into medicine (*Pharm. Centr.*, Feb. 20, p. 104). An atomic proportion of sodium is dissolved with the aid of heat in a solution of a molecular proportion of camphor in toluol and when it has cooled a molecular proportion of formic ether is added. After standing some time the mixture is poured into ice-water and the alkaline solution, which contains the camphor-aldehyd in the form of a sodium compound, is separated from the supernatant toluol, acidulated with acetic acid, and the separated aldehyd removed by means of ether, which on evaporation leaves it as an oil that after a time becomes crystalline. The reaction is represented by the following equation :—



$$C_8H_{14}\left\langle\begin{matrix}CH_2\\ |\\ CO\end{matrix}\right. + CHO\cdot OC_2H_5 = C_8H_{14}\left\langle\begin{matrix}CH-COH\\ |\\ CO\end{matrix}\right. + C_2H_5\cdot HO$$

The camphor-aldehyd so obtained is described as melting at 76° to 78° C., having acid properties and being readily soluble in alkalies.

Sodium Silicofluoride. Some time since (*Pharm. Journ.*, [3], xviii., 279) sodium silicofluoride was introduced as a powerful non-poisonous antiseptic, and statements were made that a saturated solution containing 0·61 per cent. of the salt was non-irritating. Large doses of the solid compound were admitted to act as an emetic, but it was reported that as much as seven grains had been taken as a dose, though perhaps it was not desirable to take more than one-half to one grain. On account of these statements a research was undertaken by Mr. Bokenham, on behalf of the Therapeutic Committee of the British Medical Association, to determine the germicidal value of the compound when given internally (*Brit. Med. Journ.*, Feb. 15, p. 355). In some preliminary experiments it was found that a 1 in 750 solution entirely prevented fermentation, but that a 1 in 900 solution only delayed fermentation for a time, and therefore could not be considered truly antiseptic. In the proportion of 1 in 3000 or 1 in 2000 it was quite without effect on the growth of bacillus anthracis in nutrient gelatine and there was no diminution in the virulence of bacilli cultivated through several generations on this pabulum. Injection of small quantities of the salt in solution into the stomachs of guinea-pigs through an œsophageal tube was followed by the death of the animals, in one case fifty-five minutes after the injection of 0·033 gram and in the other on the fourth day after the administration of 0·29 gram in divided doses. *Post mortem* the stomach in each case appeared much dilated, with vessels injected, full of pulpy food, with much thick mucus and gas. These results, and the fact that Mr. Bokenham and a friend had noticed after drinking some saturated solution a feeling of distension of the stomach, which was not however at the time attributed to that cause, led to a personal experiment. After a mixed meal 0·05 of sodium silicofluoride was taken; in about an hour this dose was followed by great nausea, with eructations, which lasted several hours; the pulse was at the same time greatly slowed and the tension reduced. The experiment was repeated by three other persons, who each suffered from nausea, with eructations, like Mr. Bokenham, but not for so long a time. Mr. Bokenham therefore thinks that his experience may make others hesitate before they recommend the use of sodium silicofluoride internally.

Lævogyre Urine. At a recent meeting of the Société Thérapeutique, attention was called to a sample of urine which reduced cupropotassic solution, but was inactive towards polarised light, and it was suggested that this might be due to it containing two sugars, one lævogyre and the other dextrogyre, in proportions capable of neutralizing each other. M. Carles, however, points out that the phenomenon is not at all rare and that it illustrates the necessity of supplementing the polarimetric testing of urine by a chemical examination (*Journ. Pharm.*, Feb., p. 108). The explanation, he says, lies in the fact that all normal urines have a lævogyre action varying from about 0·25 to 0·80 degree of the saccharimeter, according to the proportion of extractive, intensity of colour and odour, amount of urea and the specific gravity. M. Carles does not pronounce definitely as to what particular principle this action is due, but thinks probably creatinine takes some part in it. Mention is made of a specimen of urine with a specific gravity, twenty-four hours after emission, of 1·025 at 15° C., and containing per litre 33 grams of urea and 2·27 grams of phosphoric acid, which exercised a left-handed rotation of 1·93°. It might therefore have contained 4·35 grams per litre of sugar and still have indicated 0° on the polarimeter. Of course there is also to be borne in mind the possibly disturbing influence of peptones and of quinine where cinchona preparations are being administered.

Liquid Soaps. In a paper read before the recent congress of Russian Pharmaceutical Societies, Herr Saidemann called attention to the therapeutic value of liquid soaps, which he claimed to present the advantages of being more suitable for innunction, favouring admixture of medicinal substances, and being always producible from vegetable oils, thus avoiding the use of animal fats (*Phar. Zeit. Russl.*, Dec. 24, p. 820). The formula recommended by him for a liquid soap is to mix 1 part of caustic potash dissolved in an equal weight of water with 4 parts of olive oil and one-fourth part of alcohol, and shake it vigorously during ten minutes. The mixture is repeatedly stirred during the next hour, then mixed with an equal quantity of water, and after standing several days filtered. The author states that carbolic acid incorporated with a potash soap has its caustic and poisonous properties paralysed, whilst its disinfectant action appears to be increased. It is also stated that the Berlin District Sanitary Commission has found a solution of potash soap in 10,000 of water completely to prevent the development of the splenic fever bacillus, and has recommended a solution of 15 parts in 10,000 as one of the best disinfectants.

Type-writer Ink. In experimenting upon a compound suitable for use as ink for a type-writing machine, Mr. Shuttleworth made the observation that many of the salts of the aniline series are soluble in castor oil (*Canad. Pharm. Journ.*, Jan., p. 81). Methyl violet is especially so, and advantage can be taken of this fact to prepare an ink of remarkable power, admitting of a large number of copies being taken from the same impression. Nigrosine was not experimented with, but it would seem possible that with it a black ink of some intensity might be produced. The incorporation and solution of the aniline in the oil can be effected on the small scale by triturating the previously powdered pigment with the oil in a mortar, the operation being sometimes facilitated by the addition of a little alcohol. Various coloured inks for stamping pads might be produced in the same way, though it has not yet been determined whether such mixtures would exercise a deleterious influence on the rubber stamp.

Forms of Leaves.

At the meeting of the Linnean Society on February 20, Sir John Lubbock read two papers relating to the forms of leaves. The first dealt with the form of the oak leaf, which is unequally developed on the two sides of the midrib and sinuate at the margin. He compared this leaf with that of the beech, and showed that the leafbud is smaller in the oak than in the beech, although the leaf is larger. For this reason the oak leaf becomes curved in the bud, and this curvature is probably the reason of the sinuate form of the leaf. The asymmetrical form is due to the leaf being conduplicate, so that one-half of the leaf is subject to less pressure than the other during growth. In the beech, the leaf not being subject to the same pressure in the bud, it is not curved, and the development of the parenchyma takes place in the form of plaits. The second paper related to the two British species of *Viburnum*, in which, although the two species sometimes grow within a few yards of each other, the form and character of the leaf is quite different. In *Viburnum Lantana* the leaves are densely hairy when young and are not lobed. In *V. Opulus* the leaves have stipuliform appendages and the leaves are lobed and glabrous. In all the species allied to *V. Opulus* the leaves are lobed and these appendages are present. In *V. Lantana* the hairy surface serves as a protection to the young leaves, but in *V. Opulus* the young leaves are protected by thickened scales. The pressure thus exerted throws the leaf into the lobed form, and the stipules fill the hollow left at the base of each folded leaf, just as in the maples, which have leaves similar in shape, the interstices are filled up by the smaller succeeding pair of leaves.

Stipules.

In a third paper, on the form and function of stipules, Sir John adduced the curious fact that in some species of *Helianthemum* stipules are present; in others they are absent. He showed, however, that in the latter case the bases of the petioles are dilated, and supply the place of the missing stipules. In some cases stipules protect the leaf-bud; in others they serve the purpose of leaves, as in *Lathyrus Nissolia*. When the object is simply to protect the leaf-bud the stipules are frequently deciduous; but when it is to protect the leaves also the stipules frequently form thorns, as in *Robinia*. When the leaf of the following year has to be protected the stipules are even more persistent than the ordinary leaves. Some discussion took place concerning the value of stipules as a means of distinguishing natural orders, these organs being usually present in some orders and not in others. The opinion of the botanists present appeared to be in favour of considering them as of biological rather than of systematic importance. Mr. J. G. Baker pointed out that in the order to which the viburnum belongs (Caprifoliaceæ), which is chiefly distinguished from the Rubiaceæ, in which it should probably be included, by the absence of stipules, these organs are present in *V. Opulus*, and in another genus, *Pentapyxis*.

Effect of Light on Plants.

Mr. W. G. Smith gives an interesting note (*Gard. Chron.*, Feb. 22, p. 237) on the growth of *Saxifraga sarmentosa*, better known as the strawberry geranium. A small plant placed in a window turned all its leaves to the light, but sent out seven stolons away in a straight line from the light. As these elongated they became pendulous and formed rosettes of leaves at their tips. The new leaves requiring light, the stolons altered their direction and grew towards the light until the young plants almost touched the glass. These young plants also sent out stolons which again grew away from the light, and the same thing happened with a third generation of stolons. The plant thus serves, when grown with light on one side only, to show admirably heliotropism and negative heliotropism.

Pachyma Cocos.

The singular product, *Pachyma Cocos*, now generally regarded as the sclerotium of some fungus and used largely in China as a food as well as a medicine, has recently been found on the roots of pine trees in France. It was discovered during the laying down of a forest tramway between Coubre and St. Palais sur Mer, in the Department of Charente Inférieure. The sclerotium is also met with in Carolina, and was described by Fries from specimens found in that State on the root of pine trees. The French and Chinese specimens differ only in the degree of hardness of the substance, which appears to be due to the dryness of the former at the time of collection, since when moistened no difference is noticeable between the two (*Bull. Soc. Bot. de France*, p. 433). The reproductive or spore-bearing form of the fungus does not appear to be known, and French mycologists naturally look forward with interest to the opportunity thus afforded in their own country of watching, or if possible assisting, its development. An interesting account of the *Pachyma Cocos* is given by Hanbury ('Science Papers,' p. 200), together with figures and references to the literature of the subject.

Germination of Ricinus communis.

At the meeting of the Royal Society on January 31, Professor J. R. Green read a paper on the germination of the seeds of the castor oil plant (*Ricinus communis*), in which he traced the changes in their reserve materials which preceded their absorption by the young plant. The reserve materials consist of an oil, and of certain proteid bodies forming the aleurone grains. The oil is found to split up under the action of a ferment into (chiefly) ricinoleic acid and glycerine, the latter passing into sugar. The fatty acid is split up by oxidative processes in the endosperm cells, with formation of another acid, which is soluble in water and capable of dialysis. This, with the sugar, passes into the cells of the absorbing part of the young plant. The proteids are converted chiefly into asparagin and absorbed in that form. The changes are initiated in the cells of the endosperm, the embryo appearing, however, not only to absorb the products of the decompositions, but to act in some way as a stimulus to the processes in the cells.

Ricinus communis. The position of the male flowers of *Ricinus communis* at a distance below the female flower seems to indicate that the flowers are fertilized by the agency of the wind. Signor Delpino, however, shows that in addition to this the plant has a mechanical means of dispersing the pollen. When the anthers are mature they burst open with a sort of jerk or explosion, like those of the *Parietaria* and other plants of the nettle family, scattering the contents of the anthers in the form of a small cloud of pollen, the convex surface of the anther becoming at the same time concave (*Malpighia*, vol. iii., p. 337).

Colchicum autumnale. In the *Nuov. Giorn. Bot. Ital.* (p. 81) Signor G. Cuboni mentions the frequent occurrence of abnormal flowers of the colchicum in the Intrasca valley and other localities near the Lago Maggiore. In the specimen found by him the segments of the perianth varied in number from four to eight, the stamens from four to ten, the styles from one to four. He suggests that this curious deviation from the normal number of parts of the flower might be due to the agency of insects, such as mites, etc.; but he does not appear to have been able to determine this point, although he found insects (of the *Podura* group) in normal as well as in abnormal flowers.

PEPSIN WINE.

BY JOHN HUMPHREY.

As the communication on the above preparation read at the last meeting of the Council seemed somewhat vague, I addressed the following query to the Excise Department:—

> "I shall be obliged if you will inform me whether I shall be justified in selling pepsin wine *without licence*, if it contain not less than 320 grains of pepsin (*of the British Pharmacopœia strength*) and 2 drachms of strong hydrochloric acid (*also B.P.*) in 1 pint."

The reply is as follows:—

> "I am desired by the Commissioners of Inland Revenue to inform you that they have instructed their local officers to refrain from interfering with you in selling pepsin wine, having the composition stated, without holding an excise licence, so long as that composition is maintained."

This certainly places the matter upon a more satisfactory footing, but I would venture to suggest that in making the wine it would be as well to take rather more than 320 grains of strictly B.P. pepsin. On calculation it will be seen that this quantity is apparently based on the minimum B.P. dose, on the assumption that the dose of the wine is a teaspoonful (2 grains in 1 fluid drachm). Therefore 1 fluid drachm, under proper conditions, should peptonize 100 grains of albumen. If made with the exact proportion of B.P. pepsin, it may do this, but it is highly probable it will not.

If, however, a pure scale pepsin be used or a well-made glycerate of pepsin, a much smaller proportion will suffice.

The Pharmaceutical Journal.

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WHAT IS A PATENT MEDICINE?

The view recently expressed by Mr. Braxton Hicks in reference to proprietary medicines that are commonly termed "patent medicines ' raises a question of some importance as to the proper interpretation of the sixteenth section of the Pharmacy Act, which provides that no preceding portion of that Act shall extend to or interfere with the making or dealing in patent medicines. So far as the actual words go, they do not appear to include the idea that the "patent medicines" referred to might contain scheduled poisons, but since the first and fifteenth sections of the Act relate to the sale of poisons, and to the dispensing or compounding of poisons, the exemption of "patent medicines" from their provisions may be held as showing by implication that the framers of the Act as well as the Legislature contemplated the possibility that "patent medicines" might contain poison. In that case the sale of poisons in such a form would be outside the scope of the preceding portion of the Pharmacy Act. But what are the "patent medicines" which are thus exempted from the restrictions which have been imposed by the legislature on the sale of poisons? Mr. Braxton Hicks considers that the term has been very much misused by its general application to every kind of medicine bearing the Government stamp. That has certainly been the practice, but though the fact of a medicine being the subject of letters patent is one of several conditions entailing liability to stamp duty, it is not easy to say what may have been the circumstances that gave rise to the designation of all stamped medicines as "patent medicines." Mr. Braxton Hicks holds that this is only a popular error, and that in reality the exemption of "patent medicines" in the sixteenth section of the Pharmacy Act applies only to those preparations which are or have been the subject of letters patent. The same opinion is expressed by Mr. Alpe in his work on the Medicine Stamp Acts, and he supports that view of the matter by reference to the Food and Drugs Act, where patent medicines properly so called are distinguished from proprietary medicines. Though the meaning of the technical phrase "patent medicine" in the sixteenth section of the Pharmacy Act has not been the subject of judicial interpretation, it is his opinion there can scarcely be any doubt that it covers only those preparations which are strictly patent medicines, but does not include other dutiable medicines, which are only called patent medicines in the loosest popular language, and, we may add, without any apparent reason.

If the opinion held by these authorities be correct it would follow that the exempting provision of the sixteenth section of the Pharmacy Act has but a very small application. Very few, if any, of the preparations commonly known as "patent medicines" are really the subject of letters patent, and consequently all others containing scheduled poisons would, according to the opinion above mentioned, be subject to the general provisions of the Act in regard to poisons. If this view could be sustained a large number of articles would be brought under control that is not now exercised, and their sale would be restricted to the persons qualified under the Act. As a further consequence of such an interpretation of the sixteenth section all such preparations containing a scheduled poison would become subject to the provisions of the seventeenth section in regard to labelling and the registration of sales, and thus the requirements of public safety would be better satisfied. Mr. BRAXTON HICKS thinks that the attention of the Legislature should be drawn to the fact that an enormous number of articles containing poison are sold by grocers and other persons unqualified for that duty, and to the customary disregard of the seventeenth section of the Pharmacy Act in not labelling proprietary articles which contain poison. Many other coroners share these views, and regarding the matter as representatives of the public they consider that some check should be put upon any sale of medicine, whether patent or proprietary, that involves a breach of the Act passed for the good purpose of protecting the public. In regard to the matter of labelling preparations containing poison, both patent and proprietary articles would come under the seventeenth section of the Act, and the prosecution of offenders would be a matter for the police authorities to take up. It may be inferred from the remarks of Mr. BRAXTON HICKS that some further action may be taken in the case which gave rise to this expression of opinion, and he considers that such a proceeding would be beneficial to the trade. In his opinion, a stricter observance of the provisions of the seventeenth section of the Act would operate not only as a protection to the public, but also as an enormous protection to the trade, by preventing unqualified persons from selling poisonous preparations which they have no right to deal in.

We must admit that there is considerable force in the views expressed by Mr. BRAXTON HICKS, and that in many respects we sympathize with them. But the matter is not quite so free from difficulty as would appear from what has been stated. It is true that the prosecution of offenders under the seventeenth section of the Pharmacy Act can be undertaken by the police authorities, or by any person who desires to do so, and that probably benefit would result in every way from the consequent restriction of the sale of preparations containing poisons. But at the outset we meet with a difficulty arising from the fact that these preparations are made according to secret formulæ. The fact of their containing poison would have to be proved to establish a case, and the question then arises whose duty it is to make such an inquiry. The articles in question are sold as packeted articles, and if there be a liability to label those containing poison it would appear to fall on the makers of them, and not on the retailers, who may be said to have no right to act otherwise than as the selling agents of the makers. In the case of medicinal preparations also they are often put up with labels and directions for use as to dose, administration, etc., just in the same manner that the medicine dispensed according to a physician's prescription is. Some of the makers of these preparations are qualified men, authorized under the Pharmacy Act, and hence it becomes a question whether such preparations would not have to be regarded much in the same light as dispensed medicines, although subject to the Medicine Stamp Act. In that case the exemption relating to dispensed medicines would perhaps apply so as to render the use of the poison label unnecessary under the existing condition of the law. But however these various questions may be decided, there can be little doubt that further restriction of the sale of poisonous preparations would be conducive to the public safety and to the promotion of the interests of qualified persons.

MEDICATED WINES.

IN addition to the note on pepsin wine that appears in this number of the Journal we have received from a correspondent a communication on this subject, in which he takes some exception to the requirements of the Inland Revenue authorities. The ground on which this is done is the opinion that there is an obvious inconsistency between the expressed disposition of the Commissioners not to interfere with the sale of *bonâ fide* medicated wines by chemists, and the definitions given by them of what standards should be adopted for pepsin and coca wine. This subject is now of considerable interest, and we think it will be useful to give the substance of the views expressed, though without altogether adopting them. It is considered that when the standards set up by the Commissioners in those instances are regarded from a practical point of view they appear to suit only one side of the subject and merely to provide for preventing the sale of wines that cannot be held to be *bonâ fide* medicated, and that they do so without sufficient notice of the practical conditions relating to the use and preparation of wines that are to be so regarded. It is assumed by our correspondent, that while this result may be to a certain extent due to the one-sidedness that is characteristic of the present time and a natural outcome of the specialism rendered necessary by the rapid growth of knowledge, a Government department should, with all the means at its disposal, have avoided that influence by obtaining qualified advice as to the medical and pharmaceutical aspects of the subject of medicated wines.

To take the case of pepsin wine, it may safely be said that there is scarcely any article of the Pharmacopœia which is more wrapped in empiricism than pepsin. Among the numerous recipes for pepsin wine that have appeared in pharmaceutical papers many are utterly worthless, and most of them show complete ignorance of the properties of the substance which forms the basis of the recipe. To use three hundred and twenty grains of pepsin—so-called—in the preparation of a pint of wine is a feat easy of accomplishment, but it is altogether a different affair to prove that each fluid drachm of the finished wine contains two grains of pepsin. It has been shown that different samples of commercial pepsin vary considerably. Even those of good quality differ so much in solubility that the amount taken up in preparing pepsin wine will be entirely dependent upon the process by which the pepsin employed has been manufactured. Pepsin made by Beale's process will yield very much less to the menstruum than that made by some of the more modern methods, and it would be interesting therefore to know by what means the Commissioners of Inland Revenue propose to arrive at the pepsin strength of a sample of wine. The present knowledge of pepsin is so purely relative that it is only possible to say what is the proteolytic or peptonizing power of particular samples and to appraise their value by comparison with other samples or pepsin preparations. Whether pure pepsin has ever been obtained is very questionable, and it is quite certain that the process followed in the manufacture of the best kinds of pepsin is still a trade secret. The only means of ascertaining approximately how much pepsin is contained in a preparation is by determining its peptic power. The best kinds of pepsin in the market are capable of dissolving under proper conditions one thousand times their weight of coagulated egg albumen; they are also soluble in acidulated aqueous liquids, and may therefore be regarded as typical representatives of the nearest approach to purity. Upon that view the Commissioners of Inland Revenue should logically regard as breaches of the Licensing Acts all sales of pepsin wine of such a nature that one fluid drachm fails under proper conditions to dissolve two thousand grains of coagulated egg albumen. Such a requirement, however, would be absurd, for if a tablespoonful—the usual dose of pepsin wine—of such a preparation were frequently administered it would probably lead to serious gastric disturbances. Nor is that the only difficulty, for if wine made of that strength contained much more than twenty per cent. of alcohol it would within six or twelve months have lost a considerable part of its peptic power, and that being the only test of the amount of pepsin present a chemist might be held liable for selling without a licence wine that he had really made in strict accordance with excise regulations.

In the case of coca wine it is thought by our correspondent to be superfluous, after prescribing the use of half a grain of cocaine in each fluid ounce, to stipulate in addition that the wine shall be made unpalatable. It would be a reasonable presumption that the presence of half a grain of cocaine in each wineglassful would be sufficiently dangerous to prevent the use of the wine to any extent as a beverage, and if that were not the case the attempt to render unpalatable medicines whose palatable character has hitherto been one of their chief recommendations is directly opposed to the spirit of recent pharmaceutical progress. Unless, therefore, the regulation of this matter of medicinal wines be reconsidered more in conformity with the practical requirements of medicine and pharmacy as well as those of the excise department, there would be only two alternatives for the pharmacist to choose. He must either make his pepsin wine strongly acid and of high peptic power, and his coca wine unpalatable, in order to be able to sell them without a licence, or if he desires to meet the requirements of his customers he must take out a wine licence.

In giving prominence to the expression of the foregoing opinions, as being very generally entertained, we cannot omit saying that they appear to be somewhat exaggerated. Though it cannot be denied that the statement of a definite method of testing pepsin wine would be a desirable addition to the standard set up by the Commissioners of Inland Revenue, it may, we think, be taken for granted that the estimation of the amount of pepsin in wine by its peptonizing power would be based upon the standard of the British Pharmacopœia, according to which the peptonizing of 100 grains of coagulated egg albumen would represent two grains of pepsin. That would correspond to a strength only one-tenth as much as that referred to above as being possible. In the case of coca wine the objection urged against its being made unpalatable has greater force. Not long since Dr. LAUDER BRUNTON remarked, in the course of a discussion at a meeting of the Pharmaceutical Society, that it appears to be one of the chief problems of modern pharmacy to render medicine as far as possible palatable and otherwise pleasant, and that it is in this direction medical men look to pharmacists for assistance. It would therefore be desirable if the somewhat opposite tendencies of excise requirements could be suitably modified and supported by the dictum of an authority representing the medical profession.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The second evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, February 19, at 8.30. Mr. John Nesbit, Portobello, in the chair.

The minutes of last meeting having been read and adopted, apologies for absence were intimated from Mr. Gilmour, Chairman, Mr. Storrar, Vice-Chairman, Dr. Inglis Clark and Messrs. Lunan, Lawson, Bellshill and Maben, Hawick. The following communications were read:—

NOTES ON SOME GUM SAMPLES.

BY THOMAS MABEN.

This paper is not intended to be exhaustive. It consists simply of a series of notes borrowed from various sources, and strung together for the purpose of describing the various samples in the hope that they may prove of interest. For assistance and information I am indebted to Mr. E. M. Holmes, Mr. Jackson, A.L.S., and Mr. Hillier, of Kew, and especially to Mr. Meyjes of the *Chemist and Druggist*, who not only furnished me with the most of the samples but supplied me with valuable commercial notes regarding many of them. I have also made use of articles which have appeared from time to time in the various periodicals. There are in all twenty-one samples, but some of these are simply varieties, and different market qualities of the same gum. In describing them it will be convenient to follow as far as possible the classification of the principal gum arabic yielding plants adopted at Kew, which is substantially that given in 'Pharmacographia,' and is as follows:—

Acacia Senegal (Willd.), yielding Kordofan, picked Turkey, Sennaar, or Senegal gum.

Acacia stenocarpa (Hochst), Suakim or Talca gum.

Acacia arabica (Willd.), Morocco, Mogadore, brown Barbary, or East Indian gums.

Acacia horrida (Willd.), Cape gum.

Acacia pycnantha and other species, Australian or Wattle gum.

There are also a few samples which are as yet not satisfactorily classified.

PICKED KORDOFAN GUM (1).—This sample is shown for the sake of comparison. It is an excellent specimen of the gum with which we were all familiar six or eight years ago, but which is now not to be had except at fancy prices. It shows the characteristic ovoid or spherical lumps with rounded surface where unbroken, traversed by numerous fissures, easily broken and giving an angular glassy fracture. This gum is perfectly soluble in water, and the mucilage is transparent, moderately viscid and very adhesive. The behaviour of the sample with various reagents will be subsequently referred to.

It is entirely owing to the scarcity of Turkey gum that so much importance attaches to the general subject, and a short historical notice of the course of trade in this commodity during the past few years may therefore not be without interest.

The crop of Soudan gums was formerly estimated at about 50,000 to 60,000 bales, or from 200,000 to 250,000 cwts. (representing an average value of £600,000 to £700,000), and in 1880-81, when the crop was a very good one, and the gum plentiful everywhere, those figures were probably surpassed. In 1882, when the movement of Arabi Pasha first caused attention to be drawn to a probable scarcity of Soudan gums, there existed a large stock at all centres of the trade, Cairo, Alexandria, Trieste, Marseilles, Liverpool and London, and it was generally believed that the alarmist reports were the work of Egyptian speculators only. The market advanced slightly, but in the autumn of 1882, when Egypt was again opened to trade, all the advantage which had been gained was lost. Early in 1883, however, the Mahdist rising in Kordofan became serious, and from that time may be dated the commencement of the scarcity of true Soudan gums. The principal season for the trade in Soudan gums in Cairo was from September, when the new crop commenced to arrive, until February or March, the collecting being stopped early in the year by the advent of the rainy season. In the summer of 1883 the quotation for the usual fair Alexandria "sorts," *i.e.*, the gum as it arrived from the interior mixed with dust, yellow pieces, and to some extent with impurities, was 52*s.* 6*d.* per cwt.; in 1884 the value ranged from 110*s.* to 80*s.* per cwt.; early in 1885 it rose to 120*s.* to 125*s.*, and in January, 1886, to 300*s.* per cwt. Since that time the prices have been nominal, and of true Soudan gum only a package or two have been occasionally obtainable, all the gums offered as "picked Turkey," etc., consisting of a mixture of Turkey, Senegal, and sometimes Cape gums.

The Kordofan gum (which until about ten years ago was practically synonymous with "gum arabic") is obtained from the country through which the White Nile flows, the bulk of it being gathered from the regions west of that river, the province of Tayara being the source of the best gum. The gum is brought to lower Egypt on camels' backs, and reaches Europe, *viâ* Cairo and Alexandria. This gum used to be picked, sieved and garbled, principally in Trieste, which has for years been the largest continental gum market, owing to the perfection to which the industry of picking and sorting gums has there been brought, and also, of course, because of its favourable situation as a centre for the Levant and North African trade. The statistical movements of Egyptian gums in that port are therefore of interest.

	1880	1881	1882	1883	1884	1885
Imports . . .	20,637	16,843	12,272	10,383	5983	—
Deliveries . .	15,966	19,228	11,879	13,575	5850	—
Stock Dec 31.	5906	3521	3914	722	855	8

The figures are given in bales or serons of about 200 kilos (equal to about four cwt.).

The gums produced by the countries east of the White Nile were generally inferior to the Kordofan gum, and were known as Senari, Geddah, Gehzirah, etc., but with the stoppage of the Soudan as a source of supply, these names have ceased to have any practical meaning at present. The fact that all these inferior gums yield a mucilage that sours quicker than that of the Kordofan gums has been explained by some on the hypothesis that they are gathered in districts which are subject to a longer period of rainy weather, and that the dampness of the climate gives rise to a condition of incipient fermentation, but it is questionable if this explanation is sufficient.

GEDDAH GUM (2).—During the last few years some gum known as Egyptian gum has been imported *viâ* Geddah on the Arabian side of the Red Sea. This gum occurs in glassy amber-coloured drops, with pieces of a lighter colour, but very much mixed with impurities. The picked tears are perfectly soluble in water, and make a nice viscid mucilage, but of a dark colour, and with taste not so bland as that made from the best gum. This gum is probably obtained from the northern portion of the Arabian peninsula, from which country we also get gums known as "Mecca," "El Wisch," etc., which are all much the same as regards quality. Among these may also be mentioned *Aden Gum*, which is an article imported in considerable quantities. This gum is really produced in the triangular peninsula which forms the eastern extremity of Africa. It was formerly purchased at the

Port of Berbera (nearly opposite Aden) by Bombay merchants, who used to carry it to Bombay and roughly pick and sort it there, and then again ship it to Europe. It now also comes *viâ* Aden and other Red Sea ports. It occurs in bold glassy amber-coloured drops, and is very frequently scented with gum olibanum, which is produced in the same country; this through careless packing communicates its odour, and small pieces of olibanum are also often found in the gum.

Before the closing of the Soudan *Gehzirah and Talca gums* were regular articles of trade, their value always being much below that of true Kordofan gum. It is not so very long ago that Gehzirah gum fetched about 20*s.* to 21*s.* per cwt., and Talca, which was looked upon simply as an inferior grade of Gehzirah, about 14*s.* or 15*s.* per cwt. These gums are gathered, according to one of my authorities, in the country between the eastern branch of the Nile and the Red Sea, northwards of Abyssinia, the bulk of the supply coming from the neighbourhood of Kadariff, and being brought into commerce *viâ* Kassala and the Red Sea ports, or formerly by the Nile route *viâ* Cairo and Alexandria. The fact that the Gehzirah gum is collected east of the Nile river, where the Mahdi's influence was not felt in its full force until after the fall of Khartoum, accounts for the circumstance that after the supply of Kordofan gum had already dried up, Gehzirah still came forward in large quantities *viâ* Massowah and Suakim on the Red Sea. In 1887 Trieste imported no less than 10,249 serons of this gum, but it sold off rapidly at very high prices, and at present the stock left at Trieste, if any, is very small. From Suakim, which formerly (in 1883) exported £57,000 worth of gum per year, only £1600 came forward in 1886, and since then practically none has been received. "Suakim" gum as a variety is not known in the London market; the name is, or was, applied to all those gums which came into commerce by way of that port, such as Gehzirah, Talca, Geddah, etc. The Gehzirah gums, along with the Senegal, formed the best available substitutes for Kordofan gum when the supply of the latter failed us, but I am informed that the Gehzirah mucilage was much thinner than that of Kordofan gum, that it turned sour more quickly, and had a peculiar blue shade of colour.

Senegal Gum (3, Galam Senegal, 4, gomme du bas du fleuve).—Senegal gum is thus described in 'Pharmacographia:' "The colour is usually yellowish, or somewhat reddish, and the lumps, which are of large size, are often elongated or vermicular. Senegal gum never exhibits the numerous fissures seen in Kordofan gum, so that the masses are much firmer and less easily broken." This description for the most part answers to the samples, though there are in them pieces of gum, which for whiteness, roundness and fissured appearance might well pass for Kordofan gum. Mucilage made from picked Senegal gum is as free from odour, nearly as white and transparent as acacia mucilage, and it keeps a reasonable time without becoming sour. It is a trifle less viscid, but for most pharmaceutical purposes it might fairly take the place of Kordofan gum, with which it is, according to Flückiger and Hanbury, identical in every respect, whether chemical or optical, save as regards its physical appearance.

Gum Senegal, that is, the gum arabic produced by the countries around the Senegal river in North-Western Africa, has been an important article of commerce for at least fifteen years, and at present it probably ranks as the principal variety on the market. The centre of the trade in this gum is at Bordeaux, whence there is regular steamship communication with the French settlements on the Senegal river, the capital of that colony, Saint Louis, being the port from which the gum is shipped. The gum business is one of the staple trades of the colony, and at the late Paris Exhibition the quantity of specimens of Senegal gum exhibited in the French Colonial section was quite remarkable. The trade is entirely in the hands of the French, the fiscal system prevailing in the French colonies being of such a nature as to render it very difficult for other nations to import produce from those countries otherwise than *viâ* French ports. Some few years ago the principal Bordeaux merchants—the gum trade is in few hands—formed a syndicate for the control of the article, and succeeded in forcing up the price from about 52*s.* 6*d.* per cwt. in January, 1886, to 72*s.* 6*d.* in April of that year, 100*s.* in April, 1886, and 125*s.* in April, 1888. For the most part of 1889 the price ruled from £5 to £5 15*s.*, but there has been a gradually slackening demand for some months, and only last week the *Chemist and Druggist* (Feb. 15) reports that "there has been a serious decline in the price of Senegal gums, both varieties being easily obtainable at 85*s.* per cwt."

According to the French official statistics the exports of gum from the Senegal average about 6,000,000 lbs. (English) per year, though the quantity fluctuates considerably, according to the extent of the crop, and the prices obtained for the gum. About ten years ago, for instance, when true Soudan gum was still plentiful, there was quite a glut in the Senegal market, and the prices fell so low that it no longer paid the natives to collect the gum.

There are three distinct varieties of Senegal gum, viz., "gomme du bas du fleuve," "gomme de Galam," and "gomme friable." The two former, of which samples are shown, are of most importance. Bas du fleuve means literally "lower river," and the gum is so-called because it is collected nearest the mouth of the Senegal. This variety is the larger crop of the two, the yield being as much as 4,000,000 lbs. in good years. Quoting from the account of the Paris Exhibition of 1878 (*Pharm. Journ.*, [3], ix., p. 43), it appears that the gum is gathered in November in the windy season following the floods. The concreted exudations of gum are removed from the branches by means of crooked sticks, and the gum is usually buried in the still damp soil to remove excessive moisture. It loses much of its weight and value by drying and accumulates a coating of sand.

The second crop (gomme de Galam) is completely dry when taken from the trees and being carried direct to store is cleaner than the first. The gum derives its name from Galam, which is a trading station on the river, far up the country, to which the natives bring the gum of their respective districts in order to barter it with the French merchants for cloth, coral, amber, ammunition, etc. The third contribution (gomme friable) comes from upper Senegal. This is extremely friable owing to the annual conflagrations in the forests, and is therefore of comparatively little value.

Some thirteen years ago the French Government sent a well-known scientist, M. Louvet, to explore the gum-yielding regions of the Senegal and report on their extent, etc. From M. Louvet's report it appears that the yield of gum is most abundant if the rainy season (July–September) is followed by a prolonged east wind. The hot east wind blowing from the Sahara desert generally sets in in December and January, and upon its violence the crop greatly depends, for the heat causes the bark of the trees to crack, whereupon the gum exudes. The gum is gathered from several species of acacia, and it is impossible to refer with absolute certainty any particular gum to its exact source. The finest Arabic gums now met with in commerce are said to consist of a large admixture of gum Senegal.

Barbary Gum.—(5, white Barbary; 6, Barbary amrad; 7, brown Barbary). Casual consignments of gum acacia from Mogadore and other ports of N. W. Africa were received for several years previous to 1883–84 but since the latter year, these consignments have become quite regular and of considerable importance. This gum is said to be obtained from the *Acacia arabica*, and is produced in Morocco and the adjoining parts. Of the samples shown, the white Barbary or white Mogadore is the best variety. It appears not unlike Turkey sorts, but is rather dirtier, and consists of irregular pieces; white or pale amber, much fissured and rarely rounded, brittle, and giving a glassy transparent fracture. It is perfectly soluble in water and gives a bright transparent mucilage, rather less viscid than acacia mucilage, but free from odour and keeping sweet for a considerable period.

Barbary amrad is apparently an inferior variety of the same gum, the colour ranging from amber to light brown. The mucilage is not satisfactory; it rapidly sours, and on standing separates into a brown upper layer and an amber coloured lower layer.

Brown Barbary comes nearest that described in 'Pharmacographia,' in that it consists for the most part of "tears of a moderate size and of a uniform light dusky-brown tint." The tears are transparent, but the sample contains many impurities, it being mixed with wood, stones and other foreign matter. The gum is quite soluble in water, and the picked tears give a dark coloured mucilage, rather thinner and less viscid than acacia mucilage.

The white Mogadore gum is an import of quite recent date, and is thought by some to be a Soudan gum, which now finds its way by a diverted route to the north west instead of the north east of Africa.

WEST COAST AFRICA GUM.—There have also been recently received consignments of gum arabic from the Equatorial African west coast (Congo River territory), but this gum is too new as yet to be considered a commercial article. It rather resembles Aden gum, but is redder in colour and not so well garbled.

EAST INDIAN GUMS.—(8, glassy amrad, 9, pale amrad, 10, E.I. fine amrad, 11, E.I. amrad, 12, E.I. red amrad). *Glassy amrad.*—This sample is apparently similar to that described by Mr. Mander. The colour varies from pale amber to light brown. It occurs in tears and more or less rounded pieces and in broken fragments; surface smooth and glistening and free from cracks. The sample is evidently a mixture of two or more gums, some of the pieces bearing a strong resemblance to ghatti gum in their white opaque nature and vermiculate form. This accounts for the extreme viscidity of the mucilage, and also for the fact that portions of the gum seemed not to dissolve but simply to swell up.

Pale amrad differs from glassy amrad. It consists of irregular pieces of a light amber colour, with surface rough and opaque, or rounded or vermicular, and with broken fragments distinctly fissured and generally very hard. The gum is soluble in water but yields only a thin mucilage.

East Indian fine amrad is simply another variety of the same gum, which it closely approaches in all essential particulars. The mucilage is too dark for pharmaceutical purposes, but it is free from odour and keeps fairly well.

East Indian amrad consists of tears of varying sizes, and broken pieces, colour ranging from amber to dark brown. Surface smooth in some cases, in others rough; some pieces solid, others fissured, especially towards the surface, and moderately brittle. Soluble in water, and mucilage much less viscid than acacia mucilage, with a faint but not unpleasant odour. This gum gives a dark brown colour with ferric chloride, indicating the presence of tannin.

East Indian red amrad consists of a still lower quality of gum. The mucilage is a dark brown or black disagreeable looking mixture with an offensive odour. The gum is not entirely soluble in water. Ferric chloride gives a black coloration, indicating abundantly the presence of tannin. The questions as to the source and commercial value of these gums have been gone into so fully by Mr. Mander that it is unnecessary for me to enlarge further regarding them. Mr. Prebble (*Pharm. Journ.*, [3], xix., p. 1) thinks that the term "amrad" refers not to the source of the gums but to their "amrad" or *red* character. The word is applied to gums from different localities, such as Barbary amrad, Egyptian amrad, and so on. The most that we can say is "that the sources of the gums cannot be definitely stated, and they are not easily ascertained."

CAPE GUM.—(13, glassy hard brown Cape, 14, soft Cape, 15, fine picked white Cape). During the last three years Cape gum has become an important article in our markets, and in 1888, and especially in 1889, large quantities were imported. Practically, the whole of the Cape gums are sent to London, but I have not been able to procure statistics as to the actual exports from the Cape. There are two varieties imported, viz., glassy hard brown Cape and soft Cape.

Glassy Hard Brown Cape.—This gum is of an amber-brown colour, in irregular pieces, occasionally fissured, usually hard; soluble in water, giving a dark-coloured viscid mucilage, free from odour, but with an unusual flavour. It is said to be obtained from *Acacia horrida*, and comes from the western part of the colony, and from those parts north of the Orange river where the Germans have recently attempted to establish colonies, viz., Namagua and Damara Land. One of the German travellers, who was among the first to obtain grants of land in the Walfisch Bay district, reported this gum to be among the principal articles of produce of the country, the supply being practically inexhaustible. The gum has recently been bought for the purpose of being bleached, and afterwards mixed with pale gums, the selling price, if not the value, being greatly enhanced by the process. This brown gum has been known for many years, and is what is described in 'Pharmacographia,' which states that the quantity exported in 1872 amounted to 101,241 pounds, but more recently, that is, since the closing of the Soudan, another variety of gum has been regularly imported from the Cape.

SOFT CAPE GUM.—This new variety is said to be derived from *Acacia giraffæ*, and is supposed to be gathered in the northern parts of Cape Colony, beyond the Orange river. There are two samples, one of which consists of the ordinary variety, which is not unlike, and comes very nearly up to the old Turkey sorts. This gum contains some dark brown pieces which affect the colour of the mucilage, which has, moreover, a bitter taste quite unlike the bland demulcent flavour of true acacia mucilage. The sample of fine picked white Cape is as pretty a gum as need be looked for, and, in fact, few Kordofan gums could show a better appearance. So far indeed as can be judged by their physical properties, and the flavour and viscidity of the mucilage formed from them, it seems to me that the picked Cape gum is identical with Kordofan gums. It is thought by some that this white Cape gum is simply what we formerly received from the Soudan, and which is now brought by Arab traders right across Africa. This is a doubtful hypothesis, however, for if gums found their way so far south, we would surely receive some by way of Zanzibar.

Australian or Wattle Gum (16).—According to 'Pharmacographia,' the gum "occurs in large hard globular tears and lumps, occasionally of a pale yellow, yet more often of an amber or of a reddish brown hue. It is transparent and entirely soluble in water; the mucilage is strongly adhesive and said to be less liable to crack when dry than that of some other gums. The solution, especially that of the darker and inferior kinds, contains a little tannin, evidently derived from the very astringent bark, which is often attached to the gum.' I can quite corroborate the remark as to the presence of bark as an impurity among the gum, but when that is removed and the pure gum dissolved, I can find no trace of tannin. The gum makes a thin mucilage, even one in two being thinner than one in two and a half acacia mucilage, and the solution on standing separates, a browish deposit being formed with a pale, clear, supernatant mucilage. This gum is derived from several species of *Acacia*, and is exported by most of the Australian colonies. It has been known to commerce for many years, but it was not until 1883–4 that it began to be imported in the large quantities in which we have since received it. The market for it seems limited in this country, although it is said to be employed to a considerable extent in Sweden and Russia. The dark glassy variety is especially difficult to place, but the paler and "frosty" gum finds a fair market.

BRAZILIAN GUM (17), Para gum (18), gum angico (19).—For some few years there have been regular consignments of Brazilian gum to Liverpool. There are two distinct kinds, one of them being a gum resin of a whitish or pale yellow colour, not unlike gum arabic in appearance; this is said to be obtained from *Hymenia Courbaril*, and is used for varnish purposes. The other is the gum represented by the samples, and it is said to be obtained from *Acacia Angico*. It is found in considerable quantity in the province of Piauhy, which occupies the most easterly portion of the South American continent, whence it is shipped to Para, and thence to England. Samples 17 and 18 are commercial specimens bought as "Brazilian gum" and "Para gum," but though the former is darker in colour and contains more impurities than the latter, I have no doubt that they are the same gum. The angico gum (19) is a sample kindly sent me by Mr. E. M. Holmes from the Museum at Bloomsbury Square. This also is darker in colour than the Para gum, but, generally speaking, I can find no other distinction between them. The gum occurs in large dark amber or dark brown glossy drops, and is soluble in water. A mucilage in B.P. proportions is slightly thicker than acacia mucilage, but it is only moderately adhesive.

GHATTI GUM (20).—This gum, which is now quite familiar to most of us, is thus described by Mander:—"A pale gum consisting of rounded or vermiform pieces of varying size, clear internally, but dull and roughened on the surface, from brownish-yellow to perfectly colourless and transparent." According to Mr. Prebble (*Pharm. Journ.*, [3], xix., p. 1), "the best picked ghatti gum as now exported from Bombay is entirely, or almost entirely, derived from *Anogeissus latifolia*." The gum is largely used in India for calico printing, for which it has a high reputation. I can confirm previous statements as to the reactions obtained with this gum, but I am sorry to disagree with Mr. Mander, when he says that ghatti mucilage is "tasteless." My experience is that ghatti gum has a mawkish, disagreeable flavour, entirely *sui generis*, which will always prove an obstacle to the regular employment of the gum in certain departments of pharmacy. Ghatti gum forms a very thick mucilage, even in the proportion of 1 to 3 of water.

OOMRA GUM.—(21) According to Prebble, oomrawuttie gum, which is also an Indian product, "is considered by the native gum dealers in Bombay to be of two kinds, the 'ghatti' and the 'amrad'; the latter they consider to be derived from the Babool tree (*Acacia arabica*). Babool gum is distinguished by being unaffected by either neutral or basic acetate of lead, and not gelatinized by ferric chloride." This sample corresponds to these tests, and will no doubt be the "Babool gum." It consists of irregular tears and broken pieces, irregular alike as regards size and colour; the latter varying from clear pale to dark brown or black. The dark-coloured pieces are those which have hung long on the tree, and these contain a considerable quantity of tannin, as is indicated by the colour-reaction with ferric chloride, by which the pale samples are much less affected. Oomra gum gives a dark-coloured, adhesive, viscid mucilage, which for many purposes might be very useful.

Before going further I may indicate my opinion as to the relative value of the different gums for pharmaceutical purposes. All the dark-coloured gums or gums which give a dark-coloured mucilage may be at once dismissed from our notice, for however valuable many of them may be in the arts and for the purposes of the confectioner, it is obvious that they are unsuitable in pharmacy. There remain, therefore, not very many to pass an opinion upon, our selection being confined to Cape gum, Senegal gum, Barbary gum, and the paler varieties of Indian amrad and ghatti gum. All of these possess good emulsifying properties, and give a clear, good keeping mucilage, and I am disposed to place the relative value of picked samples in the order in which I have given them.

I am informed that Cape gum is now being freely sold for Turkey gum, and I can to a certain extent corroborate this. A parcel bought by myself recently as "gum acacia" consisted apparently of Cape gum mixed with small pieces of ghatti. This mixture gives a thicker mucilage than pure Cape gum, while the taste is not objectionable.

Of the transactions in gum recorded in the *Chemist and Druggist* trade reports during the last few months, the following summary may be of interest, but it must be borne in mind that the widely differing prices represent as widely different varieties:—

Brazilian gum	28*s*. to 60*s*.	per cwt.
Aden gum (scented) .	30*s*. to 60*s*.	"
" " (unscented).	60*s*. to 90*s*.	"
Oomra gum.	40*s*. to 59*s*.	"
Australian gum . . .	25*s*. to 64*s*.	"
Ghatti gum.	28*s*. to 94*s*.	"
Geddah and Talca gum	85*s*. to 95*s*.	"
Amrad gum.	40*s*. to 105*s*.	"
Cape gum	40*s*. to 105*s*.	"
Barbary or Mogadore gum	42*s*. to 112*s*. 6*d*.	"
Senegal	82*s*. 6*d*. to 115*s*.	"
Turkey	100*s*. to 330*s*.	"

In addition to these, parcels of Cape gum have sold for £14 10*s*., and Mogadore for £14 5*s*., while £25 per cwt. was asked for a parcel of fine Turkey gum.

It is unnecessary to go at length into the behaviour of the gums with the various reagents, while a table to be of any value would require to be on too extensive a scale for our present purpose. The reagents employed consisted of borax, basic lead acetate, ferric chloride, silicate of potash, oxalate of ammonium and alcohol. In the case of borax the powder made into a paste with a few drops of water was employed. In all the others the reagent was in the form of a solution. All the samples gave precipitates with alcohol and also with ammonium oxalate, although with the latter the Brazilian and Australian gums gave only faint reactions. All qualitative methods for testing mucilage are unsatisfactory, and any process chosen is probably only the least of several evils. After trying several methods I found the following, though not without its faults, as good as any for comparative purposes. Two or three drops of mucilage are placed on a glass or porcelain slab, and one or two drops of the reagent added; these are then stirred together with a glass rod and the results compared. In the case of borax, acacia mucilage at once agglutinates or hardens into a gummy mass; similarly with basic lead acetate and ferric chloride, whilst it gelatinises or forms a softer mass with potassic silicate. Similar reactions are given by the Senegal gums, the Indian amrad gums, white Barbary, white and brown Cape, and Geddah gum.

Barbary brown and amrad give only a jelly with borax, otherwise they react as acacia. Australian gum agglutinates with borax, but only gelatinises with basic lead acetate, and has no reaction with ferric chloride and potassic silicate. Brazilian gum has no reaction with potassic silicate, but gelatinises with borax and ferric chloride and slightly with basic lead acetate. Ghatti gum gelatinises with all four reagents, but in a slight degree only with potassic silicate. Oomra gum reacts similarly to acacia, except that it is entirely unaffected by basic lead acetate, and forms a softer jelly with ferric chloride. There are, of course, shades of difference in the various reactions which cannot be indicated by these terms, but generally speaking a fair idea is given of the nature of the gum.

The Chairman said he was sure they must all feel much indebted to Mr. Maben for his interesting and exhaustive description of this series of gums.

Mr. Boa said he had had considerable experience of ghatti gum, and would be inclined to give rather a higher rank than that assigned to it by Mr. Maben. He had found that picked pieces of it with twice the quantity of water required for Turkey gum gave a good mucilage which emulsified well. With regard to the taste he did not think there would be much objection to that, as in the ordinary way in which gum was used in dispensing it would be hardly perceptible. This gum had the merit of being cheap, and he had found it satisfactory.

Mr. Hill said he had some time ago seen a sample of powdered gum which gave a blue colour when used for making chalk mixture. It was found that the sample had been ground in a mill, in which guaiacum resin had previously been ground, and this was accepted as an explanation of the phenomenon. It was possible, however, that the sample was the same as the Gehzirah gum referred to by Mr. Maben as giving a blue coloured mucilage.

The next communication was on:—

DETECTION AND SEPARATION OF SODIUM FROM LITHIUM.

BY ISAAC W. THOMSON.

Those who have had much to do with lithium salts must often have felt an uncertainty as to their freedom from sodium salts, and a want of a reliable and ready means of detecting and estimating them. We have, of course, the well-known absolute alcohol and ether process, but absolute alcohol and absolute ether are not always at the hand of every chemist, and the great necessity of care and skill for its proper manipulation prevents this test from being of common application.

Requiring a small quantity of pure sodium chloride, I used Margueritte's method of throwing it out of solution by the addition of strong hydrochloric acid to a saturated aqueous solution. The large quantity thrown out caused me to try the solubility of sodium chloride in hydrochloric acid, B.P. strength. This I found to be about 1 in 600. I thought this would be a ready means of detecting and separating sodium from lithium, lithium chloride being very soluble in hydrochloric acid. I found it desirable, however, considering that there is a certain amount of sodium chloride soluble in hydrochloric acid, to work with an acid saturated with this salt and wash ultimately with a small quantity of pure acid. The following is the method adopted, and some of the results obtained.

10 grams of lithium carbonate, containing 2 per cent. of sodium carbonate, was put into a flask with 100 c.c. of distilled water, the gross weight noted; then boiled for a few minutes, reweighed, and made up to the original weight with water. When cold 50 c.c. of the solution was filtered off and evaporated to dryness. This was shaken up with 15 c.c. B.P. hydrochloric acid saturated with sodium chloride, cooled down to normal temperature, thrown on a small filter, drained and washed with 10 c.c. or so of the same acid, finally washing with a small quantity of pure acid. The residue was then carefully washed through with hot water into a tared capsule and evaporated to dryness; after careful heating on a sand bath, it yielded 0·11 gram NaCl, this multiplied by twenty equals 2·2 per cent. NaCl, equalling practically 2 per cent. Na_2CO_3. I have examined four samples of commercial lithium carbonate for sodium carbonate by this method in comparison with the absolute alcohol and ether process, with the following results:—

These figures are calculated to Na_2CO_3 from the NaCl obtained.

	Hydrochloric acid.	Absolute alcohol and ether.
No. 1	Free	Trace
„ 2	1·28 per cent.	1·3 per cent.
„ 3	0·1 „	0·1 „
„ 4	0·5 „	0·5 „

When we have only sodium carbonate present as an impurity, either method may be used for its detection and separation; but when we have sulphuric acid present, either as lithium or calcium sulphate, this radical requires to be removed prior to the separation of the sodium by the alcohol and ether method, their insolubility in that menstruum vitiating results. They are perfectly soluble, however, in strong hydrochloric acid, and in this respect the acid process has a decided advantage, enabling one to examine a sample in a very short time.

These notes were written and promised for an evening meeting, which was to have been held on January 15, but which, from unavoidable causes, was postponed. I make this explanation, as I notice Mr. Symons has written some notes on the same subject in the *Chemist and Druggist* of February 1.

The Chairman said he had been accustomed to rely upon the saturating power of lithium carbonate as a test of purity. The presence of any considerable quantity of sodium salt would soon be made apparent in this way.

Mr. Dott said they were indebted to Mr. Thomson for what seemed a simple and practical process. The results were more accurate than he would have been led to anticipate. Of course, for the mere detecting of sodium nothing excelled the spectroscope, but where a quantitative test was desired some other method must be adopted. The alcohol ether method was not a convenient or practical process, and Mr. Thomson's proposal met a felt want in a practical and useful way. It would require some experience to decide definitely as to the value of the process.

Mr. Gibson said, to judge by the results obtained by Mr. Thomson, the process appeared to be an excellent one.

The next communication was on:—

A SIMPLE METHOD FOR ESTIMATING THE ACIDITY OF MILK.

BY ISAAC W. THOMSON.

The great quantity of milk now sent from the country districts into our large towns, necessitates the utmost care, on the part of the farmer, to enable him to place it on the market in the best possible condition. Amongst the evils which he has to guard against, not the least is its proneness to become acid. This the farmer requires to counteract by an alkali, such as sodium bicarbonate, but how much or how little he requires to add, is often a puzzle. Litmus paper never has proved satisfactory in his hands, and so he as often goes by rule of thumb. Having been recently asked to suggest a process, which could be readily applied by any intelligent dairy farmer. I recommend the following:—

Make a solution of ammonia containing about 40 per cent. of glycerine, standardize this solution so that 840 minims will equal 63 grains oxalic acid, this equals 84 grains of sodium bicarbonate of B.P. standard. Prepare a test paper by steeping unsized white paper in a solution of phenol-phthalein and drying.

Put ½ a pint of milk (less will do, but this is a good quantity to calculate from) into a 12 oz. stoppered bottle with 20 minims of alkaline solution, rinsing the measure out with a few drops of water and adding to the milk in the bottle, shake and pour it into the testing tin; fasten on to the hook attached to the inside of the lid a piece of the test paper, moistened with a small quantity of water; close the lid and set the tin into a bath of hot water for a minute or so. Then lift the lid. If the paper is pink more alkaline solution has been added than is sufficient to neutralize the milk, and the process must be repeated with 10 minims, if this time the paper is not tinged pink, the neutral point lies between 10 and 20 minims. Repeat the process with 15 minims; if this time it turns the paper pink, the neutral point lies between 15 and 10 minims, if not it lies between 15 and 20 minims. The process is repeated with a lesser or greater quantity of alkaline solution, until the point is arrived at when the faintest tinge is perceptible. This may be considered the neutral point. Calculate the number of minims of alkaline solution required for 1 gallon of milk, from the number of minims used for the ½ pint. Thus if the ½ pint required 20 minims to exactly tinge the paper pink, 16 half pints equal 1 gallon, 16 multiplied by 20 equals 320 minims to 1 gallon. Ten minims of the alkaline solution is equal to 1 grain of sodium bicarbonate of British Pharmacopœia standard; therefore 32 grains of sodium bicarbonate added to every gallon of milk will make it quite neutral.

Of course if 20 minims has not been found to tinge the paper pink the process has to be repeated, by pouring the milk back into the bottle, and adding other 10 minims of alkaline solution. Having well shaken the bottle, proceed as before. If this is found sufficient the neutral point lies between 20 and 30 minims; if not, the process must be repeated, adding more alkaline solution until the neutral point is obtained.

At first glance the process may seem a little difficult, and with this in view I demonstrated the process before two large dairy farmers in the neighbourhood, who had no hesitation in saying that in the working of it they would have no difficulty whatever, and in their opinion it was very simple.

A word or two of caution is needed, however. Care must be taken not to leave the stopper out of the bottle containing the alkaline solution, otherwise the strength of the solution will be impaired; the stopper should be put in immediately after pouring out the required quantity.

Care also must be taken not to add the alkaline solution to the milk in the tin, but to the milk in the bottle, which is only put into the tin after being well shaken.

The sodium bicarbonate must be of British Pharmacopœia standard, and should be bought of a respectable chemist, as much of that which is sold under that name is of very inferior quality.

The supplying of a demand such as that referred to, seems to come legitimately within the province of the practical pharmacist, and I have therefore thought it appropriate to bring the subject forward at such a meeting as this.

The Chairman said, although this communication was not strictly pharmaceutical, it was one in which they were all interested.

Mr. Boa said his knowledge of dairy farming was getting a little rusty, but he happened to know that this question of the acidity of milk was one of considerable practical importance. Many methods, mostly very crude, were adopted to meet the difficulty. He knew of an ironmonger who had a secret formula in much demand and who had, he believed, reaped a small fortune from this source. Quite recently he (Mr. Boa) had been applied to for a ready test, but he had not been able to suggest a suitable one. He would now, however, recommend the process suggested by Mr. Thomson.

The next communication was a—

NOTE ON ADULTERATED ANISE FRUIT.

BY WILLIAM LAWSON.

Some years ago the stock in trade of a medical practitioner came into my hands by purchase; among other things it contained a parcel of anise fruit. The parcel remained unopened till quite recently when my assistant called my attention to the fact that it contained some adulterant. On closer examination I found that the sample was deficient in aroma and contained a large number of small clay casts which resembled anise fruit sufficiently to escape notice by a merely superficial observer. By treatment with water the clay was separated, and on being dried and weighed was found to amount to 70 per cent. by weight of the sample. One can readily understand, that in the harvesting of such an article as anise fruit a small percentage of clay might be accidentally retained. But from the large percentage above noted and its appearance there can be no doubt that it has been deliberately added. I find that a very fair imitation of the adulterant can be made by pressing moist clay through a sieve made of perforated zinc and afterwards drying and baking it in a hot air chamber, and it is probably by some such process that the fraud has been accomplished. I have not been able to trace the source of the sample with certainty but I believe it came from a quarter which I would naturally regard with suspicion. Such an adulteration of so cheap an article would hardly pay unless conducted on a large scale, and it is right that such grossly fraudulent practices should be made impossible by being exposed. I submit a sample which gives a good idea of the appearance of the adulterated article.

Mr. Stephenson, who had taken the chair, said they had frequently been favoured with communications from Mr. Lawson, and they were indebted to him for this interesting and unique note.

Mr. Hill said it was noteworthy that this parcel was found in the stock of a medical graduate practicing pharmacy. It would hardly have been met with in the stock of a qualified chemist.

The next communication was on:—

THE IGNITING POINT OF SULPHUR.

BY J. RUTHERFORD HILL.

This note is the result of some experiments suggested by a letter in the *Chemical News* of February 14. Mr. Bertram Blount there states that in course of a recent conversation a remark was made to the effect that sulphur ignites at a temperature not far above its melting point, 107° C. On referring to published authorities, Mr. Blount was apparently puzzled by the very discordant statements on the subject, which ranged from 115° C. to 293° C. He makes an appeal to anyone who has determined the igniting point of sulphur to publish the result, and indicate the method employed. What follows is intended as a reply to his appeal.

It will be convenient to state here the published igniting points of sulphur quoted by Mr. Blount as follows:—Tidy, 115° C. to 120° C.; Dumas, 150° C.; Pelouze and Fremy, 150° C.; Miller, 235° C. to 260° C.; Watts, 250° C.; Dalton, 260° C.; Thomson, 293° C.

After some little planning and experiment a method was adopted as being the least open to objection, which consists practically in drawing a current of air, previously heated, through a closed test-tube containing sulphur placed in a bath of strong sulphuric acid, and noticing the temperature at which ignition takes place when the bath is heated over a Bunsen flame.

When the thermometer placed in the bath reached 255° C. the vapour of sulphur burst into flame. This occurred several times on repeating the experiment. On one occasion it inflamed at 253° C., and once or twice at slightly higher temperatures. On pinching with the hand the india rubber syphon tube by which the air current is drawn off from the tube, the test tube fills with sulphur vapour, and the flame is instantly extinguished. On removing the pressure from the syphon tube fresh air immediately enters the test tube and the sulphur vapour instantly rekindles. This takes place with great sharpness, and the operation can be repeated with great ease and rapidity. By removing the Bunsen flame from the bath the temperature rapidly falls and the sulphur flame can be extinguished and rekindled at every degree. This continues till the thermometer falls to 248° C., but below that temperature the vapour will not re-ignite. The experiment was repeated eight or nine times with the same result. On one occasion the thermometer was read 246° C. when the flash last appeared, but this was possibly a mistake in observation.

An experiment was now made to ascertain if the sulphur inside the test tube was at the same temperature as that indicated by the thermometer in the sulphuric acid bath outside. A thermometer was placed in a test tube containing sulphur. This test tube was placed in the sulphuric acid bath. On applying heat it was found that while the temperature was rising the sulphur inside the test tube was always a few degrees lower in temperature than the sulphuric acid outside. On withdrawing the heat and allowing the temperature to fall, however, it was found that both thermometers speedily indicated the same temperature and continued to fall at the same rate. This would indicate that the point at which the sulphur flame was first seen (255° C.) was probably not the real temperature inside the tube, and also that the point at which the flame ceased while the thermometer was falling (248° C.) was the real temperature inside the tube. To test this point the sulphuric acid bath was raised once to 261° C. and at another time to 271° C., and on both occasions the flame disappeared on allowing the temperature to fall to 248° C. Mr. D. B. Dott has kindly tested my thermometer by comparison with a standard instrument, and the foregoing temperatures have been corrected accordingly.

From these results it would appear therefore that the igniting-point of sulphur in air is 248° C., and that the temperature stated by Watt (250° C.) is most nearly correct. It may be noted that the sulphur used was sublimed sulphur of ascertained purity and free from moisture.

Mr. Dott said this was a very interesting note. No doubt the discordant results given by different authorities were due to variations in the methods of working. It was not probable that accurate results would be obtained by simply heating sulphur over a naked flame and inserting a thermometer. He thought the method adopted by Mr. Hill was a right one, and his results were probably correct, as he seemed to have excluded all possible sources of error. It would be necessary to take care that the temperature of the current of air entering was not higher than the temperature of the tube. It had to be remembered that the indications of a thermometer were only statistical, or gave the general temperature of the whole mass, but did not give the actual temperature of every molecule. One portion might be very hot, and a single particle hotter than the general mass might be ignited. This was a point not to be forgotten, but the method of using a bath reduced the possibility of error from this source to a minimum.

The Assistant Secretary then, on behalf of Mr. Lunan, showed that when ammoniated tincture of quinine is mixed with simple aerated water a clear solution is obtained.

Mr. Thomson said this was probably due to the formation of carbonate of quinine, and of course the free ammonia in the tincture was neutralized by the carbonic acid. He showed two bottles, one containing 2 grains and the other 6 grains of ordinary sulphate of quinine, giving a clear solution in 10 ounces of ordinary aerated water.

Mr. Dott said it was well known that some alkaloids formed carbonates, and the explanation given by Mr. Thomson was very probably the correct one.

Attention was then directed to the following donations to the Museum:—

Specimen of trichloracetic acid.
From Mr. ALEXANDER KINNINMONT, Glasgow.
Fruit of *Areca Catechu* and leaves of *Chavica Betel*. From Messrs. JAMES ROBERTSON and Co., Edinburgh.

On the motion of the Chairman votes of thanks were cordially awarded to the authors of papers and donors to the Museum.

The Chairman intimated that the next meeting would take place on March 19, when communications from Mr. D. Storrar, Vice-Chairman, and Mr. D. B. Dott would be read.

EXAMINATIONS IN LONDON.

February 19, 20 *and* 21, 1890.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Davies, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was also present on behalf of the Privy Council.

MAJOR EXAMINATION.

19th.—Six candidates were examined. *Five* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Harris, Herbert ....Kirton Lindsey.

20th.—Five candidates were examined. *Four* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Ashton, Thomas Richard ......Manchester.

21st.—Five candidates were examined. *Two* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Norman, Edwin ....Ripley.
Osborne, James ....Bridgwater.
Priestley, Lawrence ....Nottingham.

MINOR EXAMINATION.

19th.—Twenty-seven candidates were examined. *Seventeen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Barnard, Owen Robert ....Chelmsford.
Bartle, William Thomas ......Heckmondwike.

Billyard, William Frederick	Boston.
Bones, Arthur Anderson	Manchester.
Brook, Thomas Turner	Elland.
Buckley, John Davies	Leominster.
Clarke, James	Liverpool.
Clutterbuck, Charles	Nottingham.
Davies, James Lloyd	Talgarreg.
Ecclestone, George Thomas	Soham.

20th.—*Twenty-six* candidates were examined. *Sixteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bell, Robert Henry	Sunderland.
Essery, William George	Plymouth.
Farrants, Francis Samuel	Bury St. Edmunds.
Fowlds, William	Keighley.
Goss, Samuel	Ipswich.
Heyhoe, Horace James	Swaffham.
Jackson, John Henry	York.
Malcolm, James	Middlesborough.
Moss, Frank	Bristol.
Naylor, Edward Alfred	Scarborough.

21st.—*Twenty-six* candidates were examined. *Seventeen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Naylor, John	Burley in Wharfedale.
Payne, Ernest Edward Munro	London.
Perkin, Robert James	Milford Haven.
Reece, Charles Clement	Llandilo.
Reynolds, Albert Bright	Bournemouth.
Roberts, William	Holyhead.
Sanford, Joseph Michael	Exeter.
Wiggin, Charles Watkin	London.
Wride, William Blake	Shirley.

PRELIMINARY EXAMINATION.

21st.—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Agar, Thomas William	Kennington.
Bocock, William Percy	Gazeley.
Falkingbridge, Frederick	Kennington.
Saunders, John Alexander	Bermondsey.
West, Joseph Arthur	Peckham.

Proceedings of Societies in London.

ROYAL INSTITUTION.

PROBLEMS IN THE PHYSICS OF AN ELECTRIC LAMP.

On Friday, the 14th February, a lecture on this subject was delivered by Professor J. A. Fleming. Some phenomena of glow-lamps were first noticed, the lecturer explaining that when the current through one of these became very strong and heated it beyond a certain limit, molecules or particles of the conducting filament of carbon (or other material) were thrown off and projected on to the sides of the lamp. Lamps were exhibited beautifully coated with copper, aluminium and carbon by this means, and to illustrate the fact that these particles were projected in straight lines, it was shown by throwing the image of a lamp on a screen, that if through a fault in the filament the intense heating occurred in one side of the loop, the other side screened the portion of the globe behind it from the shower of molecules and so produced a transparent line. In the high vacuum of the lamp the mean free path of a molecule, which in the atmosphere would only be about four-millionths of an inch, might amount to several inches, and so they would for the most part be projected from the carbon loop straight to the side of the lamp. Further it was shown that each of these particles carried with it a negative charge of electricity. It had been shown by Edison that if an ordinary incandescent lamp had a conducting plate soldered into it in the middle, between the legs of the loop, on connecting this middle plate with the end of the loop by which the current entered, or positive leg, a considerable current resulted, while on connecting it to the opposite leg, no current was produced. This "Edison effect" was shown to be prevented by shielding the negative leg of the loop with a glass tube or mica plate, but when the other leg was shielded the effect was produced as before. It was further shown that the middle plate was capable of discharging the positive charge of a condenser, and that the current was much diminished by withdrawing the plate to a distance from the loop or stopped altogether by placing it round the corner of a bent tube fused into the lamp; this was evidence that the carbon molecules, projected in straight lines, could no longer hit the plate. A curious unilateral conductivity is shown by the highly vacuous space between the carbon loop and the glass of the lamp, viz., that negative electricity can pass from the hot carbon to the glass, but not the other way. This was shown clearly by a specially constructed lamp with loops at each end connected in circuit with a galvanometer and a weak secondary battery. When the loop connected to the negative pole was rendered incandescent by means of another stronger secondary battery, the current was able to pass, but no current passed if the positive loop was heated or while both remained cold. It was also found on substituting for the middle plate in the Edison experiment a small loop of carbon which could be heated from a separate source, that when this inside loop was rendered incandescent a current was produced on connecting it to either leg of the outer loop. All these phenomena were explained by the fact that a red-hot body is more easily charged with negative than with positive electricity, or in other words more easily loses a positive charge, a fact easily proved by bringing a red-hot poker near a gold leaf electroscope charged with positive and negative charges successively. This also explains why the particles of carbon thrown off from the incandescent loop carry with them a negative charge, for each particle as it is thrown off would be acted on inductively by the two sides of the loop: of the two charges produced on the opposite sides of the hot particle, the positive charge would be rapidly given off through the vacuous space to the negative leg of the loop, and the particle would remain negatively charged. Effects of a precisely similar nature to those taking place in the glow lamp can be detected by suitable means in the arc lamp. The lecturer made use of a third carbon pole, which could be pushed into the arc between the two ordinary poles, or which could be placed near the arc and the latter pushed on to it by holding a magnet on the opposite side; when this third or middle carbon was connected to the positive pole of the arc a current was produced strong enough to light a glow lamp, but no current was produced on connecting it with the negative pole, showing that the third carbon was immediately brought to the same potential as the negative pole. It is noticeable that this third carbon is cratered out in the same way as the positive pole of the arc, and the lecturer was of opinion that this cratering was due to the sandblast effect of the particles projected against it from the negative pole. The fact that the temperature of the positive pole is always higher than that of the negative, might also be due to this bombardment of carbon particles. By using very thin strips for the third carbon the lecturer was able to feel about in the electric arc and ascertain that the rise of potential was very sudden, and close to the crater in the positive carbon.

CHEMISTS' ASSISTANTS' ASSOCIATION.

CRYSTALLOGRAPHY IN ITS RELATION TO PHARMACY.

BY T. S. DYMOND.

At the meeting of the above Association on Thursday, February 13, Mr. T. S. Dymond delivered a lecture on "Crystallography in its relation to Pharmacy," of which the following is the substance:—

When a solid is produced by the cooling of a liquid, or by separation from an aqueous solution, or by the direct condensation of a gas, it may be obtained in masses having a symmetrical form known as crystals. Each substance has its own crystalline form, and from this form or its simple modifications it is incapable of departing.

There are three theories to account for crystalline form. The first supposes that the molecules differ in form, some being spherical, others eliptical, etc. Owing to the force of cohesion between the molecules, they aggregate into symmetrical masses, the form of which would depend on the form of the molecules. Thus spherical molecules would form crystals whose faces are at equal distances from the centres of the crystals, *e.g.*, cubes, regular octahedra and tetrahedra. Eliptical molecules would form crystals of which some faces are at greater distances from each other than others.

The second theory supposes that the molecules themselves have a crystalline form. The fact that crystals are found to be frequently masses of smaller crystals is evidence in favour of this theory. Thus octahedral crystals of potassium bromide are found to be made up of minute cubes. Cleavage of crystals into smaller crystals is also possible; thus a rhombohedron of calc spar can be divided into numerous smaller rhombohedra. When crystals doubly refract light, their solutions also frequently have the same power, leading to the supposition that the molecules are crystalline. However, the possibility of the cleavage of a cube into an octahedron, and of a tetrahedron into a cube, is not explained by this theory, nor can a tetrahedron be conceived to be built up of molecular tetrahedra without the occurrence of air spaces which would lead to the porosity and low specific gravity of the crystal. Yet a tetrahedron is found to be no lighter in weight or more porous than a cube.

A third theory supposes that crystalline form does not depend on molecular form, but upon the power the layers of molecules possess during deposition of plaiting themselves into various forms. In support of this theory is the fact that the interior of a crystal is sometimes found to have a striated appearance, *e.g.*, potassium bromide and bismuth.

Whatever may be the determining cause, crystalline form is subject to a universal law of nature, the law of symmetry. Every face, angle, or edge of a crystal has its counterpart, and all similar parts undergo the same modifications or developments. Upon this law the science of crystallography is based.

It is found possible to classify all crystals into six groups or systems, depending on the relative distances between the opposite angles, edges or faces, and on the angles which the faces make with each other. Each system has a primary or fundamental crystalline form, and the other forms of the system are its modifications, the number and size of the faces being altered without changing the relative distances and position of the fundamental faces.

That these are natural and not artificial groups is shown by the fact that by cleavage of a crystal, the other forms of the same, but of no other system, can be obtained. A substance may crystallize in any form belonging to the same system, but not in forms of other systems. There are apparent exceptions, where substances are capable of crystallizing in more than one system, but it is probable that such cases of dimorphism are always due to difference in molecular constitution. For instance mercuric iodide is dimorphic, but the two varieties differ, it is suspected, in the atomicity of their molecules.

The axes of the crystal are imaginary lines drawn between the opposite faces, angles, or edges. They indicate the directions in which development takes place, and around them the faces are symmetrically arranged. On their number, length, and position the six systems are based.

From the primary form of each system, the secondary forms are obtained by the truncation of the edges and angles, and hemihedral or half-developed forms by the development of certain faces to the exclusion of others.

I. The regular or cubic system with three axes of equal length and at right angles with each other. The primary form is the regular octahedron. From this is obtained the cube by truncating its angles, the rhombic dodecahedron by truncating its edges, and the tetrahedron, by the development of the alternate faces to the exclusion of the others.* Pharmacopœial salts crystallizing in this system are: the alums, arsenious acid, the chlorides, bromides and iodides of potassium, sodium and ammonium. These salts are remarkable cases of isomorphism.

II. The hexagonal (rhombohedral) system with four axes, three in one plane, and at an angle of 60° with each other, and one at right angles and unequal in length to the other three. The primary form is the double six-sided pyramid, the lateral edges or angles of which may be truncated without the polar edges or angles, the parts being dissimilar. By the former modification an hexagonal prism is produced. By the growth of the alternate faces of the primary form a rhombohedron is obtained. Calcium chloride and cadmium iodide crystallize in hexagonal prisms, and sodium nitrate in rhombohedra.

III. The quadratic (square prismatic) system with three axes at right angles, one unequal in length to the other two. The double four-sided pyramid is the primary form, and from it the quadratic prism is obtained in the same way as the cube from the regular octahedron. Mercuric iodide and cyanide, mercurous chloride, potassium ferrocyanide and calcium hypophosphite crystallize in combinations of the above forms.

IV. The rhombic (right prismatic) system, with three axes at right angles, all unequal in length. The rhombic pyramid is the primary form, but prisms are more frequently met with. A modification due to the trimetric character of the axes is now first met with in the dome. As the name implies this form resembles the roof of a house, and is formed by truncating two only of the edges at each end of the crystal. The double tartrates of potassium and antimonyl, potassium and sodium, and potassium and hydrogen, silver nitrate, potassium nitrate, citric acid, potassium permanganate, potassium perchlorate, mercuric chloride and yellow mercuric iodide, the sulphates of zinc and of magnesium, and potassium sulphate crystallize in this system. The remarkable isomorphism of perchlorate and permanganate of potassium shows the near relationship of manganese and chlorine, suspected by their position in the Mendelejeff classification of the elements.

V. The monoclinic (oblique prismatic) system, with three unequal axes, two at right angles to each other, one at right angles to the one, oblique to the other. The primary form does not occur, but crystallizing in prisms, usually very much modified, are borax, oxalic and tartaric acids, tartrate, chlorate and ferricyanide of potassium, sodium acetate, ferrous sulphate, sodium carbonate and potassium bicarbonate, sodium sulphate and hyposulphite, lead acetate and the phosphates of sodium and ammonium.

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* The crystallographic systems were illustrated by crystals and models lent from the Museum of the Pharmaceutical Society. The conversion of one form into another was illustrated by slicing turnips shaped like crystals.

VI. The triclinic (doubly oblique prismatic) system, with three unequal axes all obliquely inclined to each other. The primary form does not occur, but crystallised in prisms we have copper sulphate, boracic acid and potassium bichromate.

The determination of crystalline form is made by the hand goniometer, or more accurately by Wollaston's reflecting goniometer. Instead of measuring the number, length and position of the axes, the angles which the faces make with each other, which depend on the character of the axes, are measured, and compared with published measurements. The value of the angles of the crystals of most of the above salts are given in Phillips' translation of the London Pharmacopœia, letters being used to denote the faces, as figured in the accompanying diagrams. In recent works the faces are denoted by mathematical signs, which represent the position of the faces to the axes of the crystal.*

As aids to the determination of crystalline form it must be remembered, firstly, that by the law of symmetry, similar parts are always modified in a similar way. In the regular system all or none of the angles are truncated. In the hexagonal and quadratic systems, all or none of the lateral angles are truncated. In the other systems a single pair of angles may be truncated.

Secondly, similar faces can be recognized by the fact that they are alike in lustre, hardness, colour and striation, while dissimilar faces are often unlike, and also by the fact that the cleavage of similar faces is equally, of dissimilar, unequally easy or difficult.

Thirdly, that by the cleavage of a complex form whose character is not clear, the simple form can be obtained. The distortion of crystals, due to the position in which they grew, is a source of difficulty. The examination of a number of crystals is in this case desirable. The determination of the angles at once makes clear to what system they belong.

Fourthly.—No crystal of the regular system has the power of polarizing light. In a crystal that polarizes light, if there be one direction only in which no polarization occurs, the crystal belongs to one of the dimetric systems; if two directions, to one of the trimetric systems.

Fifthly.—Crystals which conduct heat equally in all directions belong to the regular system. Those which conduct heat unequally in two directions belong to one of the dimetric systems. Those which conduct heat unequally in three directions belong to one of the trimetric systems. This property is best observed by covering the crystal with a coating of wax, allowing the point of a hot pin to impinge on the surface, and noticing the configuration of the zone of melted wax.

Crystallography is a subject which, owing to the limited time at the disposal of the pharmaceutical student, is usually crowded out of his course of study. In my opinion this is much to be regretted, for the study is one which gives an insight into a beautiful and wonderful department of nature, and teaches the laws by which she works. The laws of symmetry and the laws that govern expansion and growth are as well exemplified as they are in the anatomy and histology of animals and plants. There are many sciences, and chemistry especially, in which a knowledge of crystallography is most useful.

To the pharmacist a knowledge of crystallography is important. It cannot be said that it is as important for the identification of the chemical materia medica, as botany is for the vegetable, for in chemistry we have the means of determining the identity of salts. But to be able to distinguish at a glance salts which have a similar general appearance, but a different crystalline form, for example, silver nitrate and potassium chlorate, potassium sulphate and potassium quadoxalate, would at any rate be most useful. Salts frequently differ in the amount of their water of crystallization. To estimate the water, a quantitative determination must be made, but a knowledge of crystallography generally will render this unnecessary. The crystalline form of salts is capable of very great modification, owing to varying conditions during production. The pharmacist having a knowledge of crystallography will be able to recognize the fundamental crystalline form however much it may be modified. To the chemical investigator this knowledge is invaluable, enabling him to identify unknown crystals obtained in the course of his researches. In short, there are numberless ways in which a knowledge of crystallography may be turned to useful account, and until the pharmacist has this knowledge it cannot be considered that his professional education is complete.

The President (Mr. T. A. Ellwood) said all would agree that they had listened to a very interesting and instructive paper. The science of crystallography was both useful and interesting; this might be seen from the excellent display of models and specimens on the table, which had materially helped to elucidate the subject. A knowledge of this subject was doubtless useful to the pharmacist, but he did not think the advantages derived were commensurate with the time required to master such an intricate study, neither would he include such a science in a pharmaceutical curriculum. The application of it was not in every day pharmacy, for the usual type of chemicals in the commercial world seemed generally to lack the special crystalline form rather than possess it; from an original package or quantity such as the ordinary chemist and druggist would possess, it necessitated thorough search in order to obtain one or two definite typical crystals. Further, even if found, it would only be a proof that such a chemical as it indicated was present, and would not at all show whether there were adulterations present or not. There were also so many isomorphic salts, that it would require a chemical test being applied in order to declare what substance was under examination. The same remarks would apply to the allotropic forms of elements or salts. The chemist and pharmacist had in every day practice far more ready methods of defining a chemical or salt than was afforded by crystallography, such as those supplied by its general appearance, deliquescence, efflorescence, specific gravity, hardness, or transparency. To the scientific chemist engaged in original research the subject was useful in determining whether each time the same substance or active principle was obtained, by its crystallizing in the same system. Those who had had any experience in mounting microscopical crystals, would have found how difficult it was at all times to get well defined crystals, even when employing the same material and methods. In the study of mineralogy the science of crystallography was most useful, indeed essential, and to those who engaged in the former study, the latter became a handmaid. This seemed to point out how far nature is in advance of science in system and regularity. Doubtless there was much yet to be learnt from crystallography. If it could give any better idea of what atoms and molecules were, it would be useful, but the theories, which, as Mr. Dymond had pointed out, were built much upon the probable form of atoms, seemed to have such a weak foundation and to be so far from conclusive that they could not pin much faith to them.

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* A determination of the angles of crystals by both goniometers was made. The principle of the nomenclature now adopted for the faces was briefly explained.

The relation between crystallography and optics was very useful in many respects, as it helped considerably in the understanding the otherwise difficult branches of the latter. For his own part he must say how interested he had been with the demonstration, from which in a comparatively short time more could be learned than from hours or days spent in perusing the subject or hunting it up from the many books which but briefly touch upon it.

Mr. E. J. Millard congratulated Mr. Dymond on the clear and able manner in which he had dealt with the subject of crystallography. He could not help feeling that much of the neglect of the subject by pharmaceutical students was due to the unsatisfactory manner in which the science was treated in various text books. The student who desired to describe a certain crystal in scientific language was confronted with such a large amount of formulæ, signs, degrees, etc., that he found an advanced knowledge of euclid and trigonometry to be absolutely essential. Usually, therefore, the subject was shirked, or reduced to one of third rate importance in his studies. He was glad to think Mr. Dymond had avoided the multiplication of synonyms for the various systems. Nothing was more disheartening to students than to find three or even four names given to one system such as the triclinic, anorthic, doubly oblique prismatic system. Their interest in the paper had been augmented by the unique collection of crystals, models, and apparatus which had been lent for the occasion, whilst Mr. Dymond's demonstrations had been both practical and interesting.

Mr. E. Richards had a fair knowledge of crystals, but he was afraid that he did not know as much as he ought to. He gave an amusing account of how some members and visitors of the Association were perplexed at some of the crystals of sodium chlorate which were exhibited by Hopkin and Williams at a conversazione of the Chemists' Assistants' Association. They, however, could not be blamed, for the crystals alluded to were picked ones, and sodium chlorate assumed a multitude of crystalline forms. In fact, it was scarcely possible to get them twice alike. He referred in highly complimentary terms to Mr. Dymond's treatment of his subject, and to the importance of the microscopical examination of crystals to the pharmacist.

Mr. Dymond made a brief reply.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

February 19 was set aside for "Essays by Apprentices." Only two took advantage of the opportunity. Mr. Arthur McKellar read a short paper entitled "Useful Hints." He gave his experience of the best means of removing stains from glass and elsewhere, as they may occur in daily experience. He recommended tartaric acid solution in preference to ammonia for aniline stains; liquor potassæ for vegetable deposits, gums and gum resins; turpentine for resins; sulphuric and hydrochloric acid for cleaning smoke off opal pots; and elbow grease as the only effectual means of removing the stains from the tinct. ferri perchlor. bottle or mortars in which ethiops mineral and similar preparations have been made. Dry sawdust is cheap and effectual for ointment pots; while labels may be easily removed from dispensing bottles by being first damped and then held a short time over a gas flame. He described a simple box for use with quick lime, and recommended the same absorbent for use where books or papers have got damp. Methylated spirit and chalk had been found most useful in cleaning syphon heads and similar metals.

Mr. David Steven next read a short paper on "Suppositories." He mentioned the earlier methods of preparation, first in a manner similar to pill-making and afterwards by the use of a wooden dibble and pipeclay matrix. The present method of casting left nothing to be desired except care in its use. The various bases employed were then described, the suitability of fat or gelatine to different medicaments and the difficulties met with in incorporating these being fully described. Special stress was laid on the necessity of a carefully prepared mould (olive oil being the lubricant recommended), avoidance of high temperature in making and pouring and hurried cooling; the evils following carelessness being pointed out. Special directions were given for dispensing chloral hydrate and several other more or less troublesome medicaments in suppository form.

A short discussion followed, and, on the motion of the President, the essayists were accorded cordial votes of thanks.

The Annual Conversazione and Assembly took place in the Rosemount Academy, Sauchiehall Street, on Friday, February 21. Mr. W. L. Currie acted as master of ceremonies, and during the intervals of the dance the company was pleasantly entertained with songs.

In the course of the evening short speeches were made. Mr. Rutherford Hill congratulated the Association on the success of the session's work, and expressed his pleasure at meeting so many western pharmacists at what promised to be a most enjoyable gathering.

Mr. J. Robb, President, after urging on all the claims of the Association, expressed the indebtedness of the members to the employers, whose generous assistance had contributed so largely to the success of their annual conversazione.

Mr. J. Foster returned thanks for the employers, and proposed the thanks of the assembly to the committee who had carried out the arrangements.

Mr. Cunningham proposed a cordial vote of thanks, which was awarded with acclamation, to the singers, the accompanyist and the M.C. Mr. W. L. Currie, M.C., acknowledged the vote.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth meeting of this Association was held in the Silver Street Hall on Friday evening, February 21, the President, Mr. Curtis, in the chair. Mr. A. Craig read a paper entitled "Toleration," which bore evidence that he had given the subject careful attention. The paper was freely criticized, and several questions were asked which the author answered in his reply.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The Dundee Association met on Thursday evening, February 20, at 74, Commercial Street.

After the minutes of the previous meeting had been read the chair was taken by Mr. T. C. Henderson, who called on Mr. R. M. Lindsay to open the debate "Ought the B.P. to be Strictly Followed?" he having to take the affirmative side, whilst the President, Mr. John Forsyth, advocated the negative.

Each gentleman treated his respective side with ability, and considerable discussion took place afterwards, during which some interesting facts regarding B.P. preparations were brought to light. Several of the members had to leave before the vote was taken, but of the remainder sixteen voted for the negative and eight for the affirmative.

During the evening the Secretary read a report from Mr. J. R. Hill on the "Progress in Pharmacy," prize essay competition. This competition was open to all the members except those who have passed the "Minor," but the number of competitors was limited.

The first prize, which is 'Remington's Practice of Pharmacy,' presented by Burroughs, Wellcome and Co., was awarded to Mr. William Mair, and the second prize, which consists of books to the value of 10*s.* 6*d.* (presented by the proprietors of one of the trade journals) falls to Mr. James Petrie. In his report, Mr. Hill remarks that the successful essays were wanting in practical suggestions, and had gained the prizes more from a literary point of view, but that both were very creditable productions.

Votes of thanks to Mr. Hill and the Chairman concluded the proceedings.

Obituary.

Notice has been received of the death of the following:—

On the 13th of February, Mr. John Blenkinsop, Chemist and Druggist, late of Park Terrace, Regents' Park, N.W. Aged 25 years.

On the 17th February, Mr. John Falconer, Chemist and Druggist, Causeyside, Paisley. Aged 51 years.

On the 17th February Mr. Henry James Stuart, Chemist and Druggist, Ingatestone, Essex. Aged 60 years.

On the 18th of February, Mr. John Parkes Cooper, Chemist and Druggist, Horseley Fields, Wolverhampton. Aged 85 years.

On the 18th of February, Mr. Frederick William Salmon, Chemist and Druggist, Western Road, Hove, Brighton. Aged 62 years. Mr. Salmon took an active part in local pharmacy in the earlier days of the Brighton Association, working with especial vigour on the entertainment committee which received the British Pharmaceutical Conference on its visit to Brighton in 1872.

On the 21st of February, Mr. Gordon Fraser, Chemist and Druggist, Wigtown, N.B. Aged 56 years.

On the 24th of February, Mrs. Elizabeth Goadsby, who was elected an annuitant on the Benevolent Fund in 1887. Aged 72 years.

On the 25th of February, Mr. George Somerton, Chemist and Druggist, Week Street, Maidstone. Aged 43 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A Revelation.

Sir,—We must all have noticed with regret, in the President's address to the Council, when introducing the proposed Pharmacy Bill, the statements "that the Government authorities had told him emphatically, both in writing and otherwise, that they did not think it necessary to place poisonous patent medicines within the purview of the Pharmacy Act," "that this was the view which prevailed at the Privy Council, who took a *calm* view of the matter," "they had said distinctly that placing patent medicines within the purview of the Pharmacy Act was not necessary for the public welfare."

This is certainly a very disheartening conclusion, and we may well despair of obtaining the requisite legislative enactment, after such an explicit expression of opinion.

We could all furnish cases where deplorable results have followed by the indiscriminate sale of poisonous patent medicines. The utter unreasonableness of imagining that a Government stamp placed on a bottle, etc., will exert any protective influence whatever, is beyond argument, and I ask, are we by acquiescing consulting the "public welfare?" Is it not our duty to protest in a constitutional manner against such a conclusion?

We are indebted to Mr. Symes for pointing out in his recent presidential address to the Liverpool Chemists' Association, the significance of the word "hereinbefore" in the 16th section of the Pharmacy Act, 1868, and to Mr. A. Braxton Hicks, the Mid-Surrey coroner, who evinces a commendable familiarity with the Act, as published in the *Pharmaceutical Journal* for February 15. The 17th section applies universally, and admits of no exception, except in dispensing, in the sale to the public, and consequently poisonous patent and proprietary medicines are already included in the Pharmacy Act. It appears therefore we have had stored away for twenty-two years in our arsenal a valuable restriction intended for the public welfare, which up to the present has been allowed to rust unused, and as its efficacy is in no way impaired by neglect, it is highly desirable to at once see to its application.

Not only is it time, in the words of our President, "to say emphatically that the Council has a reputation and a history," but also that it has had conferred upon it a power which requires exercising for the public welfare.

Harrogate. R. Hayton Davis.

The Pharmacy Acts Amendment Bill.

Sir,—The speech of the President of the Pharmaceutical Society at the last Council meeting must have been very extensively read and considered.

In dealing with clause 5, it appears to me he concluded that all Minor men enter business at the age of twenty-five or earlier. Of course he does not mean this; but at the same time he neglects to provide for that large body of qualified men who are unable, from pecuniary means alone, to commence business on their own account. Surely if there are any advantages arising from a membership, all who are legally qualified ought to be allowed the option of sharing them, and not be thus prevented simply from the reason that they are not wealthy enough. If it is a necessary gain to the Society to have Associates, then let the period of Associateship be fixed as suggested a week or so ago by "Justitia."

I, however, consider that it would be a greater gain to the Society, should this proposed Act become law, if the words in Clause 5 "and being in business on their own account" were omitted. H. H. Robins.

NOTICES.

Chemists' Assistants' Association.—The Annual Dinner of this Association will take place in the Venetian Saloon at the Holborn Restaurant, on Thursday, March 6, at 8 p.m. The chair will be taken by Dr. A. P. Luff. Tickets may be obtained from the Hon. Sec. of the Dinner Committee, Mr. F. Ashley Rogers, 29, Chapel Street, Belgrave Square, S.W.

North Kensington Chemists' Association.—The next meeting of this Association will be held on Tuesday evening, the 11th inst., at 9 o'clock, at the Leinster Hotel, Ossington Street, Pembridge Square, Bayswater, W. All chemists are invited.

Glasgow Chemists and Druggists' Assistants' Association.—A meeting will be held on Wednesday, March 5 when a paper will be read on "Patent Medicines," by Mr. Thomas Robinson.

A. J. Kirk.—The question seems to be purely a legal one, the decision upon which will depend upon the interpretation of the agreement entered into by the two parties, concerning which we are not prepared to offer an opinion.

A Newcastle Chemist.—We think the information might be more readily obtained by making direct application to the officials of the association referred to.

J. Morcombe.—*Alyssum incanum* and *Arenaria trinervis.*

T. Tickle.—The alternative laid down in the regulation is, "or has otherwise for three years been practically engaged in the translation or dispensing of prescriptions."

A. P. S.—Graduation at the university granting the degree.

W. R. Cook.—We should be glad to hear from you the result of your communication to the authorities.

Communications, Letters, etc., have been received from Messrs. Davis, Spurr, Liverseege, Walter, Barnish, Sharp.

POISONS AND POISONERS.—II.

BY FREDERICK SPURR.

In popular language a poison is generally understood to be some substance capable of causing death when taken in small quantities.

In a scientific sense, however, as well as for the purposes of medical jurisprudence, this idea of the nature of a poison is not only too indefinite, but also too restricted, for many poisons are employed in small doses with marked benefit in the treatment of disease; indeed it is a common saying that "a poison in a small dose is a medicine, while a medicine in a large dose is a poison."

The definition given by Dr. Stevenson (Quain's *Dictionary of Medicine*) is that "a poison is any substance which when introduced into the system or applied externally injures health or destroys life, irrespective of mechanical means or direct thermal changes."

Husemann (*Handbuch der Toxicologie*) says:—"We define poisons as such inorganic or organic substances as are in part capable of artificial preparation, in part existing ready formed in the animal or vegetable kingdom, which, without being able to reproduce themselves through the chemical nature of their molecules under certain conditions change in the healthy organism the form and general relationship of the organic parts, and through annihilation of organs, or destruction of their functions, injure health, or, under certain conditions, destroy life."

Both these definitions, it will be seen, exclude all those substances which have a merely mechanical action, such as powdered glass, diamond dust, or boiling water; while that of Husemann further excludes those various deleterious vapours and miasmata which are now considered to be associated with the growth and multiplication of micro-organisms, and which depend upon them for their infective property.

There is no *legal* definition of the term poison, and the enactment of English law is that "Whoever shall administer, or cause to be administered or taken by any person, any poison, *or other destructive thing*, with intent to commit murder, shall be guilty of a felony." The law in fact knows no limitation as to the manner in which a substance acts, and so far as the responsibility of a poisoner is concerned, it matters not whether its action is mechanical or chemical, physiological or thermal, if it can be proved that it was administered with criminal intent. Thus a person giving powdered glass, or diamond dust, "with intent to kill," would be deemed quite as guilty as if he had given arsenic or prussic acid.

One of the most interesting and important branches of toxicological inquiry and study is that which treats of the action of the various poisons upon the living organism, and investigates the nature of those processes by which they accomplish their deleterious and fatal effects. The consideration of these questions has indeed occupied the attention of philosophers and physicians from a very early period of the world's history, though it is only within comparatively recent years that their theories have advanced beyond the stage of mere fanciful speculations, and have been established on a really scientific basis. This is not remarkable when it is remembered how entirely dependent the whole science of toxicology is upon correct chemical, physiological and pathological knowledge, and how little these subjects were understood even so recently as in the earlier part of the present century.

One of the greatest fallacies of the older theorists was the attempt to explain the action of poisons, as the action of medicines was for many centuries explained, by assuming the existence of some inherent, mysteriously concealed physical property, such as *heat* or *cold*, *wetness* or *dryness*, which was really the active principle, and which operated either by "liquefying or solidifying the blood," or by some similar mode of action on other parts of the body.

In the year 1702 Dr. Richard Mead published a work containing "A New Theory of the action of Poysons on *mechanical principles*," which was noticed at considerable length in the *Philosophical Transactions* of the following year. He maintained that the effects of poisons generally were due to certain crystalline particles, or *spiculæ*, which he believed they all contained, and which acted mechanically on the "solid particles found floating in the blood," as well as upon the vessels and nerves. One other theory may be mentioned, which is interesting on account of the insight it gives us into the state of anatomical knowledge two hundred years ago. The brain, it was thought, belonged to the glandular system of the body, and secreted a so-called "vital fluid," which was conveyed by the nerves or *brain ducts* to distant parts of the body. Poisonous substances were supposed to be rapidly conveyed along the nerve trunks to the brain, in which organ they exerted their toxic action, either by destroying its substance, or by changing the character of its secretion.

The attempt to explain the action of poisons upon any basis of uniformity has long since been abandoned, and in the present day the subject is usually discussed under several distinct heads, according to the order in which the different parts of the body have been found to be affected; but for our present purpose it will be sufficient to note that it may be either *local* or *remote*, or in some instances a combination of the two.

When a poison is applied to an exposed surface, either external or internal, it may produce some immediate effect upon it, independently of its absorption into the blood, and not extending to distant organs. This *local action* may be either chemical or mechanical, and result in circumscribed corrosion and inflammation, or it may be more physiological in character and produce an impression or a series of impressions on the nerves of the part, causing a derangement of their sensory or motor functions, or even of both. We have a familiar example of this in aconite, the leaves of which, when chewed, cause a sense of numbness and tingling in the tongue and lips often amounting to perfect anæsthesia, and yet unaccompanied by any disturbance of the general nervous system. Sir B. Brodie, in first calling attention to this peculiar neurotic action of monkshood, regarded it as affording strong confirmation to the theory that "vegetable poisons acted on the brain through the medium of the nerves, without being absorbed into the circulation."*

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* *Philosophical Transactions*, 1811, vol. 101.

In some cases the local action *per se* is sufficient to bring about a fatal result, as, for instance, in poisoning by the mineral acids and alkalies, which corrode the parts with which they come into contact, and set up violent inflammation, when death may ensue almost immediately from collapse due to shock, or after the lapse of many days or even weeks through the suspension of the functions of some important organ. Such a case as this occurs when the inner coating of the stomach and intestines is destroyed and the patient dies of slow starvation, a result which might also arise from local injury to, and subsequent stricture of, the œsophagus.

But the fatal effects of the great majority of poisons cannot be accounted for in this way. Many indeed have no appreciable local action, and often, in the case of corrosive and irritant poisons (*e. g.*, arsenic and oxalic acid), symptoms are manifested which bear no direct relation to the local injury, but which are evidently due to disturbance in some distant part or organ.

These *remote effects*, as we have already seen, were formerly explained by supposing that the local impression passed along the nerves to the organ secondarily affected, and although it is still maintained by some that poisons may destroy life by their action on the nervous system, it is almost universally admitted that they are absorbed into the blood, and are conveyed to distant organs, partly by diffusion, but principally by the force of the circulation. An accurate acquaintance with the remote effects of the various poisons is indispensable to the medical jurist, for the symptoms produced will almost invariably indicate the class of poison causing the mischief, and not unfrequently the presence of a specific poison.

The usual action of poisons may be considerably modified by idiosyncrasy; by the part to which they are applied, or the channel by which they enter the body; and by the largeness of the dose and the state of chemical combination or admixture of the poison.

The influence of *idiosyncrasy* in modifying the action of poisons and drugs is often very striking, and has an important bearing in toxicology. Thus, cases are recorded in which small medicinal doses of opium, arsenic, strychnine and other drugs, have produced effects so serious as to endanger life. Again, certain kinds of food (*e.g.*, pork, mutton, fish, mushrooms, etc.) have been known to produce every symptom of violent irritant poisoning in one person, whilst others partaking of the same food at the same time have experienced no ill effects.

On the other hand, a case is cited by Sir Robert Christison[*] of a gentleman, unaccustomed to the use of opium in any form, who took an ounce of good laudanum without ill effect, and it has been stated on equally good authority that some persons are capable of taking with impunity enormous doses of arsenic, strychnine, corrosive sublimate, etc. The influence of *habit* (which may be regarded as a sort of *acquired* idiosyncrasy) is also very important; and most physicians and pharmacists are familiar with numerous cases of the remarkable tolerance engendered by the long use of poisonous drugs.[*]

The action of poisons is influenced also *by the channel through which they enter the body*, or *the part to which they are applied*. For example, some of those poisons which are speedily fatal when introduced into a wound, appear to be almost inert when taken into the stomach. Of this class of poisons the curari, or wourali, the arrow poison of South America, may be taken as a type.

There is no way in which a poison acts so fatally as when introduced directly to *the blood-vessels by means of a wound*, for, to quote the words of Dr. Taylor, "this is not *absorption*, but *injection*, and the effects of all poisons are thus displayed with the greatest rapidity and intensity."[†] Sir Robert Christison (*op. cit.*) mentions several experiments made with a view to test the rapidity of the action of poisons administered in this manner, and he relates that he was unable, with watch in hand, to note any appreciable interval between the moment at which a poison was injected into the femoral vein of a dog and the moment of death. The introduction of medicines into the system by hypodermic injection has been much practised of late years, drugs administered in this manner acting much more powerfully and rapidly than when given by the mouth, so much so, indeed, that the smallest doses have frequently produced very undesirable results, and even death.

Poisons entering the *stomach* are in part absorbed by its mucous membrane, in part passed on to the intestines, where further absorption takes place. As this is by far the commonest channel for the entrance of poisons into the system, it will be worth our while to note one or two points in connection with it.

(*a*) Absorption in the stomach is considerably retarded by the presence of food, and hastened in its absence.

(*b*) The gastric juice increases the solubility of some substances by bringing about certain chemical changes, as in the case of powdered nux vomica or aconite, which yield their alkaloids to the gastric juice, leaving the powder apparently unchanged in the stomach.

(*c*) When a poison is slowly absorbed, so that it can be disposed of in the system, or again excreted more rapidly than it is absorbed, no poisonous effects are manifest; but when the opposite conditions obtain then, of course, the specific effects are developed (Taylor). These facts help us to understand why curare and certain other poisons produce no effect when taken into the stomach. They are simply excreted by the kidneys as fast as they are absorbed; but it has been found that *if the ureters be tied* so as to prevent elimination, the poison rapidly accumulates in the blood, and the same results are observed as when they are injected into a wound.[‡]

The skin and cellular membranes constitute another important channel for the introduction of toxic substances into the system.

It has been laid down as a definite law by

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[*] 'Treatise on Poisons,' Edin., 1845.

[*] As a striking instance of this the well-known case of De Quincey may be cited, whose work, *The Confessions of an English Opium Eater*, will well repay perusal, apart from its medical and pharmaceutical interest.

[†] Taylor, 'On Poisons,' 1875, p. 7.

[‡] Power's 'Physiology,' 2nd edition, p. 286.

Müller that "*the rapidity of absorption through membranes is in inverse proportion to the thickness of their epithelia, or surface linings,*" and in conformity with this law the cutaneous absorption is slow.

But there is another reason for this.

The unbroken skin is in health covered with a peculiar *oily* substance secreted by the sebaceous glands, and this secretion plays an important part in relation to the question of cutaneous absorption, for "it favours the entrance of all solid substances that are in fine powder, or that are left in a finely divided state on the cuticle, by the evaporation of their aqueous solutions;* but on the other hand it retards, or prevents the introduction of those poisons that are dissolved in water."

But poisons which are prevented from penetrating the skin when in aqueous solution, on account of this impermeable oily secretion, are readily absorbed when dissolved in fatty or oily menstrua, or in such substances as chloroform, alcohol or ether, a fact which explains the necessity for employing substances of this class when it is desired to produce medicinal action through the skin by inunction. While speaking of this method of medication it may be mentioned that several fatal cases have occurred from the use of liniments containing carbolic acid in alcoholic solution, and of ointments containing mercurial or arsenical compounds, while serious results have been known to follow the use of the *Unguentum Plumbi Subacetatis* for the treatment of sores on the legs and other parts of the body. These cases, which might be greatly multiplied, are principally alluded to as showing the importance of carefully watching the effects of even such apparently "simple and harmless" medicaments as liniments and ointments.

During the past few years cases have occurred in which arsenic, corrosive sublimate and other poisons have been criminally administered in the form of enemata. The action of these and other lethal substances on *the mucous membrane of the intestines* is therefore of considerable importance. Numerous experiments tend to show that *cæteris paribus* poisons given by the rectum act more quickly and more powerfully than when given by the stomach. This fact should always be remembered in giving powerful medicines in the form of clysters or suppositories, for several cases are recorded by Christison and others of serious consequences following the exhibition of opium and belladonna by the rectum in doses which are constantly given with good results by the stomach.

The lungs and air passages are the only other channels by which poisons enter the body, and owing to the extreme delicacy and large surface presented by the pulmonary mucous membrane, absorption here is a very rapid process, in accordance with Müller's law, to which reference has already been made. The poisons acting through the lungs are called aërial poisons, though the question has been raised as to whether these substances really possess any positive toxic properties, or whether they act merely in a negative manner by replacing the oxygen necessary for life, and so inducing a state of asphyxia or oxygen starvation.* It is now generally thought, however, that while some gases (*e. g.*, nitrogen and hydrogen) act solely as asphyxiants, many other gases and vapours, such as carbonic oxide, sulphuretted hydrogen, chlorine, etc., have a distinct poisonous power in addition, and hence they are sometimes spoken of as *toxic asphyxiants*.

It has been stated above that the action of poisons is modified by three sets of circumstances or conditions. Two of these we have already discussed, and we will now consider very briefly the influence of *the largeness of dose and its state of admixture or combination* in modifying the effects of poison.

That the largeness of the dose exerts a powerful modifying influence will be evident on *prima facie* considerations, but it may be mentioned that sometimes a large dose has acted as an emetic and so proved its own antidote.

A state of solution as a rule enables a poison to act with its greatest rapidity and power, and it may be generally stated that the chief modifying influence of combination or admixture depends upon the increased or diminished solubility which results.

As instances of the changes following chemical combination mercury and baryta may be mentioned. The former in the free state is not poisonous, but most of its compounds are powerful poisons, while the latter in its elementary condition is a deadly poison, but is rendered innocuous by combination with sulphuric acid. The probable explanation of these phenomena is that in the one case an *insoluble* element forms more or less *soluble* salts, and in the other a *soluble* element is replaced by an *insoluble* salt.

Cyanogen again possesses very marked toxic power, as do also most of its compounds, but it is curious to note that one, the ferrocyanide of potassium, is almost without action on the system.

The effects of admixture may be illustrated by the increased activity following the addition of dilute acids to opium and its preparations, a result probably due to solution of its active principles. But the admixture of lime and magnesia, salts of lead and solutions of tannin, cause the active principles to be thrown down as an insoluble precipitate, and the solution is rendered inert.† If the mechanical mixture serves in any way to shield a poison its intensity of action is thereby diminished. Thus, arsenic has been given in a suet pudding without producing any effect. This is the explanation, too, of the delay in the commencement of the symptoms caused when a poison is taken with or directly after a meal, or when administered mixed with oil or mucilage.‡ The poisonous action further is usually lessened by dilution, though sometimes, in the case of oxalic acid, for instance, it is thus increased by the application of the poison to a greater area of absorbent surface.

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* This should be borne in mind when recommending the use of so-called "hair restorers" containing lead. The writer has seen several severe cases of plumbism due to the absorption of lead through the scalp in persons using these preparations.

* It is a curious fact that oxygen itself becomes poisonous when undiluted, and that it is only to be regarded as a life-sustainer in its common form, and at ordinary pressure. It has been shown that if an animal be exposed to oxygen at three pressures symptoms are produced which very closely resemble those of strychnia poisoning. Ozone has also been found to destroy life when present in the proportion of 10 per cent.—*Chem. News*, 1888, p. 44.

† Royle and Headland, 'Mat. Med.,' p. 306.

‡ Woodland and Tidy, 'Handy Book of Forensic Medicine.'

The Pharmaceutical Journal.

SATURDAY, MARCH 8, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

THE Council meeting last Wednesday was attended by sixteen members, and after the elections to different grades in the Society, as well as some restorations to the Register, had been disposed of, the President reported that the Society had lost three Local Secretaries by the death of Mr. BROOM, of Exeter, Mr. BADGER, of Barnsley, and Mr. WILLAN, of Preston. The motion to appoint in their places Mr. LAKE, Mr. EASTWOOD and Mr. BELL was then put and carried. Mr. W. PICKARD was also appointed District Secretary for the borough of Fulham in place of Mr. SANDELL, whose early death was spoken of with much regret. The report of the Finance Committee recommended payments on the architect's certificate not exceeding one thousand pounds to the contractors for the new buildings, which are rapidly approaching completion and may be expected to afford opportunity for holding a Conversazione on the occasion of the annual meeting of the Society's members in May. Some penalties have been paid for infringement of the Pharmacy Acts, and a sum has been received from the Government for copies of the Register, but the report contained no other special features. In mentioning that subscriptions have been coming in for the Benevolent Fund, the President took occasion to remark that what was mainly desired, to enable the Committee to relieve distress, was a continuous income of small subscriptions from a large number. On the recommendation of the Committee two grants of ten pounds were made. The deaths of two annuitants during February were reported. In reference to the proposal that the Society should subscribe to orphanages in order to obtain the power of nomination, it was reported that after fully considering this matter, and though desirous of adopting the suggestion, the means at disposal would not permit of its being adequately carried out. The case of SARAH W. PENNINGTON, who failed to be elected to the Watford Asylum in January, is still being supported, and it is hoped that a strong effort will be made to secure her election next June.

The report of the Law and Parliamentary Committee stated that application has been made to the Board of Inland Revenue, in accordance with the desire expressed in the memorials from the Durham and Northumberland chemists, and from the chemists of Exeter, in reference to the Medicine Stamp Duty. The reply received was to the effect that the Board is unable to comply with the request that in future no penalty should be inflicted for the use of any label unless the same had been continued in use after notice had been given to the user that it involved liability to medicine stamp duty. Reference was also made to the full discussion of this subject which took place when the Chemists and Druggists' Trade Association had an interview with the Board in 1886, and the Board expresses inability to add anything to the statement then made by the Deputy Chairman. It was also pointed out that if the suggestion put forward were adopted it would amount to an admission that infractions of the Medicine Stamp Duty Act should be treated differently from other infractions of the revenue law, and the Board is not prepared to make such an admission. Guided by the tenour of this communication and a general consideration of the subject, the Committee had come to the conclusion that the Inland Revenue authorities cannot be induced to make any alteration in their mode of procedure. It also reported that it is not deemed expedient or in the interest of the trade that the Medicine Stamp Act should be repealed.

In speaking of this subject the President said that after thorough and repeated discussion the Committee was unanimously of opinion that while the abolition of the medicine stamp might for a time relieve some irritation, it would on the whole be a distinct trade disadvantage. Those who feel irritated by the imposition of the stamp duty should, he urged, consider that if it were abolished, or even reduced in amount, it would tend to increase the sale of compounded medicines outside the registered ranks of pharmacy. The stamp duty as it is affords chemists and druggists a protection against the sale of twopenny medicines by hawkers in the street, and the fact that the lowest stamp is three halfpence involves the necessity that for the purposes of trade the medicine should be worth at least sixpence; this fact alone prevents the sale of preparations in a cheap form, which would interfere considerably with the business of registered persons. If the Medicine Stamp Act were to be altered, the disposition of the authorities to alter it in the direction of requiring a halfpenny stamp to be affixed to every packet of medicine is not one that would be conducive to the interests of chemists and druggists. For these reasons he does not consider that it is desirable to move for either abolition or alteration of the law. In regard to the request made to the Board of Inland Revenue at the instance of the memorialists the reply received is so emphatic that it requires no further comment. The point had been strenuously contended for years ago by the deputation from the trade association, the members of which had the widest experience of the trade side of pharmacy, but they failed altogether to induce the Board to entertain their suggestions. And now a very unanswerable reason is given why those suggestions should not be entertained. Instead of recognizing the objections urged by chemists against being compelled to use the stamp, the Board considers it would be to their advantage to put stamps on their preparations whenever they are in doubt as to their liability, and that the small chemists and druggists, who think they suffer most by the Act, could make it really beneficial to themselves, if they stamped their preparations and were thus enabled to say what they liked about them in the shape of recommendation. But the consideration of alleged hardships is not a function that the Commissioners of Inland Revenue can be expected to undertake. They simply look at the stamp duty as a means of raising money and they do not consider it any disadvantage to the public that medicines of the kind covered by the Act should contribute to the revenue. As the President remarked, it is not a very grateful thing to put forward these views as a kind of counter proposition to the memorialists, but they are the views held by those who have authority in the matter, and they are in conformity with the provisions of the Act, and it may be added with the intention of it, which is to impose stamp duty on every medicinal preparation sold in a manner infringing in any degree upon the province of the medicinal practitioner.

In the discussion of this subject the President's view was shared by most of the speakers, but, as might be expected, Mr. Harrison did not do so entirely. Though admitting the impracticability of attempting to obtain the repeal of the Act, he opposed its application on the principle that it is improper and unwise for the State to tax its citizens when obtaining the means of relief from sickness or injury. As a further ground for objection he instanced the uncertainty and inequality in the incidence of the Act, as well as the difficulty of understanding it, and in support of this position he referred to cases in which the Board of Inland Revenue has given contradictory decisions when applied to for information as to the liability of certain labels. That he contended was unfair to chemists. But his chief contention was that the safety of the public requires that any patent medicine sold by a chemist should have attached specific directions for its use. Men educated to know what drugs are, and how they are to be used, should not, when they put their knowledge into operation, by placing on medicines specific directions how they are to be used, be placed at the disadvantage of being liable to the payment of stamp duty, whilst others not taking the same precautions were exempt and could undersell the more conscientious dealers. In that way he held the operation of the law to be decidedly unfair. As a means of mitigating this inconvenience he suggested that as all pure drugs are exempt from the operation of the Act the compound medicines of the British or any other Pharmacopœia should also be exempt, as well as any medicine for which a secret or exclusive right of manufacture is not claimed. He thought a benefit would then be conferred upon the public as well as upon the trade. Upon these grounds Mr. Harrison moved an amendment to the adoption of the report of the Law and Parliamentary Committee. This was formally seconded by Mr. Atkins, who also mentioned inconsistencies and changes in the procedure of the Inland Revenue Department which had come to his knowledge, but differed from Mr. Harrison in thinking that the disease or use for which a medicine is intended should not be stated on the label. That is in reality what renders a medicine liable to stamp duty. The directions for its use, such as would be given with medicine dispensed according to a physician's prescription, may be as full as necessary, without entailing such liability. To give such directions as to dose, etc., is the proper function of the pharmacist, and, as before stated, it is only when that duty is exceeded by giving medical directions as to the ailments for which medicine is useful, that liability to stamp duty is incurred. After some discussion, the tendency of which was chiefly in opposition to the amendment, it was put to the vote and negatived.

In referring to the Pharmacy Bill, the draft of which had been adopted at the previous meeting of Council, the President stated that in pursuance of the instructions of the Committee he had taken steps for having it introduced into the House of Commons. The result of his communication with members of the House had, however, led him to the conclusion that the chances of getting any Bill introduced were largely affected by the amount of opposition it was likely to meet with. Members who undertake to introduce a Bill render themselves subject to a great amount of trouble from the correspondence with objectors to the measure, and they are therefore unwilling to take in hand the task of introducing a Bill that is likely to meet with opposition. On communicating with members of the House, the President found that these proceedings had already commenced in regard to the Pharmacy Bill, and he had received so many letters objecting to one or other clause of it, without a single expression of sympathy or direct support, that he felt, when the question was put to him what chance there was of opposition, he could not give such an assurance as he thought he ought to be able to give. He could not even say that the Council as a body was in favour of the Bill, to begin with, and under those circumstances he thought it was his duty not to proceed further with the Bill. He considered it would not be right for the Council, or for himself, as President, to proceed with a measure intended for the benefit of the whole trade and for the consolidation of the Society in the face of opposition. He therefore called a meeting of the Committee and placed the case before it, with the result that it was decided to recommend that the Bill should not be proceeded with this session. In asking the Council to adopt this recommendation he expressed the opinion that he had a right to complain that when seeking to do public work for the benefit of the pharmaceutical body there was not only opposition but an entire absence of support from those who were supposed to be behind him.

In the discussion upon this subject regret was generally expressed by the members of Council that after the trouble taken to draft a Bill so much in the interest of all it should have met with opposition. Several members were of opinion that there had not been sufficient time for considering the Bill, and reference was made to the recent meeting at Sheffield, which was unanimously in favour of it. Probably in other places there may still be a similar result, and in any case it may be expected that the contemplated provisions of the Bill will form the subject of discussion throughout the country in view of its future introduction into Parliament. We might also suggest that, in order to promote such discussion, it would be desirable for some member of Council who retains his seat to give notice of motion that the Bill be brought up again for consideration at or after the meeting of Council in June next.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual dinner of this metropolitan Association took place on Thursday evening at the Holborn Restaurant, and was carried out with similar success to that which has marked it for several years past. The chair was taken by Dr. A. P. **Luff**, and among the company were Sir **Edward Sieveking**, the President of the Pharmaceutical Society, and Messrs. **Atkins**, **Hampson**, **Hopkin** and **Ince**. In replying to the toast of "The Medical Profession," which was proposed by Mr. **Frank A. Rogers**, Sir **Edward Sieveking** compared the relation between medicine and pharmacy to matrimony, each having its own duties to perform, while neither should interfere with the business of the other. Referring to the many remedies recently introduced from Germany, he said that medical men had not time to inquire where these substances came from, but he thought it was the duty of British pharmacists to devise and perpetuate British remedies on British soil. The toast of "The Pharmaceutical Society" was proposed by Mr. F. **Ashley Rogers**, and Mr. **Cartrighe**, in replying, referred to the necessity for union among pharmacists before their representatives could go to Parliament with any probability of having their demands acceded to. The toast of "The Chemists' Assistants' Association" was proposed by the Chairman, and acknowledged by the President, Mr. T. **Ellwood**, who gave a satisfactory account of its progress during the past year.

An Evening Meeting of the Pharmaceutical Society will be held at 17, Bloomsbury Square, on Wednesday next, the 12th inst., when papers will be read on "The Estimation of Ethyl Nitrite in Spirit of Nitrous Ether," by Dr. J. C. Thresh; "A Review of Recent Work on Spirit of Nitrous Ether," by Mr. T. S. Dymond; "Oil of Betel Leaf," by Mr. D. S. Kemp; and "Resin Soap as an Emulsifying Agent," by Mr. H. Collier. The chair will be taken at eight o'clock, but, as usual, the theatre will be open an hour previously to afford opportunity for the inspection of exhibits.

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We have been requested to state that the next Evening Meeting of the Pharmaceutical Society in Edinburgh will be held on Thursday, the 20th instant, and not on Wednesday, the 19th, as previously announced.

* * *

On Wednesday next, March 12th, at 11·30 a.m., a meeting will be held at 17, Bloomsbury Square, for the purpose of making preliminary arrangements for the annual dinner of the members of the Pharmaceutical Society and their friends in connection with the forthcoming annual meeting. All gentlemen who feel interested are invited to be present.

* * *

A case of poisoning by crystallized aconitine is reported from Belgium, which once more illustrates the enormous toxic power of some preparations sent out under this name. A prescription ordering ten pills, each to contain 0·15 gram of quinine sulphate and one-fourth of a milligram of crystallized aconitine was dispensed, the directions being that five should be taken daily. The patient, a lady, after taking three of the pills, became indisposed, suffering from great nausea. Her uncle, a man of sixty years, apparently with a view to encourage her in continuing to take her medicine, swallowed two of the pills, but he was seized with convulsions an hour afterwards and died. The remaining five pills seem to have been thrown upon the fire, so naturally some doubt exists as to whether the prescription was dispensed correctly, and even the Antwerp *Journal de Pharmacie*, while professing no doubt upon this point, asks whether it is a fact that half a milligram of this alkaloid can act so powerfully. To this query M. Ferrand replies in the *Bulletin Commercial* that in 1887 the Paris Society of Pharmacy had this subject under consideration, and came to the conclusion that in some cases the absorption of a granule containing one-fourth of a milligram of crystallized aconitine by an adult has been sufficient to provoke extremely grave symptoms and endanger life.

* * *

The new Pharmaceutical Register issued under the authority of the Pharmacy Board of Victoria, a copy of which has been just received, contains 758 names. Of these 99 are on the Register in virtue of a British qualification, 22 being referred to the Major examination, 54 to the Minor, and 7 to the Modified. There are also 4 names on this Register in virtue of the Irish qualification. In addition, certificates authorizing dealing in poisons have been issued to 114 persons resident in places distant four miles from a registered chemist.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, March 5, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Cross, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martindale, Newsholme, Richardson, Robbins, and Southall.

The minutes of the previous meeting were read and confirmed.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Ashton, Thomas Richard.
Harris, Herbert.
Norman, Edwin.
Osborne, James.
Priestley, Lawrence.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Ashton, Thomas Richard	Manchester.
Jones, William Thomas	Brighton.
Priestley, Lawrence	Nottingham.
Roper, Frederick Alfred	Plymouth.
Seccombe, Charles William	Tavistock.
Stuart, William	Preston.
Sturton, John Gilbert	Peterborough.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Bowman, Samuel	Silksworth.
Buchan, David Donaldson	Froickheim.
Cave, James Robert	Southport.
Farthing, George Thompson	Spennymoor.
Hickson, Robert William	Hull.
Jackson, Thomas	London.
Newlyn, James	Torquay.
Osborne, George Cooch	Abingdon.
Rainey, James Jarvis	Spilsby.

Modified.

Roberts, Theophilus Jones	Holyhead.

ASSOCIATES.

The following, having passed the Minor examination and tendered or paid as "Apprentices or Students" their subscriptions for the current year, were elected "Associates" of the Society:—

Barnard, Owen Robert	Chelmsford.
Bartle, William Thomas	Heckmondwike.
Bell, Robert Henry	Sunderland.
Bones, Arthur Anderson	Manchester.
Clarke, Andrew	Scarborough.
Coulson, Thomas	Leicester.
Davidson, James	Gateshead.
Ecclestone, George Thomas	Soham.
Kent, John Collison	Wakefield.
Leys, Alexander	Banchory Ternan.
Lloyd, William Howard	Leicester.
Malcolm, James	Middlesborough.
Moore, John	Stafford.
Payne, Ernest Edward Munro	London.
Reynolds, Albert Bright	Bournemouth.
Sanford, Joseph Michael	Exeter.
Sleath, Edmund Watson	Manchester.
Tudor, William	Carmarthen.
Umney, John Charles	Sydenham.
Westmacott, George Leonard	Manchester.
Young, George Herbert	Brigg.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Barnett, Herbert G.	Birmingham.
Bishop, John Duval	Stroud.
Brett, George	Louth.
Broadbent, William Henry	Ollerton.
Brown, Thomas Hugh	Liverpool.
Carlton, Herbert	Horncastle.
Carmichael, George Scott	Edinburgh.
Charlton, Thomas Dixon	Houghton le Spring.
Coupland, William Finlay	Harrogate.
Darney, William Ephraim	Stanley.
Finney, Henry William	London.
Gates, Colvin	Moffat.
Gaul, Ernest George	London.
George, David	Cardigan.
Gorton, Albert George	London.
Green, Edward Joseph	Boroughbridge.
Hall, Alfred William	Watford.
Heap, Robert Edwin	Shelton.
Higgs, Andrew Badgery	Bodmin.
Hill, Joseph Harrison	Birmingham.
Humphreys, Nigel Carr	London,
James, Charles	London.
James, David Isaac	Cardigan.
Johnstone, James	Carlisle.
Larcombe, Arthur	Exeter.
Lazenby, Arthur	York.
Lee, Wilson	Wem.
Mercer, Alfred	Rochdale.
Morris, Edward Herbert	Bedford.
Nall, Walter	Rochdale.
Parry, Frederick George	Stockton-on-Tees.
Patrick, Christopher	Bradford.
Plowright, John	Ryde.
Pryor, Sydney Hildyard	Cambridge.
Ridding, Emily Charlotte	London.
Roberts, Henry	Morriston.
Rosser, William Marmaduke	Abergavenny.
Saunders, John Alexander	Bermondsey.
Shepherd, Joseph Henry	Derby.
Smith, Harry George	Downham Market.
Smith, Thomas A.	Radcliffe.
Smith, Walter	Liverpool.
Spoor, Herbert Mather	Manchester.
Summers, Stanley	London.
Sumners, Henry Tindale	Heckington.
Thompson, Harry	Oldham.
Thursfield, Bevington	Kettering.
Thwaites, Alfred	Ryde.
Vernon, George Henry	Silverdale.
Weight, Samuel Thomas Ford	London.
Whaley, Charles Edward	Newcastle-on-Tyne.
White, Walter Michael	Canterbury.
Wildman, Harry George	Feltham.
Wilkinson, George Henry	Dudley.
Wilkinson, John Horsley	Colne.
Wilson, Charles Henry	Stockton-on-Tees.
Williams, Thomas	Aberayron.
Winzer, Edmund	Stoke Damerel.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

ADDITIONS TO THE REGISTER.

The Registrar reported that

Lewis Parry, 5, Nelson Terrace, Wrexham, and
Charles Edwin Coke, 68, Devonshire Road, Holloway, London, N.,

having made declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been duly supported, their names had been placed on the Register.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Frederick William Guest, 12, Great Dover Street, London, S.E.
Roger Jones Owen, 5, Market Terrace, Wood Green, London, N.

LOCAL SECRETARIES.

The **PRESIDENT** said it had been reported by the Secretary that the Society had lost, by death, three Local Secretaries, viz., Mr. Broom, of Exeter, Mr. Badger, of Barnsley, and Mr. Willan, of Preston. Mr. Broom was well known to some members; he remembered meeting him when the Conference met at Exeter. Mr. Broom was a man who had always promoted, as far as he could, the objects of the Society, and above all he was particularly interested in all matters of education, and every one must regret his loss. Mr. Badger was also a very active local man, who did credit to pharmacy and had the respect of all his brethren in the town and neighbourhood. Mr. Willan also took an active part in local matters in Preston, and though he had not been local secretary very long he had shown a desire to do the best he could for the welfare of the Society. In consequence of these deaths the usual nomination papers had been sent out to the members and associates in business in these places, and acting on the returns which had been received he would move that Mr. Lake be appointed Local Secretary for Exeter, Mr. Eastwood for Barnsley, and Mr. Robert Bell for Preston.

The motion was seconded and carried unanimously.

Mr. Lake was also appointed superintendent of the Society's written examinations in Exeter.

DIVISIONAL SECRETARY FOR FULHAM.

The **PRESIDENT** then moved that Mr. William Pickard be appointed District Secretary for the parliamentary borough of Fulham, in place of Mr. Sandell, deceased. Many present had met Mr. Pickard, and from what he knew of his zeal, he congratulated the Council on the fact that he was willing to undertake the duties. Mr. Sandell had been prominently before them as a worker in pharmaceutical matters for many years. He was a man who had an active business habit of mind and a clear head, and when he had made up his mind that a thing had to be done he put his whole heart and soul into it. If Mr. Sandell had been spared to take a more prominent part in the affairs of the Society, he was quite sure that he would have done credit to himself and those with whom he was associated. It was matter of great regret that so promising a man should have been taken away from active work.

The motion was unanimously agreed to.

REPORTS OF COMMITTEES.

FINANCE.

The Report of this Committee was of the usual character, and included the recommendation for payment of various accounts, including a sum not exceeding £1000 to the contractors during the month on the architect's certificate.

The **PRESIDENT**, in moving the adoption of the report, said there was nothing calling for special notice. There had been a few penalties received, but they were by no means all profit. Sometimes it cost the Society £50 to recover £5, but the law had to be carried out in the interests of the public, and put in force whenever it was infringed. There had also been a sum received from the Government for Registers. With regard to the Benevolent Fund, subscriptions had been coming in, and he hoped that during the current month and the next there would be a large influx. It was a continuous income of small subscriptions from a large number which was mainly desired, and he hoped friends would bear in mind that the Committee did its best to relieve the distress of the present generation from the funds thus placed at its disposal.

The motion was unanimously agreed to.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to a member (aged 74) from 1847 to 1854, who had to give up business in 1856, and is now paralysed and unable to do anything. (Birkenhead.)

£10 to the widow (aged 65) of a registered chemist and druggist, who has had three previous grants, the last in January, 1880. Since then she has been assisted by her relatives, who are now unable to do so. (Birmingham.)

Death of two Annuitants.

The Secretary had reported the death of Mr. Thos. Wm. Stone on February 15, aged 69, and of Mrs. Elizabeth Goadsby on February 24, aged 73, who had been annuitants since 1886 and 1887 respectively.

Subscription to Orphanages.

The Committee had considered the question of the desirability of the Society subscribing to orphanages in order to obtain the power of nominating candidates, and after considerable discussion had concluded that it was not desirable to recommend the Council to act in that direction.

The **VICE-PRESIDENT**, in moving the adoption of the report, said the two cases in which relief had been afforded were typical, but called for no special remark. With regard to the question of subscribing to one or more orphanages, for the purpose of nominating children connected with the trade, the Committee could not see its way to recommend it. It would be very easy for the Council to contribute a small annual sum to any or all of those institutions, and thereby get the right of nomination; but when that was done there might be a good deal of difficulty in securing the election of the children nominated, and it was felt that it would injure the prestige of the Society if its nominees were not elected. Of course an election could always be secured by the expenditure of money, but the Committee did not feel that it could, in the present condition of the Fund, recommend that much more money should be expended in this direction than was now being done, without encroaching on the amount available for giving relief to the aged. He would only say further that he had been desired to bring before the Council and the members the candidature of Sarah W. Pennington for election to the Watford Asylum as a case very well deserving of support. She failed at the January election, but a strong effort would be made to secure her election in June next, and Mr. Bremridge would be glad to receive proxies.

Mr. **NEWSHOLME** having also strongly recommended the claims of Sarah W. Pennington to the support of members and the trade, The report and recommendations of the Committee were unanimously adopted.

The Annual Meeting.

It was resolved that the annual meeting be held on Wednesday, May 21, and that the preparation of the annual report be referred to the Library, Museum and Laboratory Committee.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average
January	Day . .	696	39	3	26
	Evening .	201	16	2	9

Circulation of books.	Total.	Town.	Country.	Carriage paid.
January . . .	245	128	117	£1 9 0

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Schär (E.), Das Zuckerrohr, seine Heimat, Kultur und Geschichte, 1889. From the AUTHOR.

Royal Institution, Proceedings, No. 83, 1889.

— List of Members, etc., 1889.
From the INSTITUTION.

Royal College of Physicians, List of Fellows, etc., 1890. From the COLLEGE.

Medico-chirurgical Transactions, vol. 72, 1889.
From the ROYAL MEDICAL AND CHIRURGICAL SOCIETY.

Curtman (C.), Uses of Chemical Reagents, No. 5.

— Methods for the Detection of Glucose.
From the AUTHOR.

American Pharmaceutical Association, Proceedings, vol. 37, 1889. From the ASSOCIATION.

For the Library in Edinburgh—

American Pharmaceutical Association, Proceedings, vol. 37, 1889. From the ASSOCIATION.

Year Book of Pharmacy, 1889.
From the BRITISH PHARMACEUTICAL CONFERENCE.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
January.	Morning	493	23	10	18
	Evening	78	2	1	2

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of the Implements used in collecting Cassia Bark. From Mr. H. HUMPHREYS.

Specimens of the pure Oils of Lavender and Rosemary from plants grown at Brighton.
From Mr. J. C. SAWER.

Specimens of the following Indian Drugs, leaves of *Clerodendron infortunatum* and *C. inerme*, roots of *Alangium Lamarckii* and *Casearia esculenta*, bark of *Chloroxylon Swietenia* and *Pittosporum floribundum*, herb of *Kyllingia monocephala*, *Herpestis Monniera*, *Adiantum lunulatum*; flowers of *Calotropis gigantea*, fruits of *Ficus hispida*, oil of the seeds of *Jatropha glandulifera*, and large tears of assafœtida.

Two specimens of false chirata, *O. angustifolia* and *O. alata*. From Mr. R. H. DAVIES.

Specimen of Pituri. From Mr. J. H. MAIDEN.

Specimen of Cubeb fruits attached to the inflorescence. From Professor ATTFIELD.

The staff of the Society's School had attended and reported on their respective classes.

The PRESIDENT moved the adoption of the report, which was unanimously agreed to.

LAW AND PARLIAMENTARY.

Two meetings of this Committee had been held. At the first the President had been instructed to take means for introducing the Pharmacy Acts Amendment Bill into Parliament. At the second meeting the President had reported the steps taken by him to carry out the instructions of the Committee, and the Committee recommended that owing to the opposition which appears to exist, and the want of adequate support from the Society and the trade, the Bill be not proceeded with during the present session.

The Committee had also considered the memorial from the Durham and Northumberland chemists, and also one from the Exeter chemists, with reference to the Medicine Stamp Act, and the following correspondence thereon was read:—

[*Copy.*]

"*January* 2, 1890.

"W. H. Cousins, Esq., C.B.,
"Inland Revenue Secretaries' Department,
"Somerset House, W.C.

"Dear Sir,—The Council of this Society has received a communication from some of its members, residing in Northumberland and Durham, respecting the interpretation of the Stamp Act by the Board of Inland Revenue, and suggesting that it would only be reasonable on the part of the Board to inflict no fine for the use of any label unless the same was continued to be used after they had given notice to the user that it involved liability to stamp duty.

"I shall be much obliged if you will inform me whether there would be any objection to the adoption of such a course by your Board.

"I am, dear Sir, Yours faithfully,
(Signed) "M. CARTEIGHE, *President.*"

"Inland Revenue,
"Somerset House, London, W.C.
"*January* 8, 1890.

"Sir,—I have laid before the Board of Inland Revenue your letter of the 2nd instant, in which you suggest that in future no penalty should be inflicted for the use of any label, unless the same had been continued in use after notice had been given to the user that it involved liability to medicine stamp duty.

"In reply, I am directed to acquaint you that the Board are unable to comply with this request. Upon referring to the account of the interview between a deputation from the Chemists and Druggists' Trade Association and this Board on April 12, 1886, and contained in the *Chemist and Druggist* of April 24, 1886, it will be seen that this question was fully discussed, and the Board can add nothing to what was then stated by their Deputy Chairman on the subject.

"If your suggestion were adopted it would be tantamount to the admission that infractions of the Medicine Stamp Duty Act should be treated differently to other infractions of the revenue law, and such an admission the Board are not prepared to make.

"I am, Sir,
"Your obedient Servant,
"W. H. COUSINS, *Secretary.*

"M. Carteighe, Esq."

The Committee reported that in its judgment it is not expedient nor in the interests of the trade that the Medicine Stamp Act should be repealed. Also that with regard to the suggestion made by the memorialists of Durham and Northumberland as to the infliction of fines, the Committee is unable to induce the Inland Revenue authorities to make any alteration in their mode of procedure.

The Draft Pharmacy Bill.

The **President**, in moving the adoption of the report, said he proposed to take the discussion on the question of the Pharmacy Bill first, and then deal with the Patent Medicine question separately. The Committee met soon after the last Council meeting to make certain verbal amendments in the Bill, and he was then instructed to make arrangements for having it introduced into the House of Commons. In the course of the following week he saw several members of Parliament who had already devoted a good deal of time and trouble to the matter in previous sessions, which had entailed upon them a considerable amount of correspondence, and he could not but feel that the chances of getting the Bill introduced and carried depended very largely upon the amount of opposition it was likely to meet with. He referred to that kind of opposition which consisted in communicating with M.P.'s in an indefinable sort of way, so that the person addressed had no means of knowing from what class of persons the opposition came. Seeing a statement that the Bill was to be introduced, an aggrieved person wrote to his representative or to any other member who had shown an interest in pharmaceutical matters and objected to it, sometimes giving a reason, and sometimes giving no reason at all, whilst in other cases the objection was that the Bill did not contain provisions which it was thought ought to be there. Opposition of this kind, which had been growing during the last year or two, gave a great deal of trouble to those who had charge of the Bill in the House of Commons; each member addressed communicated with those who had charge of the Bill, and correspondence ensued, and very often it turned out after all that the objectors had no connection with the trade whatever; in fact, the members of Parliament did not know with whom they were dealing. Of course, this kind of thing worried and irritated the members who had charge of the Bill, and he—the President—soon found that these proceedings had already commenced. He had already received many letters on the subject, all objecting to some one clause or other, but by no means all addressed to the same clause. It seemed rather to be a general grievance that the Bill would do no good to the trade, and that no Bill could do any good unless it confined the sale of poisonous patent medicines, and indeed of drugs generally, to registered persons. As he had mentioned when the Bill was introduced there, the different ways of dealing with trade matters, and the differences of opinion in the trade had often been discussed at that table; but the Council as a whole certainly thought it was bringing forward a measure which would be of great benefit to the whole trade. The Bill had been drawn up, and a great deal of time spent in discussing it, with no other object; there was no other view in the Council than the benefit of the trade, and it was preposterous to suppose that there could be any other view. But the Society was not powerful enough to pass such a Bill as many of its friends wished. It was perfectly easy for a body of gentlemen who chose to throw off all responsibility to draft a Bill, and agree to it once a year, and let it lie on the table, but it was a very different thing to take it to the House of Commons and try to pass it into law. The Council had therefore adopted what he still thought was the wisest course in asking for that which, it was felt, would be in the interest of the public and which would at the same time distinctly be in the interest of the trade. It was very remarkable that with regard to the clause in which it was proposed to make arrangements by which every member of the trade, whether he passed the Minor or the Major examination, might in future become a member of the Society, several letters had been sent to him complaining that the writers must oppose the Bill because of certain trivial questions connected with that clause. For example, they raised the question whether a man, when he passed the Minor, should not be eligible to be admitted to membership at once. They knew perfectly well that the Council did not object to that, but the clause was worded to meet a particular class of cases. A number of young men preferred to be ordinary associates until they went into business, and it was extremely difficult in one Act of Parliament, or in a bye-law framed on an Act of Parliament, to provide for two classes of men in one society with the same qualification. If the associateship were retained it would follow that many of the associates would not wish to go into business; they would remain associates and would not become members, and that without regard to the question of fees. The very object of the Bill was to get rid of the associate in business and make him a full member, so that really the criticisms were somewhat frivolous and were at all events ungenerous. He was accustomed to criticism and was not easily turned back from what he considered to be the right course by letters written in a sort of ill-natured tone; but he mentioned this as showing how a Bill could be opposed on a trifling objection of that kind, when it was not drawn up to the satisfaction of everybody. The same kind of carping criticism appeared in all the communications he received, and consequently when he made the final arrangements with Sir Henry Roscoe and other M.P.'s whose names he need not refer to—there were five or six who were ready to back the Bill—they naturally put to him the question as to this new clause whether there was likely to be any opposition, and explained the great difficulty of doing anything this session, or probably, indeed, for some time to come, unless an agreement on disputed points could be arrived at in the lobby. It was perfectly well known to all who followed the course of legislation that it was much more difficult to get fifteen minutes of the time of the House of Commons than it was to climb a mountain. The whole time of Parliament was taken up by Government business, and consequently Bills which were presented, if there were to be any chance of their passing, must be of a kind which would not provoke active opposition. It was quite obvious when he was asked to inform M.P.'s what chance there was of opposition that he was not able to give such an assurance as he thought he ought to be able to give. He could not say even that the Council as a whole body was in favour of the Bill to begin with, and under those circumstances he considered it his duty to recommend that the Bill be not proceeded with. It was not right for the Council, nor for him as President, to proceed with measures of this kind, which were intended for the benefit of the whole trade and for the consolidation of the Society, in the face of such opposition. It was not wise; it tended to produce friction when even their own members did not appreciate what was being done. He therefore called the Parliamentary Committee together and placed the case before it, and the resolution was come to which was now presented that the Bill be not proceeded with in the present session. He did not propose to say anything about the way this difficulty arose or to open up a discussion upon it. He need only say further that he found no direct support or sympathy for any one clause of the Bill; not a single associate or associate in business had expressed his approval, nor had he seen such approval expressed in any publication, and therefore he thought when he was seeking to do public work of this kind in the House of Commons he had a right to complain if, on the one hand, there was a certain amount of opposition, and on the other that he had no direct support from those who were supposed to be behind him. He should therefore ask the Council to adopt the recommendation of the Law and Parliamentary Committee.

Mr. **Newsholme** said he was exceedingly disappointed to find that the Committee had been at such trouble to draft a Bill, which was so much in the interest of everybody throughout the whole country, and then, when the Bill was at last placed in the hands of members of the House of Commons, it was objected to. He thought those who objected to it little knew what they were objecting to or what they wanted. It seemed that the Bill was drawn in the very best interests of chemists and druggists throughout the country. The President had referred to having no direct support from any member or associate, but he thought he was a little premature in that, because a meeting was held at Sheffield only last Friday on that very subject, when a unanimous vote was passed in favour of the Bill. Personally he was exceedingly grieved that the Bill had to be withdrawn, and he was quite sure his friends in Sheffield would agree with him. Notice of that meeting was sent to every registered chemist in the district, and each man had a copy of the Bill sent him, so that he knew perfectly what was to be discussed. Although the meeting was not large it was composed of men who had in years gone by and even in recent years opposed several Bills which had been brought forward, particularly the one of last year, because it did not go far enough; but now these fresh clauses had been added they were prepared to give the Bill their hearty support, seeing that it was the grandest Bill which could be devised for chemists. He regretted that it could not be persevered with.

The **Vice-President** said he was exceedingly sorry he had been prevented from attending the last Council meeting himself and hearing the eloquent speech of the President in regard to the Bill introduced; but he read it in print with great interest and satisfaction, and regretted extremely that the President's persuasive eloquence had failed to convince two members of the Council. He was very sorry that the President now felt called upon to withdraw the Bill, which, as had been truly said, was intended to benefit all classes of the trade, and, as far as he could judge, it was eminently calculated to do so. How a gentleman who had for half his lifetime been working in behalf of the leading principle of the Bill could now oppose it he could hardly understand; but, at all events, there was evidently an indisposition or inability to judge between the terms "instruct" and "entrust." To say that the 6th clause of the Bill prohibited the instruction of an apprentice or a junior assistant would, to his mind, be quite apart from anything which was intended, as well as from the manner in which it had to be construed. It was intended that the master should not entrust to his apprentice or to an unqualified assistant duties which he ought to perform himself in the interest of the public, and in his own interest. While regretting exceedingly that this Bill had been withdrawn, he agreed entirely with the President's views, and would far rather sacrifice this Bill, or any other, than breed dissension amongst themselves, especially at the Council table.

Mr. **Hampson** said he might be permitted, having had a hand in framing the Bill, and having felt a very deep interest in its prospects in the House of Commons, and having also realized how much it would benefit the entire trade, to say that he naturally regretted it was not to be introduced. But after all some good would probably come out of it. He was quite sure there was sufficient intelligence in the craft, upon mature consideration, to see that the Bill was not simply a well intentioned Bill, but contained elements of real benefit to the trade, as well as of safety to the public. It would be certainly undignified of the Council to attempt to push a Bill through the House of Commons against the free will of the trade; but the most melancholy part of the whole transaction was, that when an offer was made to open the portals of the Society—which was after all of considerable standing and weight—to every examined individual, so far as membership was concerned, so that they could manipulate the Society just as they thought proper, according to their strength, that offer was refused because it did not include everything which some people would wish. It seemed to him a very short-sighted policy on the part of those grumblers who did not seem to be able to accept the situation not to seize the opportunity to strengthen the Society. This was their only chance of doing anything in future, for if there was any good to be done to the trade it must come from the Society, the representative body which had, to a certain extent, the opportunity, not simply of formulating bye-laws, but of doing other good works in the interest of the trade. After all, he hoped these regrets and embarrassments would be educational, at least, he trusted so. Before sitting down he must say a word with regard to the attitude of the President, with whom he had not always agreed in the past, but he liked him exceedingly because he always hit straight out, and one always knew what he meant. With regard to this Bill he had spent hours and hours of his leisure, night and day, not only in framing it, but in considering what might be done with it, and it would be a very bad compliment to him to ask him now, seeing the want of sympathy in the trade, to raise one finger further with regard to its introduction.

Mr. **Hills** also very much regretted that it had been thought advisable by the Committee to withdraw the Bill for the present session, but still he thought the step was necessary under the circumstances. He regretted it all the more, because the Bill seemed to him to be about as good a one as could be passed under the present conditions. It was a Bill which on the one hand proposed to give a better system of education and training to the chemist, and on the other to give the whole of the dispensing to registered men; and personally he could think of no better Bill, especially when it contained, together with those two important features, a clause tending to the consolidation of the Society. As he was one of the candidates for election in May, he might say that he knew of no better means for improving the present condition of chemists and druggists than the course proposed to be taken by that Bill, and if he went to the poll he would go on those two grounds: the better training of those who entered the craft and the placing of dispensing in the hands of registered men. He did not think he could have a better programme than that.

Mr. **Martindale**, as a member of the Committee, thoroughly appreciated what had been done by the President, who had spent an enormous amount of time over this Bill, and it was very distressing to find he had not received the support of the trade. The Bill was as much as they could unite to ask for, but, unfortunately, they were not united even on that, although it was conceived that this was a reasonable Bill to ask for. Under the circumstances it was inevitable the Bill should be withdrawn. Of course he could see that the time of application was rather inopportune, particularly with reference to the case which had just come before the Law Courts, but he hoped that at some future time something on the same lines might be brought forward when there was more union among themselves. He had hoped that this Bill would consolidate the Society by bringing in a greater number of members. He had hoped that all the members of the trade would see their way to uniting and pulling together for this Bill, which would have given them so many advantages.

Mr. **Gostling** desired to emphasize the regret which had been expressed with regard to the fate of this Bill, which was calculated to improve the condition and status of chemists and druggists throughout the country, and was decidedly in the public interest. It was very mortifying after all the pains which had been taken by the President and Committee and after the long discussion of last month that all those efforts seemed to have been abortive. He deplored the fact that a small minority of the Council should not loyally have accepted the decision of the majority. It was well known that every member of the Council felt an intense interest in the welfare of the trade, as well as a regard for the interests of the public, and it was therefore a very great pity that any member should not loyally accept the decision of the majority. It was also much to be deplored that individual members of the Society did not realize that the Council had the opportunity of understanding the position and the necessities of the case very much better than outside members could do, being constantly in communication with each other, and having constantly under consideration the difficulties to be contended with.

Mr. Harrison said he noticed that the Committee reported in favour of withdrawing this Bill in consequence of the opposition which "appears" to exist; but after the very clear explanation of the President he thought the word "appears" might be struck out, because it was perfectly clear it was not an appearance but an actual existence of strong opposition to the passing of the measure. Still he hoped it did not mean that this measure was entirely dead, and that it was to sink into the grave uncoffined and unknelled; it had received the first kind office at the hands of the Committee, and the latter had been already performed that morning. But he also wished to add a word or two of his own in that direction. He regretted it had been found necessary to withdraw the measure, because he agreed with those who said that the consolidation of the Society and the entrusting of the dispensing of medicines throughout the country to the chemist and druggist would have been of very great advantage. Of course he recognized fully that there were many other points wanted, and equally that it would be very difficult to obtain them; but what many of the members seemed to lose sight of was that whilst it was their duty to go for what they wanted, as far as there was a reasonable probability of obtaining it, at the same time this effort need not be a final one. If this measure were lost they were not bound to go on to all eternity and never attempt anything further; but if by means of this new measure they could have formed a stronger and more powerful basis to work upon at some future time, they might have gone for a further measure with even greater advantage. After all it was unnecessary perhaps now to indulge in vain regrets, and he thought there was something to be learned from what had happened. In the first place, putting the measure before the country was something of an educational effort, and it might teach those outside the Council what were the views of those who sat there and had better opportunities than those outside of knowing what was practical. Again he thought it was a mistake that the Bill had not been introduced to the public sufficiently early. The details of the measure only became known a month ago, and that was not a very long time for men to make up their minds about a measure or to meet together and discuss and arrange their differences. As they had just heard, a meeting was held in Sheffield the other day, when a resolution was unanimously passed in favour of it, and as far as he knew there had been no meeting actually objecting to it, and he was inclined to think that if the measure had been before the country sooner and the members had had an opportunity of discussing its details and had had explained to them why certain things were put in and others were left out there would have been a very powerful expression of opinion that day in favour of it. Then it would have been for the Council to weigh the differences between the two, instead of reporting, as it was obliged to do, that all the expressions of opinion were against the Bill and none had come in in its favour. The moral was that if it were intended in another session to proceed on the same lines their constituents should be taken into confidence at an earlier period, so that more time should be allowed for discussion.

Mr. Atkins said he also must join in the funereal celebration, though he thought it was a case rather of suspended animation than either of cremation or annihilation in any other form. He was disposed to hope it was a case of only temporarily suspended existence, and he quite acquiesced in the decision of the Committee that it would be wiser to beat a masterly retreat for a time rather than to press on in the face of a decided, though a very indiscreet and unwise opposition. From the first he had had his misgivings as to the wisdom of loading the Bill with what he feared would prove, as it had proved to be, contentious matter. It was not that he had any doubt about the questions at issue, but because of the probable impossibility of getting a Bill through Parliament which contained contentious matter in it. He quite agreed with the views of Mr. Harrison that there was no finality in this question. The carrying of one great principle would strengthen the Society to advance to another. Line upon line was the best way to proceed, and they constantly realized that the great process of evolution was going on. He therefore thought that it would have been wise to have gone for a measure which, as far as he knew, would not have been actually opposed, although it would not have received the impetus of strong support from certain quarters, but he believed that an educational measure would have been unopposed in Parliament. At any rate, gentlemen who had communicated with him on the subject were impressed in discussing the matter with members of Parliament that the opposition would have assumed very small dimensions, and those who would have placed their names on the back of the Bill were very sanguine of its being carried. He regretted this temporary defeat, because life was short and time was precious. Many hours of his own time, which was not so valuable as that of some others, had been spent in considering and reconsidering, polishing and repolishing these clauses, until they were put in a form which it was thought would be manageable. As for the time which the President had spent upon it, he was amazed at the hours and hours, amounting even to day and weeks, which he had devoted out of his busy life to this measure, and he deeply regretted the loss of so much time. Perhaps after all it would only be an educational process; but he did implore the poorer members of the craft to realize that it was a most unjust aspersion on the Council to assume that they were either ignorant of, or indifferent to, the interests of the very poorest. The design of this Bill was, and if it had become an Act of Parliament the effect of it would have been, to raise the very lowest and poorest, and to have done so by the great principle of consolidation, without which no collective body could make any impression on the country generally. He felt very strongly that their friends utterly misunderstood the subject, either from want of carefully considering the debates of the Council or the measure proposed; they had somehow got the opinion that this measure was proposed in the interests of the wealthier and older businesses, or of men who were independent of business, and that the Council was not sufficiently in touch with those who were struggling. He could only say that he had never known a man at the Council table, whatever his position, either in the scientific world, or whatever the property he had accumulated, who had been indifferent to the interest of the very poorest, and it was because he thought it a suicidal act to wreck a measure on these small details that he felt so much regret at the result. Still he thought it was prudent to withdraw the Bill, though he hoped that it was only for a time.

Mr. Allen said when he heard the President's statement to the Committee on the previous day he felt as if the Bill were completely dead, and that there was no chance of anything of the kind being reconsidered for a long time to come; but after listening to the remarks of his colleagues, especially of Mr. Harrison, he had somewhat more hope than at first that there was a possibility of the Bill lying for some little time before the members, and being after further consideration introduced in another session, on somewhat the same lines. The question why the Bill took its present shape ought to be a very pertinent one to those who opposed it, and the answer was, because there seemed a reasonable chance of passing it on those lines, but not much chance of passing one outside of them. Of course, if men had particular fads of their own, which they thought ought to be incorporated in a Bill, they had a perfect right to oppose anything else; but one would suppose that there was a sufficient want of caution on the part of those who were to be affected to prevent them doing anything which would wreck their only chance of getting what they wanted. He hoped there would be a further discussion of a Bill on these lines; the educational portion had been well discussed and although there had been opposition to it, as years went on there was every indication that the trade as a body was coming round to approve it, and if a Bill were promoted by the Council, the only real danger would be if it could be said that the Council was not trusted by the general body of the trade. Most unfair things had been said of the Council, even to the length of accusing its members of want of sympathy with the general body of the trade, but on the face of it such an assertion was absolutely ridiculous. There were men on the Council representing all grades and classes of business, from the smallest upwards, and it was nonsense to suppose that such men did not pay attention to every want of the trade, or did not know those wants. Some people even went so far as to say since the bringing out of the Bill that it was framed in the interest of the large houses and co-operative stores, but a more absurd statement was never made. In fact, the smaller men owed to the larger houses their position in life at present. What pecuniary advantage could it have been to Mr. Jacob Bell and those who joined with him to found the Society. He was raising up a body of men to contest his position and to a certain extent that had happened. All honour to those who, from Jacob Bell to the present President, had given up their time and interest to the Pharmaceutical Society. It was most humiliating to think that men in the President's position should be met by opposition of the kind which had been referred to. He would never as a member of the Council put his hand to the framing of any Bill which there was not a fair and reasonable hope of passing.

Mr. Southall said like others who had spoken he was very sorry that the Committee had decided to withdraw the Bill, and he thought it had been rather easily frightened. As had been said the country had hardly had time yet to speak out upon it, and though it was very doubtful that the Bill would pass this year, still their constituents would have been educated a little if it had been pressed a little further. It must be remembered that the majority of the Council—by far the larger proportion—were united upon it, and they were sent there to represent the country, not individual constituencies, and he had an idea that they represented the country very well. No doubt there were grumblers here and there; there were some in Birmingham; but he believed a meeting would be held in Birmingham very shortly, when he fancied an opinion would be expressed very similar to that which had been expressed at Sheffield, that they wished God speed to the Bill. He did not know what would be done at the next election, when some of his friends would be judged, perhaps, upon this Bill. He had not to undergo that ordeal, but he should have been quite ready to do so, for if the constituents could send up men more to their mind he should have been very glad to have been relieved of the duty. He supposed it was too late now to proceed further with the Bill.

Mr. Leigh said it seemed to be expected that every one should say a word of regret for this Bill, and though it did not go quite so far in the protection of the chemists as he should have desired, still it was a Bill he should have given his hearty support to, in the hope that other Bills might follow in its wake, and he regretted that a comparatively small number of critics had opposed it. He had no means, of course, of knowing exactly how much opposition there was, but so far as his own knowledge went he thought there was comparatively little real opposition amongst average chemists. There seemed to be a few men who were desirous of creating difficulties for the Society, and he believed that that was to a great extent the result of ignorance. Before he had a seat on the Council he was much more critical of the doings of the Society than he was now, when further knowledge had altered and perhaps matured his judgment. He regretted that the Bill should have been withdrawn simply as the result of a small amount of adverse criticism.

Mr. Richardson said he had no desire to prolong the discussion; his views were pretty well known, and he agreed with Mr. Harrison that probably good might come out of evil. He did think that sufficient time had not been given, after launching the Bill to allow those in the country to examine it. They could not understand it so thoroughly as members of the Council, who had been discussing it for the last six or eight months, but he hoped if it were allowed to lie on the table for another session meetings would be held, at which those conversant with its details would enlighten the members upon it, and thus an agreement would be arrived at. But of course there would be always some opposition to anything. He recollected an old picture in *Punch*, years ago, where the two political leaders were represented, Mr. Gladstone endeavouring to lead a donkey over some water and Mr. Disraeli pulling his tail behind to prevent him, and so it would be to all time, whatever Bill was introduced. He sincerely hoped that every word said there that morning would be read by the constituents. They were all delighted to know that the President had done so much, and they felt that it was their duty to support him loyally in every possible way, because they knew that he had the interest of chemists and druggists at heart as much as any man in the kingdom. He hoped the next election would show him that he was much more appreciated by the members and the trade than some people supposed.

The President said of course it was open to the members to discuss the Bill, and it was to be hoped they would avail themselves of the opportunity. It was unusual, of course, for one to say that he was disinclined to go forward because there was a certain amount of opposition, and perhaps he had not made himself perfectly plain; he would therefore endeavour to do so. If the members of the Society, through the Council and the President, gave their best friends in Parliament a great deal of trouble, the energies and good will of those friends would probably be used up before they had done what was required of them, and therefore it was bad policy to disgust their friends with their differences of opinion on such matters. It was much wiser to hold them in readiness for another time in the hope that the whole trade might be fairly united up to a certain point. The difficulties had not been usually considered very serious. He had had to face a great many, there and elsewhere, and he agreed with Mr. Leigh and many speakers that the differences in pharmaceutical politics which existed amongst the members, and especially the differences between members and the views of the Council, were due to the fact that they who were on the Council knew the whole of the responsibilities and the limit of their powers, and had some notion of what was practicable, whereas a large number of the members outside seemed to be under the impression that the Council had the power of passing laws. Of course that was not so; it had to go to Parliament before anything could be done. He would also remind members that the disposition of Parliament was not always friendly towards giving increased powers to any corporation at all, and therefore to throw away any opportunity of getting consolidation and bringing a larger number into the Society, so as to make it more powerful at some future time to ask what was reasonable, seemed to him a great mistake in tactics.

The Medicine Stamp Act.

The PRESIDENT said he would now refer to the second subject in the report, which had been considered a good many times, namely the Patent Medicine Stamp Act. A memorial upon the subject had been received from the north of England some time ago, and another from Exeter, and the recommendation was specifically made that the Act should be repealed. Of course, that was what might be called "a large order," to suggest the repeal of an Act which brought in a considerable sum in the shape of taxation, but apart from that the Committee had always had to consider whether either the repeal or any alteration in the law, as had been suggested, would tend to improve matters. This was not a new question to those who had been some time on the Council; it had been brought up from time to time and thoroughly discussed though the conclusions had not always been published. He had come to the conclusion, and the Committee was unanimous in the view that the abolition of the stamp, while it would relieve from a good deal of irritation, would on the whole be a distinct trade disadvantage. Some twenty years ago a cry was raised to have the patent medicine licence reduced, but he thought they were all wise enough now to acknowledge that the best thing that could have happened would have been to have had it increased; in fact, amongst the suggestions sent in one was to this effect. He would ask those who felt the irritation produced by the imposition of the stamp, especially when prosecution took place, to consider the fact that if the stamp were abolished, or even reduced in amount, or if it were modified by being put on a sliding scale of value, it would tend to the propagation and the sale of compounded medicines and poisons in enormous quantities outside the registered ranks of pharmacy. Was that a thing which that Council could advocate? If the members of Council desired to go for popularity, probably the abolition of the Act would be regarded as popular, but he would appeal to the members to beware, and not to throw away what little advantage they now possessed. This tax was levied on articles prepared by chemists as well as by other people, but within certain limits the restrictions afforded by it were of considerable value to the chemists and druggists, and if these were abolished or reduced it would make an enormous difference to a large number of traders throughout the country, and he thought it would be a great disadvantage to the public also. It was a positive advantage that preparations of poison should not be sold in twopenny bottles by hucksters through the streets of every great town, which could be done if it were not for this Act. The actual limitation of the amount was in itself a kind of restriction. The fact that the lowest stamp was 1½*d*. and that therefore practically you must have a bottle of medicine worth 6*d*., at least, before it would be advantageous to deal in it, prevented the unrestricted sale of thousands of preparations in the form of sedatives which would take place outside of any shop at all, and certainly outside the shops of registered men. It was some protection to the public that the price of 6*d*. or 1*s*., paid for the article, enabled the purchaser to get directions for use and ensure that he presumably had to do with a class of people who could deal with these things without doing too much harm. If the members wished to get rid of the whole of this business altogether, by all means let them agitate for the alteration of the stamp. He had been in communication with the authorities at Somerset House a great many times, and the letters now submitted were simply the official records which epitomized the conclusions come to after a series of interviews with a number of officials who thoroughly understood the whole subject, and who themselves would not be sorry to see the law altered, for it was a very troublesome Act to carry out. But if it were altered by the authorities, either on their own initiative, or that of any one else, the form in which that change would take place would probably be this, they would simply press for a halfpenny stamp to be affixed on every packet of medicine; and this possibly might be brought forward some day. There were other suggestions of a similar kind which he was not at liberty to refer to, but the whole of them were not calculated to protect the registered dealer in poisons. That being so, as a matter of expediency it was not desirable to move for abolition or alteration. The second part of the request was that in the event of the authorities not being disposed to alter or modify the law, they should be asked to issue a caution or notice, but their letter on this point was so emphatic that it was not necessary to explain it further. It referred to a meeting of the Trade Association, and every one would remember the very influential deputation from the executive of the Trade Association which waited on the authorities some years ago. All those who attended and spoke had had large experience of the trade side of pharmacy in its widest sense, and this very point was then raised, and the Commissioners declined to entertain it, saying that if the suggestions were adopted, it would be tantamount to an admission that infringements of the Medicine Stamp Duty Act should be treated differently from other infringements of the revenue law, and such an admission they were not prepared to make. Whenever these matters were pressed upon the authorities they always said that they thought it would pay the average chemist and druggist, whenever he was in doubt, to put a stamp on his preparation. They were quite willing to continue, as they had done, to give information when things were liable and when they were not, and many of the exemptions which are looked upon as being specially peculiar were either conferred by the Exemption Act, which was passed in 1814 or 1815, with regard to seidlitz powders and mineral waters, or under a similar Act under which all preparations containing carbonic acid gas were exempt. Fluid magnesia was one of these cases, but many of their brethren in the country did not understand why it was not stamped. The simple reason was that it came within that special exempting Act. The opinion of the authorities was that the small chemists and druggists, who thought they suffered most by this Act, could make it really beneficial to themselves if in making their preparations they were to stamp them and thus be able to say what they liked about them. The authorities simply looked upon the stamp as a means of raising money, and if it were to be abolished the same amount would have to be raised by some other process, and they did not consider that it was any disadvantage to the public that medicines of this kind should contribute a certain amount to the revenue. These were the views placed before him by those in authority, and he put them forward as a kind of counter proposition to that of the memorialists. It was not a very grateful thing to do, and no doubt it would be said it was another case of *non possumus*; but he hoped the members would carefully consider the question and endeavour as far as possible to point out to their neighbours that from all the information given any alteration in the Act would inevitably tend to their disadvantage.

Mr. **Hampson** said he had dealt as a matter of business in what were called patent medicines and had had some difficulty in carrying out the law, for after all it had been administered in a somewhat different manner of late years; but he long ago came to the same conclusion as that expressed by the President that it would be against the interest of the trade to move at all unless it were in the way of increasing the licence duty. If any attempt were made to introduce a uniform method of stamping he was quite sure that it would soon create an immense deal of opposition and his advice was to let things remain. By a little trouble anyone could ascertain what was liable to the stamp and what was not, and if that were done there was no difficulty in carrying out the law. Although he did not desire to go into detail, still he thought the stamp was really a kind of mercantile property which it would be unwise to remove.

Mr. **Allen** as one who had to get his livelihood entirely through the retail sale of medicines, with a little dispensing added to it, said he had studied this question for a long time, even before he was elected on the Council, and he endorsed to the fullest extent all that had fallen from the President. A repeal of the Medicine Stamp Act would certainly be a great disaster to the retail trade. If a stamp of less value were introduced the market would be flooded with an enormous number of small things which might be sold on costermonger's barrows, or in grocer's and huckster's shops to a much greater extent than they were now, and it was a question whether chemists would retain any of their business in patent medicines. It was quite sufficient to look at the sale in the streets of two preparations, menthol and quinine, which did not come under the Stamp Act, being pure drugs, to feel sure that the repeal of the Act would be a great misfortune to the trade.

Mr. **Harrison** said, like previous speakers, he had paid some attention to this matter, and was bound to say he had come to a different conclusion. He did not think it was practicable to go for the entire repeal of the Act, though there was much that might be said in favour of such a course. He thought it was unwise and improper for any State to tax its citizens who might be subject to sickness or injury when they sought to procure the means of getting well; it was the direct interest of the State that any man who was sick should be restored to health as quickly as possible, and anything that stood between him and the restoration of his health was impolitic. Still he did not think it would be wise to go so far as that at present. But what was the position? They were face to face with an Act which was uncertain in its operation and unequal in its incidence, from the fact that it was so uncertain and difficult to ascertain what the law was. He thought, therefore, an effort should be made for an alteration or modification of it. Mr. Hampson had said that any man might easily ascertain what was liable and what was not, but that was not so. He knew of cases which had been submitted to the Board of Inland Revenue, and if any one knew what the Act meant surely the authorities ought to know, and in several cases the labels submitted were returned as liable, and in other cases the same labels were returned as not liable to stamp duty. If that were so, if a decision were given in one way on one occasion and in another way on another, it was unfair to the chemist and misleading to the public to say they could ascertain by application at Somerset House what was the law of the matter. His great contention was this, that the safety of the public demanded that when any medicine of a potent character was sold, the chemist ought to be able to place upon it the full and specific instructions how it should be used. Men were educated to know what drugs were and how they were to be used, and yet if they put their knowledge into operation and placed on the medicines specific instructions how they were to be used, those medicines were liable to stamp duty, and the men who took these precautions were placed at a disadvantage. He knew of a painful case of that kind, in which the label on tincture of arnica gave careful instructions how that powerful drug was to be used, and at first sight he should have said that it was not liable. It simply stated that if used for sprains it was to be used in a certain way, and if required for a lotion it might be mixed with water, and so on; but because that label conveyed the information which enabled that preparation to be used with safety and advantage by those requiring it, it was held liable to stamp duty, and those who conscientiously placed medicine in the hands of the people in a safe state were made to pay a tax, whilst another man who would not take the precaution, and issued it with a simple label, was exempt and could undersell the one who took greater precaution. In that way the operation of the law was decidedly unfair. There were generally two extreme courses and a middle course, and the middle course he proposed was this: all pure drugs were exempt from the operation of the Act, and he would go one step further and exempt not only pure drugs, but all compound drugs, or any medicine or preparation compounded according to the formula of any British or foreign pharmacopœia, or any medicine for which there was not claimed the exclusive right of manufacture or secret art. He simply asked that the chemist and druggist who had to follow the Pharmacopœia should be able to place on his medicine instructions given in the Pharmacopœia. If a man made a secret preparation, or claimed that it was his own, and that no one else could make it, let him stamp it by all means; but if the formula was a published one, or official either in this or any other country, so that its nature could be ascertained by all those who choose to seek for it, it should be exempt. By so doing a benefit would be conferred, not only on the trade but on the public also. Mr. Allen said it would open the sale of these medicines to a large extent to hucksters, and so on, and he knew that some of these things, such as menthol and quinine, were sold in the streets, but he believed the quantity so sold was very small indeed. The public preferred to go to a chemist who could give them instructions how the things were to be used, and if such a relief as he asked for were given it would become still more general. It would be a decided advantage to the chemist, because it would enable him to make larger use of the information he possessed of the nature and properties of the articles he dealt in, and the public would have medicines placed in their hands with instructions which would enable them to use them with intelligence and advantage. He would, therefore, move as an amendment:—

> "That the Law and Parliamentary Committee take into consideration the expediency of taking steps to secure exemption from Medicine Duty of all preparations made according to the formulæ of any British or foreign Pharmacopœia, and described and sold as such; and all medicines for which there is not claimed either exclusive right of or secret process in their manufacture."

Mr. Hampson asked Mr. Harrison if it was also intended that the particulars of the dose, and the disease for which the medicine was applicable might be put on the label?

Mr. Hills asked if Mr. Harrison considered it was irregular to put any directions on the label without making it liable to stamp duty.

Mr. Harrison said, yes. The Pharmacopœia said what an article was to be used for, but if that were placed on the label it made it liable to duty.

The President thought Mr. Harrison was under a misapprehension. A Pharmacopœia preparation might be brought within the purview of the Act by describing the disease for which it was to be used, and going into particulars. A good quack medicine could be made out of sweet spirit of nitre, sal volatile or anything else. It was not the Pharmacopœia, but the text books, which gave information what various articles were used for.

Mr. Harrison said he might have been referring to the text books, but he claimed that a chemist should be able to put that on the label.

Mr. Gostling asked whether in the case referred to of tincture of arnica the label bore the name of the chemist in the possessive case?

Mr. Harrison said no.

Mr. Gostling thought the therapeutical use of drugs was given in very few instances in the Pharmacopœia.

Mr. Atkins said he would second the amendment in order that it might be discussed, and he would make a few observations partially in support of Mr. Harrison's views. He was not content with the existing state of affairs, nor did he go in for anything so utterly utopian as the abolition of a tax bringing in nearly £300,000 a year, but he would much prefer that the money should be raised in a different way. He agreed with the President that the reduction of the licence was a great blunder, and thought that if it were raised so as to become costly, it would at once scotch that competition which had been referred to. In the conditions of the licence terms might be introduced which would prevent the selling of compound medicines with halfpenny stamps in the way indicated. He had been long impressed with the painful position in which men of the highest honour had been placed by having ignorantly and unconsciously violated this Act of Parliament, and therefore he thought that if the revenue could be obtained by another mode, and men were delivered from that bondage to which they were now exposed, a great sense of relief would be felt. Men whose businesses were not much connected with proprietary preparations had no idea of the burden it was. It was within his knowledge that a man for whose honour he could vouch had been pounced upon unexpectedly. He had come into possession of a business, and found a label which had been in the possession of the firm for nearly 100 years; it simply said, "Mr. So-and-so's Antibilious Pills," and as such it came within the purview of the Act, and a prosecution ensued. It was true that the penalty was reduced to the smallest amount, evidently indicating that the authorities regarded it as an unwitting violation of the Act, but it was a very painful position for an honourable man to be placed in. He therefore wished that some alteration could be made. With regard to warnings being given, he did not know that he had a right to claim any different treatment from the Inland Revenue Department than anyone else, but he should like the question to be kept open and not regarded as finally settled. He had known cases much akin to that which Mr. Harrison had mentioned, in which there had been a most complete alteration and change of view in a short time, which really made the matter perfectly absurd. He differed from Mr. Harrison, however, in one respect, that he did not think the disease for which medicine was to be used should be stated on the label, though full particulars as to its use might be included.

Mr. Cross said he could not vote for the amendment, because he was afraid the remedy Mr. Harrison proposed would be worse than the disease. If it were indeed the fact that drugs were sold exclusively by druggists he might agree with him, but he was not quite sure that even then he should regard such a change with complete satisfaction, because to encourage the drawing up of labels in the shape of nostrum labels to be put on Pharmacopœia preparations, and to encourage people to use the Pharmacopœia as a source from which to make proprietary medicines, would not, he thought, be a good thing. But looking outside, the evil was still greater. Those people who, like Mr. Harrison, were qualified chemists, who consulted the text books and the Pharmacopœia, went to the trouble of acquiring information which would simply be copied by unqualified men outside. If they were to tell what all these things were to be used for on the labels, they would be simply educating other people to compete with them in the sale of medicines, and therefore in the true interests of chemists and druggists he thought the less they moved in that direction the better. As far as patent medicines were concerned, all that the chemist wanted to know was what was the law; when he knew it he would obey it, harsh or otherwise. If any good could accrue from relegating this portion of the report back to the Committee he thought all would agree to doing so, but he was not prepared to point out what could be done.

The President said he thought the amendment was hardly explicit enough in its language. It described what was practically the state of things now. What Mr. Harrison wanted was that the chemist should be allowed to say anything he pleased about those preparations, whether they were prescribed for the relief of disease or not; he wanted to say that spirit of sal volatile was a useful remedy for headache, or that Dr. Pereira says such a drug is good for this, that and the other.

Mr. Harrison said he simply wanted to have compound medicines put in the same position as pure drugs, of which the seller could say anything; he simply wanted to exempt them from the operation of the Act in the same way as pure drugs. It seemed clear enough to him.

Mr. Hampson said if the amendment were carried and the Committee decided to recommend it in a future report it would be necessary for the Government to amend the Act; and was it possible that a Government department would undertake anything of the kind? He should have no objection to supporting the amendment to this extent that a man might put the dose on the label, but sometimes even that was misleading; something more was required as to how it should be used in disease, and that was a responsibility which the chemist ought not to assume. It had been suggested that it was not right to prevent by law the ready access to medicines, but he very much questioned whether it would be a right thing to give instructions for the cure of disease on the label; it would not only be travelling out of their proper course, but assuming to give advice, for it was advice, and to a certain extent it would be dangerous. It should also be remembered that there were plenty of household books, edited by medical men; giving full instructions for the administration of all simple drugs, so that the public were not in want of information.

Mr. Hills said he could not vote for the amendment, and he thought the remarks of the President and others had shown that any alteration of the law would not be to the advantage of chemists, and from a public point of view and a medical point of view the amendment was not advisable. With regard to pharmaceutical preparations, such as ipecacuanha wine, or sal volatile, all the necessary information might be given as to the dose on the label at the present time, and the books to which Mr. Hampson had referred were very numerous, and gave sufficient directions how they should be used otherwise than under strictly medical advice. It would be very dangerous to put into the hands of any body of men, not specially qualified, the power to copy from text books, not only directions for doses, but the occasions when such things as tincture of strophanthus and other powerful drugs should be used; but the same regulations would be applicable to such articles as applied to sal volatile. It would be very dangerous that new preparations of that kind, which had only been partially investigated, should be sold with general directions for use.

Mr. Allen said he could not support the amendment, for this very good reason, that all that Mr. Harrison claimed to be done by the chemists could also be done by outsiders, and it would be done better. It would be done in much larger quantities, the sale being much larger, and therefore it would be much better done than the poor average chemist and druggist could do it. The result would be that every grocer would be supplied with a nice little pamphlet to give away to all his customers with his tea and tobacco, recommending the particular medicines for every complaint that flesh is heir to.

Mr. Martindale said he had great sympathy with Mr. Harrison's amendment, because he thought it only right that reasonable directions for use should be placed upon the medicines sold; and from the trade point of view it must be remembered that chemists got their living by selling medicines, and they ought to be allowed to sell them under the best possible conditions. He was rather inclined to think that the exemption which applied to pure drugs should also apply to compound medicines. Still there were so many difficulties on the other side that he could not see his way to support the amendment, and it certainly would not be safe to push drugs wholesale into the hands of the public, and therefore perhaps the wisest course was to remain as they were.

Mr. Gostling said he could not support the amendment, although there were strong reasons for asking that chemists should be allowed to sell such medicines as Mr. Harrison referred to without using the stamp. After all, the stamp was immaterial, because it was not the druggist, but the public who paid for it, and he should much prefer to let things remain as they were than to alter them and get into worse difficulties.

The President said he objected strongly to the amendment, which was really asking for a new Act of Parliament. It meant that every ordinary retailer of medicines, not solely a registered chemist and druggist, should not be liable to stamp duty when he sold those kind of things, but that every man who advertised them or professed to have a secret remedy should affix the stamp. The whole of his observations in introducing this subject applied to the amendment with greater force, and Mr. Allen had raised the question very properly. Within six months after this had been done every preparation that could possibly be brought within the meaning of the language proposed to be used would be put up in elegant bottles and distributed throughout the whole country and not through the chemists and druggists. He utterly failed to comprehend how their friends in the north could think this would be beneficial. He quite admitted that if you did not want to be a quack it was not nice to put a patent medicine stamp on a bottle, and, as a matter of actual freedom, of course many would like to get rid of the Act altogether. If anyone supposed they were going to do any good to chemists and druggists by that process they were very sanguine. He was quite sure they failed to realize the handle this would give to large distributors, who were making every preparation under the sun in a domestic form and sending them everywhere. This would get rid of the whole individuality of the calling. The strength of the chemist's position was that he possessed personal skill and knowledge, but if he transferred all his knowledge on to a piece of paper every one would get the benefit of it. People came to the chemist because they thought he had certain information which he could give to his customers, and to abolish that individual personal advantage would be to degrade the sale of medicines to that of an ordinary ounce of tea, and would bring the chemist and druggist still further down in the mire to compete with innumerable traders. He should suggest to Mr. Harrison to withdraw the amendment, but he was quite willing to allow him, if he thought fit, to reply to the discussion. He could not help thinking that the resolution on which the amendment was founded must have been passed under a sense of irritation, without thinking how it would affect the whole trade in the long run.

Mr. Harrison said the resolution was not passed under any sense of irritation at all, but in a perfectly calm spirit, and with full knowledge of the responsibility which rested on those who framed it. They found in the north of England very great difficulty in the working of this matter. In seaport towns they were occasionally asked for medicine chests to be taken abroad, or to be used in the country districts, and were often pressed to give specific instruction as to what the medicines were and how they were to be used, but they found that to do so brought them within the purview of the Stamp Act. They were strongly of opinion, notwithstanding all that might have been said, that instead of it being degrading to their position, either as professional men or traders, it would on the contrary relieve them from a serious responsibility and make clear what was anything but clear now, the operation of the law in that particular direction. That was the point to be aimed at; they wanted the law to be perfectly clear, and to be able to place medicines in the hands of the public in a safe way. As Mr. Atkins had said, there was no body of men probably, taken man for man, more honourable and more desirous of acting properly than chemists and druggists, and they felt deeply the very great burden of having an uncertain Act of Parliament hanging over their heads which they were unable to interpret. They believed that the exemption referred to in the amendment would enable them to follow their calling with freedom and relieve them from a great burden and responsibility.

The amendment was then put and negatived, and the original motion for the adoption of the report was carried.

General Purposes Committee.

This report, which was taken in committee, included the usual letter from the Solicitor, stating the progress made with cases placed in his hands. Three defendants had paid the penalty sued for, and in one case the defendant had obtained a verdict in his favour from a jury.

Two cases of alleged infringement of the Pharmacy Acts had been considered by the Committee, and in each case proceedings were recommended.

On resuming, the report and recommendations were unanimously adopted.

Meeting at Sheffield to Consider the Pharmacy Acts Amendment Bill.

The President said a communication had been received from Sheffield, stating that at a meeting of registered chemists and druggists of Sheffield and the neighbourhood, held on Friday, February 28, the two following resolutions were carried unanimously:—

"1. That the chemists and druggists of Sheffield and district heartily approve the Pharmacy Acts

> Amendment Bill, and undertake to use all legitimate means to ensure its becoming law.”
>
> “That a copy of this resolution be sent to the Council of the Pharmaceutical Society, to the members of Parliament for the borough of Sheffield, and to the member for Hallamshire.”

REPORT OF EXAMINATIONS.

February, 1890.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (19th)	6	1	5
„ (20th)	5	1	4
„ (21st)	5	3	2
	—16	— 5	—11
Minor (19th)	27	10	17
„ (20th)	26	10	16
„ (21st)	26	9	17
	—79	—29	—50
	95	34	61

Preliminary Examination.

21st.—Four certificates by approved examining bodies were received in lieu of the Society's examination.

Provincial Transactions.

SHEFFIELD CHEMISTS AND THE PHARMACY ACTS AMENDMENT BILL.

A meeting of the chemists and druggists of Sheffield was held on Friday, February 28, in the rooms of the local Pharmaceutical and Chemical Society. Mr. J. H. Bradwall was voted to the chair. The Secretary having read the Bill Mr. G. T. W. Newsholme proposed the following resolution:—

> “That this meeting of the chemists and druggists of Sheffield heartily approve of the Pharmacy Acts Amendment Bill, and they undertake to use all legitimate means to ensure its becoming law.”

Mr. W. Ward seconded the motion, after which a long discussion took place, in which Messrs. Ellinor, Fox, Learoyd, Morrison and Watts took part. Mr. Newsholme replied to the discussion. The Chairman put the resolution, which was passed unanimously.

Mr. Learoyd proposed and Mr. R. Watts seconded that a copy of the above resolution be sent to the Council of the Pharmaceutical Society of Great Britain, to the members of Parliament for the Borough of Sheffield and to the member for Hallamshire. This motion was also carried.

Votes of thanks were passed to the Chairman and to the local society for the use of the rooms and the meeting terminated.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The usual fortnightly meeting of the Society was held on Monday, February 24, when a lecture was delivered by Dr. George Tate, F.C.S., F.I.C., on “The Chemistry of the Yeast Plant.” The Vice-President, Mr. J. R. Johnson, occupied the chair.

The lecturer first described the chemical changes that take place in infusions of vegetable or animal substances, such as alcoholic fermentation, putrefaction of animal matter, etc., due to bacterial fermentation. The changes that took place in these substances were apparently spontaneous, and it was only during the present century that it had been determined that these changes depend upon the growth of specific organisms. This can be proved by taking a watery infusion of beef or hay that has been filtered, boiling a portion in a flask for some time, and setting it aside, after having plugged the neck with wool; then setting aside another portion that has not been boiled, without taking means to exclude the air. On examination, the infusion that has not been boiled and exposed to the air will be found to have become putrid, and contain a quantity of bacteria, while the portion that has been boiled and protected from contact with the air will be found to be quite sweet. The putrefaction then was due to the growth of minute organisms which were in the air, and these organisms bring about the change in the infusion. Specific changes were brought about by specific organisms called ferments, of which yeast might be taken as a type. The lecturer then described the chemistry of brewing, and the important part yeast plays in it. The chief chemical constituents of yeast were then described as 1, cellulose; 2, protein; 3, phosphates; 4, fat; its life and growth were fully treated.

The lecture was illustrated by means of microscopes, diagrams, and numerous experiments.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the twelfth session was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, February 26, at 9.15 p.m., Mr. A. Russell Bennet, President, in the chair.

The minutes of the last meeting having been read and approved the Chairman called upon Mr. J. Lothian to open a debate on the question—

IS A COMPULSORY CURRICULUM DESIRABLE?

Mr. Lothian, who supported the affirmative, said: There is probably no subject affecting pharmacists about which there has been so much discussion as the one we are to consider to-night. At almost every meeting of the Council of the Pharmaceutical Society it is shown to be the subject that is uppermost. We may, therefore, reasonably expect that as soon as the necessary legislation can be obtained some of the schemes that have been proposed for the compulsory education of the pharmacist will take definite shape. Since the institution of the Pharmaceutical Society, half a century ago, its constant aim has been education, and there is no doubt we owe to it in great measure the improved position we occupy to-day. In spite of all we hear about the good old times the pharmacist of to-day stands in favourable contrast to the apothecary of the olden time. Long before the introduction of compulsory examinations the desirability of a curriculum suggested itself to the early pioneers of pharmacy. I find, for instance, that as far back as the year 1856, at a meeting of the Pharmaceutical Society held in Edinburgh, the following resolution was passed, viz., “That it is expedient in order to assist in carrying out the provisions of the Pharmacy Act to render it imperative that all future apprentices at Edinburgh, etc., where lectures are delivered, shall attend at least one course of materia medica and chemistry, and resolve that this meeting recommend a special clause to that effect in each indenture.” The above is important evidence as showing the convictions of leading pharmacists on this subject nearly forty years ago. The passing of the compulsory Act of 1868 was a decided step forward, and it was expected that the proper education of the pharmacist would be thereby secured. These expectations, as we all know, have not been adequately realised. In 1872 Professor Attfield drew prominent attention to the subject and strongly advocated a definite compulsory curriculum. It certainly seems to be a serious defect that the law should demand compulsory examination, and that there should be no recognition or approval of a definite course of instruction. If there is any calling for which a systematic training is more necessary than another it is certainly that of the pharmacist. Considering the rapid strides made in recent years in the sciences connected with his business his thorough education is a matter of the first importance, whether we have regard to his relation to the medical profession or to the general public. I believe it is the only thing that can ever raise his status or place him above the level of the mere tradesman. There can be no doubt that under present arrangements a great deal of time is wasted by pharmaceutical students, and many opportunities are allowed to slip past which will never occur again. Moreover, knowledge which is hastily acquired merely to pass an examination is often of a very fugitive nature compared with that acquired by systematic study. I have no hesitation in saying that nothing short of a compulsory measure is ever likely to remedy this state of matters. I think it is not out of place to suggest here that the scope of the Preliminary examination should be extended to include mathematics, and French or German. It would be a great advantage to the student in his future studies were this done. Then, with two examinations at intervals of two years or so, the student would be able to overtake fully all the subjects required, and even go a great deal further before he reaches the age of twenty-one: and it would not be so great a strain upon him as taking the whole six subjects at once. If we compare ourselves with pharmacists in France, Germany, or America, we find that we are very much behind them in our methods for securing adequate professional education, and I think all who have the future prosperity of our calling at heart will look forward with expectancy to the time when a uniform and compulsory system of professional training for pharmacists shall be instituted in this country.

The Assistant-Secretary then read the paper of Mr. J. B. McCurrie, who could not be present. Mr. McCurrie, in supporting the negative, said a compulsory curriculum was undesirable, because it would cause an unnecessary increase of expense, and would thus exclude from the trade many clever, plodding men who would, if allowed to enter, do something to raise pharmacy in the estimation of the public. It was also undesirable because there were instances to show that more efficient men had been produced by private tuition and self-study than had ever come out of our learned institutions. Another objection to a compulsory curriculum was the low rate of wages paid to assistants, and it had not been shown that a curriculum would increase them. Moreover the present examinations were a sufficient guarantee to the public, and there was no necessity for anything more. His version of the reason for a compulsory curriculum was simply that the Pharmaceutical Society wanted to make money. Money was the root of all evil, and therefore the desire for an enforced curriculum was evil.

The discussion which followed was taken part in by Messrs. Bennet, Duncan, Findlay, Henry, Hill, Lunan, Rawlinson and Robertson, all of whom spoke in favour of the affirmative. On being put to the meeting one apprentice voted in favour of the negative, and the affirmative was declared carried by an overwhelming majority.

On the motion of the Chairman the thanks of the meeting were cordially awarded to Messrs. Lothian and McCurrie.

Mr. Hill then gave a demonstration entitled "Back Shop Experiments," illustrative of typical chemical and physical phenomena, and specially designed for the benefit of the junior members.

On the motion of the Chairman a hearty vote of thanks was awarded to Mr. Hill.

Owing to the lateness of the hour a series of "Laboratory Notes," by Mr. C. F. Henry, were postponed till next meeting, which will take place on March 12.

The meeting then closed.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The last of the Musical and Social Evenings of this Association was held on Thursday evening, Feb. 27, in the Art Rooms, Reform Street, Ex-Bailie Doig, Hon. Vice-President, in the chair. There was a very large attendance of the assistants and their friends; also one or two local chemists. A very lengthy programme of vocal and instrumental music was gone through in a very able manner, and the meeting proved in every sense throughly enjoyable. In acknowledging a vote of thanks at the close, Mr. Doig expressed the pleasure he felt in being present on that occasion. He hoped the Association would see its way to continue the series of Musical Evenings. They were of special benefit to chemists' assistants, than whom, he said, there was not another class of young men more confined, and they helped to make up for his inability to take advantage of other such amusements owing to late hours. He regretted this late hours' question very much and earnestly hoped that ere long chemists would see their way clear to close earlier in the evening. The Bailie's remarks were received with great applause. After the usual votes of thanks the company broke up.

Correspondence.

⁂ No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

Patent Medicines.

Sir,—A ship's captain who had undertaken to give up swearing, having become very angry with one of his men, shook his fist in the man's face, stammered for a moment, and then said, "Bless your eyes!—but you know what I mean." Without any of the subtleties of philological learning the sailor knew quite well that "bless" under the circumstances meant a very big "D.," and that the true meaning of a word is the meaning it is intended to convey.

Pharmacists are at present interested in ascertaining the meaning of the word "patent" as applied to medicines in the Pharmacy Act. There would not be much gained by dictionary definitions, or by the evidence of how the word is used in connection with medicine duties, but it is to the point to keep in mind the circumstances which guided the construction of the Pharmacy Act.

The fear of a powerful opposition to the proposed Bill from a very numerous body of proprietors of "patent medicines" induced the framers of that measure to insert the clause exempting from interference all patent medicines. The general utility of the measure was thus very much weakened. But vested interests were not touched, and opposition from owners of "patent medicines" ceased to threaten. Now who were these owners of patent medicines who were felt to be so formidable? Look to the specifications of patents and you do not find them. Look to the catalogue of a patent medicine warehouse, and you do find them, I do not say by hundreds, but by thousands, and with the consciousness that there are other thousands behind these, who would be unwilling that their proprietary preparations should be interfered with by the Pharmacy Act. "They would put the Government stamp on them rather than that."

This was the opposition that was bought off, and would not have been bought off if the exemption had applied only to medicines patented under the great seal. If a reconstruction is now to be put upon the meaning of the clause, the far reaching character of the change will not have to be overlooked, nor the opposition of those who have vested interests in proprietary medicines. It would quite accord with my views of what is right, that there should be no exemption of nostrums from the provisions of the Pharmacy Act. And I can see a fair reason to regard with more consideration medicines which were made under letters patent, as in that case particulars must be given in the specification of the patent, open to anyone whom it might concern, but the specification of composition is only one step, and a very small one, towards protecting the public against the danger of poisons. And on the other hand the patentee, having protection for his preparation for a term of years, would be less disadvantaged by interference than one who had no protection but that of secrecy.

The whole system of secret medicines is a sacrifice of the public good to the interests of the individual, and there is very little hope of any satisfactory legislation so long as it is sought to be promoted in the interests of individuals as against the more general good. The repeal of the Medicine Stamp Acts and the removal of any exemption from the provisions of the Pharmacy Act would be two steps towards a better state of things. The Pharmacy Act is so full of weak joints that there is little hope of tinkering it into a good workable machine; but if a good point could from time to time be secured, a point true in principle, and consequently permanent in practice, another century might see us progressing favourably.

BARNARD S. PROCTOR.

UNIVERSITY DEGREE FOR PHARMACISTS.

Sir,—The earlier portions of Mr. Johnston's most courteous communication require no further comment from me. I will say, however, one thing, *i.e.*, I should be exceedingly sorry to see the "Pharmaceutical Society. . . . . considerably weakened through loss of examination fees," my motive in following up the suggestion of Professor Fraser merely being to elevate the pharmacist by every possible way and means. I do not think this "weakened" state need be feared: taking for our example the College of Surgeons we do not find it so there.

The explanation which Mr. Johnston asks for, *re* sanitary science, is, the medicos should have special knowledge in the medical branches, whilst the chemists should have special chemical knowledge bearing on sanitary science, and, indeed, upon such points should be looked to as a consultant. That the pharmacist should act as an inspector of nuisances is obviously absurd, being far too highly educated to hold such a position, except, perhaps, in the case where a presumed chemist does not know when saffron is adulterated; possibly, however, this might be expected from a certain class of non-examined men, but certainly not from an examined man of the present day.

86, *Newington Causeway, S.E.* FREDERICK DAVIS.

Sir,—Being considerably interested in the subject of a university degree for pharmacists I was pleased to see that the matter had been discussed by the Chemists' Assistants' Association, because should the movement prove successful, it is probable that that enterprising society would provide the first pilgrims to Burlington Gardens. From the report in the Journal, however, I see there has already been raised the question of pecuniary advantage, which it seems to me will be greatly in danger of wrecking any effort in the direction of university distinction. What will the public think of the graduate in pharmacy if it only becomes acquainted with his new title through the medium of his labels and counter bills? I venture to say that the present "pecuniary advantage" to a medical man or student in arts is very small and grows yearly less. How many of a doctor's patients stop to inquire where or how he obtained his necessary qualification? What is the cry for second class clergy, raised just now in the *National Review* in the interest of those who have taken high honours at their university, but an admission of the same fact? It is just because the only use made of the Major qualifiation by its possessor is to advertise himself at the expense of his Minor brother across the street, who is often as good a chemist as himself, that the membership of the Pharmaceutical Society is so lightly esteemed by even the educated public. The motive for obtaining this new title must be love of their science and the honour of the reward, and aspirants must be prepared to be placed upon the same footing as candidates in other branches. They must expect no back door to be open in their favour if they would have any distinction from their degree when they obtain it. As one speaker pointed out, matriculation would doubtless be insisted upon, and under the regulations now in force this would be no very great hardship. I think that most will agree with the general feeling of the meeting that it is highly desirable some academic recognition should be made of the scientific work which the modern pharmacist is called upon to engage in. Though organic chemistry, botany and physics "finals" in the present examination for a degree in science can scarcely be said to be "outside the sphere of the pharmacist," undoubtedly the mathematics required previously are not in his province, and as examiners are already appointed and papers set yearly by the London University in materia medica and pharmaceutical chemistry it seems very probable, as Mr. Davis remarked, that if representations were made by the proper authorities, a London degree would soon be open to those pharmacists who were willing to work honestly for it.

M. P. S.

GHATTI MUCILAGE.

Sir,—In Mr. Maben's interesting and valuable "Notes on some Gum Samples," published in the last issue, a statement of mine respecting ghatti gum is disputed. All the samples of Indian gums I investigated were given by Mr. E. M. Holmes from the Society's Museum, and certainly mucilage prepared from ghatti was as free from taste as that afforded by the finest Kordofan gum. For use in the pharmacy each supply obtained from the wholesale houses has varied, and within the last twelve months some pieces have had that peculiar mawkish flavour mentioned. These I consider as admixtures of gums from other sources than *Anogeissus latifolia*, and I am convinced, to repeat my former statements, that were ordinary care taken in collection, etc., ghatti would satisfactorily meet all pharmaceutical requirements.

The mucilage prepared as follows:—

"Ghatti gum . . . . 6 ozs.
Distilled water. . . . . 18 ozs.

Stir occasionally till dissolved and strain through muslin," only needs to be known to be appreciated as a suspender of insoluble powders, and especially as an emulsifying agent.

Belle Vue House, Malvern. ALFRED MANDER.

SUPPOSED FORMATION OF QUININE CARBONATE.

Sir,—In the condensed report, at page 723 of the Journal, of the point brought before the last Evening Meeting in Edinburgh by Mr. Lunan, as to the solubility of quinine in aerated waters, it is not stated that in his letter to me Mr. Lunan said he had made experiments with a view to the isolation, if possible, of the carbonate of quinine probably formed. I mentioned that he had not had time to complete his experiments, but would probably be able to make a statement himself at a future meeting. I think it would have been more fair to Mr. Lunan had this been mentioned in the report, and as I am responsible for the omission, I shall feel obliged by your insertion of this explanation. J. RUTHERFORD HILL.

NOTICES.

School of Pharmacy Students' Association.—The next meeting of this Association will be held on Thursday, March 13, when Mr. A. Gunn will read a paper on "Home made Telephones and other Apparatus," and Mr. E. J. Eastes will give a Report on Physics.

Chemists' Assistants' Association.—At the next meeting of this Association on Thursday, the 13th inst., a paper will be read by Mr. C. F. Rideal, on "Dickens's Heroines and Women Folk."

A. Crick.—*Pharmaceutical Journal* for October 12, 1889, and January 18, 1890.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Dott, Farrer, F. Reynolds, Thresh, Groves, Johnston, A Birmingham Reader.

REPORT ON RECENT DONATIONS TO THE MUSEUM.*

BY THE CURATOR.

OIL OF CINNAMON LEAF.

A specimen of cinnamon leaf oil has been presented to the Museum by Mr. J. J. Sharp as one of guaranteed purity, prepared from the unfermented leaves, and therefore suitable for scientific investigation. The cinnamon plants from which the oil has been obtained were grown in Mahé, one of the Seychelles Islands, where also cloves, vanilla and other spices are under cultivation (*Pharm. Journ.*, [3], xvi., p. 1045).

The chief points of interest attaching to this product are:—

1. That the oil of cinnamon obtained from the leaves, bark and root respectively, differs in composition in each case, that of the leaves containing chiefly eugenol, a hydrocarbon having an odour of cymene, a little benzoic acid and some cinnamic aldehyde, the stem bark yields an oil consisting chiefly of cinnamic aldehyde and a variable quantity of hydrocarbon, whilst the oil from the root contains cinnamic aldehyde, hydrocarbon and ordinary camphor.

2. The respective value of the oils is very different, that of cinnamon bark being worth about eighteen times as much as the oil of cinnamon leaf. Now the elaboration of plant products probably commences in the leaves, is carried on further in the bark, and is completed in the root. The chemical changes thus brought about by this plant seem to indicate for the modern chemist a line of investigation that might be followed with profit and could not fail to lead to interesting results.

3. In some remarks on cinnamon oil published by Messrs. Schimmel and Co. (*Pharm. Journ.*, [3], xviii., p. 888), it is stated that "cinnamon oil of fine quality when dropped into cold water should sink, and should develop an intense sweetness far exceeding that of sugar, when brought into contact with the tongue. With an inferior quality a clove-like taste is first developed, and after a time a slight sweetness." It might be inferred from the test here given that the clove-like oil is not heavier than water. This, however, is not the case. It sinks readily in water, being, indeed, according to 'Pharmacographia' rather heavier (sp. gr. 1·053) than oil of cinnamon (sp. gr. 1·035), a very small proportion rising to the surface when the oil is shaken with water. The oil of cinnamon leaf was examined so long ago as 1854 by Dr. Stenhouse (*Pharm. Journ.*, [1], xiv., p. 329), but the proportions of eugenol and the other constituents do not appear to have been determined by him.

WHITE MOGADOR GUM.

This gum appears to be identical with that described by Mr. Maben in his recent paper (ante, p. 719). In appearance and character it closely resembles the best Kordofan gum, having the same opaque surface and minutely cracked interior. It also dissolves readily in water. A gum almost exactly similar in appearance to this, came into English commerce some years ago, but gave a glairy mucilage, and I would therefore direct attention to the importance of always ascertaining the solubility of gum arabic in water before purchasing it in quantity. In my opinion this gum is not produced in Morocco, for the gum from that country, commonly known as Barbary, Morocco or Mogador gum, has a remarkably clear transparent appearance and is not opaque, but lustrous on the surface. The Senegal gum also, which is produced in the neighbouring country to the west, and that imported from the West African coast are all more or less clear and free from cracks internally. It seems probable that it comes from East Africa, and that since the late troubles in the Soudan the gum has found a fresh outlet at Mogador.

NOTES ON RECENT RESEARCHES ON THE OIL OF BETEL LEAVES.*

BY D. S. KEMP, F.C.S.

The *Piper Betle*, L. (*Chavica Betle*, Miq.), is a creeper extensively grown in India and the Malay Peninsula, being very commonly trained on the trunk and branches of the *Æschynomene grandiflora*, a quickly growing tree, in the neighbourhood of villages and in plantations. The leaf, well known as betel leaf, has long been in universal use in these countries as a masticating stimulant and aromatic. The preparation known as "pân supari" (*pân*, betel leaf, and *supari*, areca or betel nut) consists of a betel leaf made into a triangular packet, enclosing fragments of areca nut and catechu with a smearing of wet lime. Cardamoms, nutmeg, cloves, camphor, and other aromatics are a common addition. Thus prepared it is an article of constant use for chewing among all classes. There is often a sense of languor when deprived of it; it is a staple amenity in social life; and, on occasions of ceremony, it is served gorgeously done up in gold leaf. When chewed it colours the saliva red, and, while it does not improve the appearance of the mouth, it is an undoubted antiseptic and stimulant, and is said also to improve the voice.

As an article of commerce, betel leaf is always green and fresh, and in transporting or storing it, great care is taken, by frequent airing and wetting, to maintain its fresh appearance. For sale the leaves are sorted one by one, the damaged rejected, and the others, tied in small bundles, are priced according to size and quality.

The composition of betel leaf has not, to my knowledge, been thoroughly investigated. In 1885 I obtained from it by distillation two volatile oils, a heavy and a light, and it is in connection with these products, round which considerable interest is gathering, that I write these notes.

Professor Eykman, and Messrs. Bertram and Gildemeister of the firm of Schimmel and Co., have both obtained volatile oils, the former from fresh, the latter from dried leaves, but in neither case was the product obtained in two separate portions of different specific gravity. My experiments were performed in June, 1885, when 152 pounds of fresh leaves of mixed quality, as obtained in the market, by being distilled in several portions, using the same original water throughout, yielded me 3 fluid ounces of oil of specific gravity (*without corrections*) 1·039, and 2¼ fluid drachms of a light oil, the former sinking and the latter floating in the water of the receiver. Specimens of both of these oils, now before you, were presented to the Society's Museum by Professor Dymock. Of the heavy oil, distilled by me, Mr. Prebble, of Messrs. Kemp and Co., Limited, some time ago wrote to me as follows:—"I took the specific gravity of this oil *very correctly* about twelve months after distillation, and found that it was 1·046. It was of a very pale yellow colour, and a rotation for a column of 200 mm. of − 1·04. It was freely soluble in spirit and commenced to boil a little above 100° C., the boiling point rapidly rising, and the oil afterwards acquiring a darker hue. . . . . After boiling with access of air the oil did not lose its characteristic odour." The initial low boiling point mentioned by Mr. Prebble was probably owing to the presence of water. Quite recently he has again written to me reporting that on January 16 last he distilled 90 lbs. of fresh betel leaves, and obtained therefrom 1¼ fluid ounces of a pale green oil of specific gravity 0·9404 at 28° C., and *no heavy oil*. After keeping this oil a few days it changed to a dark brown colour.

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* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, March 12.

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It would appear from the above as if in January, in the middle of the dry and cold season, the yield of oil were small and consisted only of the light variety, while in June, in the hottest weather and at the commencement of the rains, the yield were large, and mainly heavy oil. It is difficult to account otherwise for the disparity in the yield of the two distillations. I have every reason to believe that my leaves were unadulterated, and this is borne out by the nature of the oils obtained, as well as by an argument of Professor Eykman's, that the betel chewing Orientals would be very unlikely to permit adulteration in their favourite aromatic.

The investigations of Professor Eykman on this subject, as described in his paper in the Journal of the German Chemical Society of November 11 last, as well as those of Messrs. Bertram and Gildemeister, as reported in the *J. für. Prakt. Chemie*, 1889, p. 439, invest the oils of betel with special interest, and it seems worth while to give a brief abstract of the results obtained by these chemists.

By distilling with "cohobation" a large quantity of betel leaves in the Botanic Garden of Buitenzorg (Java) Eykman obtained a proportionately very small quantity of volatile oil, clear, pale greenish yellow in colour, becoming under exposure to air a golden yellowish brown, and with the characteristic aroma of the leaf; in taste strongly burning, but agreeable and exhilarating, recalling mint, lemon, and something like creosote. It was lævorotatory (− 3·5 for 200 mm. by sodium light), and had a specific gravity of 0·959 at 27° C. Shaken with KHO solution about a third was dissolved with gradual assumption of a brown colour, and from this solution diluted sulphuric acid precipitated a brown phenol. For purification this phenol was redissolved in KHO solution, shaken with ether, which removed a small quantity of oil of a pronounced mint taste, reprecipitated with acid, and dissolved in ether, which now left a little brown resin. The ethereal solution, after washing with water, was evaporated and the residual phenol fractionally distilled. Finally, the product distilling at about 237° C. was considered a pure phenol, and to this substance, which constituted the main bulk of the phenolic liquid, Eykman gave the name of *Chavicol*. In this portion of the investigation therefore there were obtained chavicol, higher boiling phenols, oil tasting of mint, a brown resin.

The residual oil freed from phenols by KHO was fractionally distilled. The lower boiling portions, (173°-176° C.) had a very fine lemon-like aroma, a sp. gr. 0·848 at 16° C., and a rotation of − 5° 20′ in 100 (200 ?) mm. That possessing the highest boiling point, being brought to a constant of 260° was a colourless hydrocarbon, of no distinctive odour, sp. gr. 0·917 at 13° C., and was found to be a sesquiterpene, $C_{15}H_{24}$. The intermediate portions were not determined, but were believed to contain cymol, cineol, and menthon or menthol. Thus the non-phenolic bodies found were—terpene, with a limonene boiling point 173° to 176°; sesquiterpene, boiling at 260° C., probably cymol, cineol, and menthon or menthol.

Of these various constituents thus separated by Eykman from betel oil, the one to which the greatest interest attaches is the phenol named by him, *chavicol*, boiling at 237° C.

This was a colourless liquid of a peculiar, somewhat creasotic odour, soluble in alcohol, ether, chloroform and petroleum ether, and in KHO solution; very slightly soluble in water or ammonia. In fully saturated aqueous solution it gives a blue colour with ferric chloride, disappearing on the addition of alcohol. It is not solidified by a temperature of − 25° C. Specific gravity 1·041 at 13° C., and 1·034 at 25° C. By oxidation with permanganate, oxalic acid was yielded, and its analysis, together with refraction and vapour density determinations, gave the composition of its molecule as $C_9H_{10}O$.

Two substitution products were obtained, ethylchavicol C_9H_9O,C_2H_5, and methylchavicol, C_9H_9O, CH_3, both colourless fluids and possessing the odour of anise, like anethol. By oxidation with permanganate, methylchavicol yielded anisic acid, from which it was concluded that chavicol contains the group C_3H_5 in the para position. Eykman further shows that this is a normal allyl group and that chavicol has the constitution

$$C_6H_4\begin{cases}OH\ (1)\\C_3H_5\ (4)\end{cases}\text{para-allyl-phenol.}$$

The apparent identity of chavicol with *Anol* and of methylchavicol with *Anethol* will at once be seen; an identity, however, not borne out by their melting points, anol and anethol being easily obtained as crystals, while the new bodies could not be solidified at a temperature of − 25° C.

Trials were made with chavicol to test its power as an antiseptic, compared with the allied bodies ordinary phenol and eugenol. Gelatine cultures of various bacteria were prepared, and the average proportions of the three antiseptics required to arrest further development are shown in the following table:—

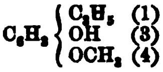
	Phenol. p.c.	Eugenol. p.c.	Chavicol. p.c.
Micrococcus, B.B.	0·5	0·12	0·07
Micrococcus prodigiosus . . .	0·2	0·08	0·04
Staphylococcus aureus . . .	0·25	0·08	0·05
Bac. febr., typhoid	0·15	0·05	0·025
Vibrio Koch, . . . under	0·1	0·03	0·02

Showing that chavicol is about five times stronger than phenol, and twice the strength of eugenol as a bacteria poison.

The higher boiling phenols associated with chavicol were marked by giving a deepish blue in alcoholic solution with ferric chloride (a character of eugenol), but were not further determined.

The above are the main results of Eykman's examination of the oil obtained by him. The heavier oil, distilled from dried leaves by Schimmel and Co., is reported on fully in Bertram and Gildemeister's paper above mentioned, and is also the subject of a portion of Eykman's remarks.

The leaves were obtained from Bangkok (Siam), and yielded ½ per cent. of oil. The latter was a brownish fluid of a pleasant aromatic flavour, specific gravity 1·024 at 15° C. Treated with soda ley it yielded about 70 to 75 per cent. of a phenol. Impurities in this phenol were removed by first distilling it at 12–13 mm. pressure, when it came over at 131°–132°. It could then be distilled at ordinary pressure with very little change at 254°–255° C. This substance, named by them *Betel-phenol*, is an oily, colourless, strongly refracting fluid of a persistent flavour, gives an intense greenish blue in alcoholic solution with ferric chloride, more inclining to green than the same reaction with eugenol; and its analysis yielded the formula $C_{10}H_{12}O_2$. They obtained acetyl and benzoyl derivatives and a methyl ether. They identified the latter with the similar ether yielded by the eugenols, and having obtained iso-vanillic acid from the first derivative by oxidation, and removal of the acetyl group, they were able to arrive at the following formula, which is also that of iso-eugenol,



$$C_6H_3\begin{cases}C_3H_5 & (1)\\ OH & (3)\\ OCH_3 & (4)\end{cases}$$

and they attribute its non-identity with iso-eugenol to a difference in the constitution of the C_3H_5 group.

The residual liquid after removal of phenol from the oil was washed and fractionally distilled. The bulk of it, a light yellowish oil with an agreeable tea aroma, came over at 200°–250°, and by treatment with hydrochloric acid yielded a sesquiterpene dihydrochloride ($C_{15}H_{24},2HCl$) having the same melting point as that yielded by the portions boiling at 270° of cubeb, savin, patchouli, and other oils. The sesquiterpene they consider is probably *cubebene*.

Eykman has given the two following tabular statements of what he finds the respective characters of his and Schimmel's oils and phenols, that firm having sent him samples:—

Volatile Oil.	Schimmel and Co.	Eykman.
Colour . . .	Deep brown.	Colourless, then pale green to yellowish.
Aroma . . .	Not recognizable as *betel* aroma, but as ordinary dried tea-leaves.	Very agreeable, strong, exhilarating, pure betel aroma.
Specific gravity	1·024 at 15° C.	0·969 at 15° C.
With KHO solution . . .	There is produced a darkish colour.	Colour gradually darkens, brown to purplish.
Boiling point after elimination of phenol .	Only a few drops distilled under 200°, a small part between 200° and 250°, the bulk from 250° to 275°.	Considerable part distilled between 173° and 190°, a considerable quantity between 190° and 250° and between 250° and 265°.

Phenol.	Schimmel.	Eykman.
Aroma . . .	Weak, somewhat of a cinnamon kind, not reminding of betel.	Agreeably strong, with a peculiar betel aroma somewhat creasotic.
Specific gravity	1·067 at 15° C.	1·030 at 15° C.
Boiling point	254°–255° (uncorr.)	236°–238° (uncorr.)
Solubility in water	Very little.	About 3 or 4 times more.
Saturated watery solution with ferric chloride.	Not coloured.	Blue colour.
In alcoholic solution with ferric chloride.	Deep blue.	Scarcely coloured blue.
With 32 per cent. KHO (standard volume)	Separates as an oily potassium salt.	Forms a clear solution.

It appears from these researches that the chief constituents isolated from the betel oils, stated in the order of their boiling points are, *terpene* (lævo-rotatory limonene?) boiling point 173°–176° C., *chavicol*, boiling point 237° C., *betelphenol*, boiling point 254°–255° C., *sesquiterpene*, boiling point about 260° C. Eykman's oil distilled from the green leaves appears to have contained all four substances, but Schimmel's distilled from dried leaves only contained the two last; at all events as chief substances.

As above stated Eykman's leaves were grown in Java, Schimmel's in Siam. Bertram and Gildemeister's paper was based on the product of a second supply of dried leaves imported by Messrs. Schimmel and Co. from Siam, and they do not allude to any difference in the nature of the oils yielded by the first and second importations.

Possibly the oils obtained in the Bombay distillations of June and January may help to throw some light on the somewhat discordant results of these chemists. It still remains to be explained why, in Bombay, betel leaves should show so much variation in their yield of volatile oil in different hands and at different seasons.

[*The discussion on this paper is printed on p.* 759.]

RESIN SOAP AS AN EMULSIFYING AGENT.*

BY H. COLLIER.

I desire to bring under notice the emulsifying properties of a compound formed by boiling yellow resin with a solution of sodium hydrate, and which I venture to think will be a useful addition to our stock of emulsifying agents. The term soap is here applied to the combination of the acids of resin with alkaline bases, the resulting compound being present, as is well known, in all common yellow soap.

This resin soap I have prepared by boiling gently for two hours, in an evaporating dish, 1800 grains of resin with 300 grains of caustic soda, dissolved in one pint of distilled water. Upon cooling the soap separates as a yellow pasty mass, which is drained from the liquid, well squeezed, then heated on a water bath until it becomes dry and friable, and finally rubbed to powder in a mortar. Made in this way the soap is somewhat like powdered yellow resin; it is soluble in water and rectified spirit; from concentrated solutions prepared by heat, part of the soap separates on cooling, but gelatinization never occurs. The taste is resinous and somewhat acrid. Five grams dissolved in water, the solution acidulated with hydrochloric acid, and the liberated resin acids separated by ether, after drying, weighs 4·22 grams, corresponding to 84·4 per cent. of resin.

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* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 12.

Mercury shaken in a bottle with a solution of resin soap is immediately broken into very minute globules: as long as this divided mercury is kept moist with the solution, it will not run together. Each globule is coated with a layer of soap, which completely prevents it from coalescing with its neighbour. Chloroform shaken up in the same manner is converted into a permanent cream-like liquid. Ordinary soap and tincture of quillaia act in a similar manner upon mercury and chloroform; in fact, this experiment is a proof of the fact that these substances possess the essential property of an emulsifying agent. Resin soap, compared with sapo durus and sapo mollis B.P., has a more powerful emulsifying effect upon oils, etc., and it possesses also the great advantage of not becoming gelatinous. Compared with tincture of quillaia it appears to give greater viscosity to liquids, so that suspension of the emulsified oil, etc., is more perfect.

A solution of coal tar may be prepared on the lines of the B.P.C. formula for liq. picis comp.:—

Resin soap	2 ozs.
Rectified spirit	1 pint.

Dissolve the soap in the spirit by means of a gentle heat and then add—

Prepared coal tar	4 ozs.

Digest at a temperature of 120° F. for two days, allow to become cold, and decant or filter. This solution poured into water forms a perfect emulsion, which does not separate either upon dilution or standing. In the same way can be prepared emulsion-forming solutions of pix liquida, oleum cadinum and balsam of peru. The fixed oils, cod liver, almond, olive, and castor, have been emulsified according to the following formula:—

Oil	1 fluid ounce.
Resin soap	10 grains.
Water	1 fluid ounce.

Dissolve the soap in the water, and shake with the oil. The oil is perfectly emulsified, and there is no separation into layers, even after long standing. It is possible to make an excellent emulsion with only 5 grains of soap, but a separation into a cream and a milky liquid occurs in time. Oleum terebinthinæ, oleum pini sylvestris, oleum pini pumilionis and pure terebene, when emulsified, are miscible with water in any proportion without separation. This emulsive form will, I think, be found very useful for the preparation of inhalations of volatile oils. These emulsions have been prepared according to the following formula, which is the same strength as vapor olei pini sylvest. B.P., resin soap taking the place of the magnesium carbonate.

Volatile oil	ʒij.
Resin soap	10 grains.

Water sufficient to produce 3 fluid ounces.

Dissolve the soap in the water, and shake with the oil. Creasote requires double the amount of soap for perfect emulsification compared with the above volatile oils.

Spirit of camphor containing 5 grains of resin soap in each fluid drachm can be mixed with water, and the camphor remains perfectly suspended. Tincture of tolu with the same quantity of soap is also miscible with water in the same manner. Thymol prepared as follows does not separate on the addition of water:—

Thymol	18 grains.
Rectified spirit	3 fluid drachms.
Resin soap	20 grains.

Water sufficient to produce 3 fluid ounces.

Dissolve the thymol and soap in the spirit, add the water and shake together.

Oleum santali and copaibæ are emulsified thus:—

Copaiba	1 fluid drachm.
Resin soap	10 grains.

Water sufficient to produce 1 fluid ounce.

I have now given a sufficient number of examples to show that resin soap does possess valuable emulsifying properties which, for certain purposes in pharmacy, may be found useful.

[*The discussion on this paper is printed on p.* 760.]

THE ESTIMATION OF ETHYL NITRITE IN SPIRIT OF NITROUS ETHER.*

BY JOHN C. THRESH, M.B., D.SC.

So many processes have been devised for determining the strength of spirit of nitrous ether that an apology almost seems necessary for the introduction of another. If, however, we criticize from the pharmacist's point of view any or all of these processes, I think we shall find that there are none without defects, some requiring special apparatus, others giving only roughly approximate results. A process requiring no apparatus beyond that which should be found on the laboratory bench in every pharmacy, requiring no special reagents or volumetric solutions, and capable of yielding results in the hands of the pharmacist as accurate as those of any official process, would therefore be acceptable. It is because I believe the method I am about to describe fulfils all these requirements that I venture to publish it.

Eykman's process, which "consists in the measurement of the volume of nitric oxide given off when the spirit is heated with an acid solution of ferrous sulphate," undoubtedly gives trustworthy results, but it requires special apparatus and considerable manipulative skill. Dott justly says of it, "whilst excellently suited for the analytical laboratory it is not well adapted as a Pharmacopœia test."

In Allen's process the spirit is mixed with a solution of potassium iodide and dilute sulphuric acid, and the liberated nitric oxide measured. This also requires special apparatus, and in order to obtain strictly accurate results corrections have to be made for temperature and barometic pressure, solubility of the nitric oxide in the brine used, and for the vapour tension of the alcohol. Still, without any of these corrections the results are sufficiently approximate for most practical purposes.

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* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 12.

Dott has suggested a method of estimating the ethyl nitrite by titrating with hyposulphite the iodine liberated when a measured quantity of the spirit of nitrous ether is added to a solution of potassium iodide and sulphuric acid in dilute alcohol. The process can only give even approximate results by one serious error compensating another. Upon mixing the spirit of nitrous ether, acid, etc., in an open basin there is a brisk effervescence, and a very considerable proportion of the ethyl nitrite is carried away. To compensate for this error the mixture is allowed to stand for half an hour exposed to the air, whereby oxygen is absorbed with great rapidity, an equivalent quantity of iodine being liberated.

Dunstan and Dymond make use of the same reaction, but conduct the operations in the entire absence of air in a vacuous flask, the ebullition of the acid liquid to which the nitrite solution is afterwards added also ensures the reagents being free from dissolved oxygen. This process yields accurate results, but is quite unsuited for the use of the ordinary pharmacist.

The process I have devised is also based upon the estimation of the iodine liberated by the interaction of the nitrous and hydriodic acids. The disturbing influence of atmospheric and dissolved oxygen is avoided by working in an atmosphere of coal gas, and with reagents free from dissolved oxygen. A short time ago, when experimenting upon the estimation of nitrites in potable waters, I was led to examine several samples of sodium nitrite, and found the following method work admirably.

A known quantity (about ·1 gram) of the nitrite to be examined is dissolved in from 250 to 300 c.c. of water, about 1 gram of potassium iodide and a few drops of starch mucilage added, and the whole boiled in a flask for a few minutes. The flask is then closed with a rubber stopper having two perforations. Passing through one is a piece of glass tube, which, by means of a short length of caoutchouc tube, is connected with the gas supply on the bench. The gas is turned on, and after passing a few seconds the second opening in the stopper is plugged with a short piece of glass rod. The flask and its contents are then allowed to become quite cold (this may be hastened by immersion in cold water), the glass plug removed, and 5 c.c. of dilute sulphuric acid (B.P.) added by means of a pipette. The nozzle of a burette charged with standard hyposulphite is now passed through the opening, and the solution run in carefully until the blue colour is discharged. The iodine estimated corresponds to that liberated by the action of the nitrous acid *plus* that due to the free oxygen in the hyposulphite solution. When very accurate results are desired a correction must be made for the latter. This is effected by deducting ·01 c.c. from each c.c. of volumetric solution used, or, what is the same thing, deducting 1 per cent. from amount of nitrite found. I have examined samples of sodium nitrite from four different sources, and the results will show the degree of accuracy obtainable by this process.

Sample 1.—Small colourless crystals, quite dry.

Amount taken ·100 gram. Amount found ·10005.
" ·200 " " ·19934.
" ·100 " " ·10012.
Mean 99·95 per cent.

Sample 2.—Resembling No. 1 in every respect.

Amount taken ·200 gram. Found ·2000.
" ·200 " " ·2002.
Mean 100·1 per cent.

Doubtless both the above were chemically pure.

Sample 3.—Resembled 1 and 2, but not quite dry.

·100 gram taken. ·0957 gram found.
·100 " ·0956 "
·200 " .1919 "
Mean 95·76 per cent.

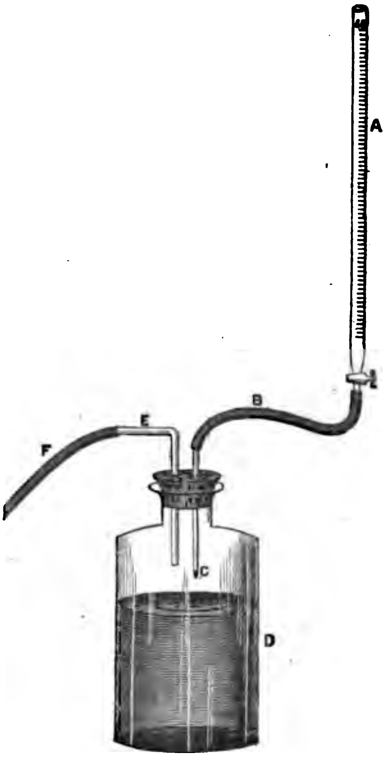
Sample 4.—Crystals rather larger, not so well defined.

·100 gram taken. ·0979 found.
·100 " ·0982 "
·200 " ·1945 "
Mean 97·8 per cent.

These results I think leave little to be desired.

A modification of this process may be used for the assay of spirit of nitrous ether; merely adding 5 c.c. of the spirit to be examined to the water, etc., after it has been boiled and cooled, and titrating as before. I however prefer another modification, which I will at once proceed to describe.

Take a flask or wide-mouthed bottle, capable of holding about 350 c.c., and in this place about 250 c.c. of tap or distilled water, add about 2 grams of potassium iodide, a few drops of starch solution and 10 c.c. of dilute sulphuric acid. Have ready a rubber stopper with gas connection, etc., such as I have just described (*vide* illustration).



Insert the stopper and depress the tube E until the end is about half an inch beneath the surface of the liquid in the bottle and pass a brisk current of gas for ten minutes. The escaping gas can be ignited at the end of a piece of glass tube pushed through the second aperture in the stopper. Now remove this tube, after extinguishing the gas and raising the tube E until the end only just projects below the lower surface of the rubber stopper and introduce into the flask 5 c.c. of the spirit of nitrous ether by means of a pipette with stem sufficiently long to reach to the bottom of the bottle. The pipette should slip easily through the aperture and yet allow of no escape of gas or vapour. As soon as the pipette is pushed through the stopper the gas must be turned off. Allow the spirit to flow into the flask very slowly indeed, at the same time imparting a gentle rotatory motion to the liquid in the flask. There must be no shaking, no appearance of effervescence, or the results will be inevitably too low from loss of the volatile ethyl nitrite.

The gas tap must be turned now and again for an instant to relieve the pressure within the bottle and allow the spirit to flow in. The whole of the spirit having been introduced the pipette is withdrawn, the burette tube "C" quickly inserted, and the hyposulphite run in until the colour of the solution is discharged. All violent agitation must be avoided, otherwise nitric oxide is evolved with visible effervescence, and a loss of iodine ensues; a gentle rotatory motion is quite sufficient.

A second determination is made by simply introducing another 5 c.c. of the spirit with the same precautions as before, and repeating the titration. If the spirit contain less than 1·5 per cent. of ethyl nitrite a third determination may be made with the same solution.

Each c.c. of volumetric solution used (less 1 per cent.) corresponds to ·075 milligram of $EtNO_2$, or as 5 c.c. of spirit of nitrous ether to have been used.

No. of c.c. hypo. × ·15 = grams of ethyl nitrite in 100 c.c. of the spirit.

The correction (1 per cent.) for the oxygen dissolved in the volumetric solution is so small that it might be disregarded were it not so easily effected.

The process as above described gives results uniformly a little higher than those I obtain with Allen's nitrometer. To determine the accuracy of the method some pure ethyl nitrite was prepared by the modification of Hare's process suggested by Dunstan and Dymond. Its specific gravity at 9° C., compared with water at the same temperature, was ·906; 5 c.c., therefore, at this temperature weighed 4·53 grams, and this quantity was carefully added to sufficient rectified spirit to make 200 c.c. 100 c.c. of this solution should contain 2·265 gram of ethyl nitrite. Solutions of other strengths were made in a similar manner. The following determinations were made in pairs, as above described, and the samples were at the same time examined by Allen's method.

Series A.—5 c.c. of solution containing—

		Thresh.	Allen.
2·265 gram $EtNO_2$ in 100 c.c.	a	2·21	2·10
"	b.	2·21	
"	a.	2·22	2·07
"	b.	2·205	
Mean		2·21	2·085

Series B.—5 c.c. of solution containing—

·453 gram $EtNO_2$ in 100 c.c.	a.	·46	·43
"	b.	·47	
"	a.	·46	·41
"	b.	·47	
Mean		·465	·42

Series C.—Same sample as used in Series A,

but after keeping three days	a.	2·19	2·145
"	b.	2·175	
"	a.	2·19	2·115
"	b.	2·15	
Mean.		2·18	2·13

Series D.—Sample C, diluted with

an equal vol. of alcohol	a.	1·10	1.00
"	b.	1·08	
"	a.	1·10	·99
"	b.	1·08	
Mean.		1·09	·995

Series E.—5 c.c. of solution containing—

4·53 gram $EtNO_2$ in 100 c.c.	a.	4·52
"	b.	4·49

The solution of potassium iodide and acid may be deprived of its oxygen also in the following manner, using exactly the same apparatus as before. Pour into the solution 2 or 3 c.c. of spirit of nitre (the exact amount is of no moment), insert the stopper and pass a current of coal gas through the bottle (the gas inlet tube only just passing through the stopper), to displace the air, then insert the nozzle C. of the burette in the second aperture in the stopper and allow the whole to remain at rest for two or three minutes. Then drop in the hyposulphite carefully until the blue tint is just discharged. The fluid is now ready to receive the 5 c.c. of the sample to be examined, and the process is conducted in all respects as previously described.

The difference between the two readings minus 1 per cent. will be the amount of hyposulphite corresponding to the ethyl nitrite in the 5 c.c. of spirit used. To check the result it is only necessary to add other 5 c.c. of the spirit and again titrate; the difference between the third and second readings should correspond with that between the second and first.

Before giving results obtained by this method it may be as well to describe briefly the rationale of the various steps in the process. The addition of the first 2 c.c. of spirit of nitrous ether to the acidulated water containing the potassium iodide is in order to liberate sufficient nitric oxide to deprive the water rapidly of its dissolved oxygen.

$$2NO + O_2 + 4HI = 2NO + 2H_2O + 2I_2.$$

The current of coal gas drives all the air out of the flask, and the space above the liquid is occupied by the gas, which usually contains a very small percentage of oxygen. This small quantity of oxygen is removed by standing five minutes in contact with the fluid, and after adding hyposulphite until the solution is decolorized we have a solution of hydriodic acid free from dissolved oxygen and confined in a flask, the atmosphere of which is also free from oxygen. By rapidly replacing one tube by another, as in introducing the pipette, etc., we avoid any change in this atmosphere, and also after the removal of the pipette, any loss of ethyl nitrite which would ensue were a stream of gas kept passing through the flask. The spirit of nitrous ether is introduced very slowly and in the gently moving fluid, in order to prevent as far as possible any of the undecomposed nitrous ether reaching the surface of the fluid and being lost by diffusion into the gas above.

Carefully performed the results are as accurate with a solution of the volatile ethyl nitrite as they are with solutions of such inorganic nitrites as the sodium salts.

A series of experiments were made by this method using for each 5 c.c. of a freshly prepared solution of ethyl nitrite in rectified spirit, strength 2·5 c.c. in 100 c.c., or 2·265 grams $EtNO_2$ in 100 c.c.

	Mean Thresh.	Allen.
(*a*).	2·23	2·13
(*b*).	2·24	2·14
(*a*).	2·175	2·11
(*b*).	2·24	2·11
(*a*).	2·21	2·13
(*b*).	2·175	—
	2·21	2·13

I copy from my note book the results of a series of experiments made in the manner described with different commercial samples (or the same sample at different times) of sweet spirit of nitre. 5 c.c. were used for the assay in every case, and all the experiments were made in pairs.

Sample.		Readings of Burette.		Correction for O in vol. sol. used.	C.c. of hypo. used minus correction.	P.c. of ethyl nitrite.
A.	(1)	13·70	6·4	·07	7·23	1·08
	(2)	20·90	13·7	·07	7·13	1·07
B.	(1)	14·50	5·8	.08	8·62	1·29
	(2)	23·0	14·5	·08	8·42	1·26
C.	(1)	9·28	4·65	·05	4·58	·687
	(2)	13·92	9·28	·05	4·59	·688
D.	(1)	19·50	6·1	·13	13·27	1·99
	(2)	18·65	5·35	·13	13·17	1·975
E.	(1)	15·94	7·82	·08	8·04	1·21
	(2)	24·12	15·94	·08	8·10	1·215
F.	(1)	9·90	5·38	·05	4·47	·674
	(2)	14·45	9·9	·05	4·50	·675
G.	(1)	15·5	1·35	·14	14·01	2·10
	(2)	18·8	4·9	·14	13·76	2·06
H.	(1)	20·0	6·3	·14	13·56	2·03
	(2)	20·5	7·0	·14	13·36	2·00

The results obtained leave no doubt as to the accuracy of both modifications of the process. It is sufficiently simple and rapid to be of practical use to the pharmacist, and it requires neither special apparatus or reagent. For these reasons I recommend it to you, and I would respectfully suggest that in the next Pharmacopœia the spiritus etheris nitrosi should be stated to answer to some such quantitative test, as the following:—

When freshly prepared, 100 grain measures, introduced into a pint bottle containing about 60 grains of potassium iodide and 3 fluid drachms of dilute sulphuric acid dissolved in about 15 fluid ounces of water, and from which all the free oxygen has been driven by a current of coal gas or otherwise, yields a red solution, requiring at least 335 grain measures of the volumetric solution of hyposulphite of sodium, added without access of air, for the discharge of its colour, corresponding to 2·5 parts by weight of ethyl nitrite in 100 volumes of the spirit. Even after it has been kept for some time, and the vessel containing it has occasionally been opened, it should require at least 200 grain measures of the hyposulphite solution for the discharge of its colour, corresponding to 1·5 parts by weight of ethyl nitrite in 100 volumes.

[*The discussion on this paper is printed on p.* 761.]

REVIEW OF RECENT WORK ON SPIRIT OF NITROUS ETHER AND ETHYL NITRITE.[*]

BY T. S. DYMOND, F.I.C., F.C.S.

The last number of *Ephemeris* (vol. iii., No. 4) contains a paper by Dr. E. R. Squibb on "Spirit of Nitrous Ether." Its purpose is to show that of the methods for its preparation a better product is obtained when alcohol is distilled with nitric acid alone, than when distilled with (1) potassium nitrate and sulphuric acid; (2) nitric acid and sulphuric acid; (3) nitric acid, sulphuric acid and copper. The first method, which is that of the United States Pharmacopœia of 1850, is dismissed from consideration on account of the difficulty of the process, and because the resulting spirit contains "an undue proportion of aldehyde." The second and third methods, which are those of the U.S.P. of 1880 and B.P. of 1885 respectively, are condemned, because, when the proportions of the Pharmacopœias are employed, they yield a smaller amount of ethereal product and of ethyl nitrite. The process advocated by Dr. Squibb is essentially that of the London, Dublin, Edinburgh and United States (1860) Pharmacopœias. Nitric acid and alcohol are distilled together, the distillate is shaken with a solution of sodium carbonate, the ethereal layer that separates is dissolved in 93 per cent. alcohol, and the solution neutralized with ammonia. The experiments are summarized in the following table:—

B.P. process.—4960[†] grains alcohol and 1840[†] grains nitric acid distilled with copper and sulphuric acid yield 1380 grains "peculiar ether," of which 39 per cent. is ethyl nitrite.

U.S.P. process.—7440 grains alcohol and 2160 grains nitric acid distilled with sulphuric acid yield 1420 grs. "peculiar ether," of which 56 p.c. is ethyl nitrite.

Squibb's process.—4080 grains alcohol and 2400 grains nitric acid distilled alone yield 2000 grains "peculiar ether," of which 64 per cent. is ethyl nitrite.

Unfortunately the experiments are not comparative, for the relative quantities of ingredients used differ in each. They are therefore valueless, for it would be impossible to predict what the result would be, if the same quantities of alcohol and nitric acid were distilled together under the different conditions, and they neither refute the results obtained by previous workers, nor establish the value of the process proposed.

A section of this paper treats of the estimation of ethyl nitrite, and two remarkable phenomena are mentioned, to which previous workers have alluded, and of which I am able to offer an explanation.

I. On the addition of water or of a solution of potassium iodide to an alcoholic solution of ethyl nitrite, a gas is evolved, which is capable of being chiefly absorbed by ferrous sulphate solution, like nitric oxide, but yet gives no red fumes when mixed with oxygen, nor is it absorbed by water afterwards. This gas is unquestionably ethyl nitrite, thrown out of solution by the addition of water, the small portion insoluble in ferrous sulphate solution being oxygen and nitrogen, derived from the dissolved air of the water.

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[*] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, March 12.

[†] These are not the proportions for spirit of nitrous ether of the British Pharmacopœia, but by a line of argument, which need not be here discussed, the experiment is taken to indicate its composition.

II. On washing ethyl nitrite with water much dissolves, and yet the aqueous solution evolves no nitric oxide when treated with an acid solution of potassium iodide in the nitrometer. This is due to (1) the rapidity with which ethyl nitrite escapes from water, (2) its rapid decomposition by water, and (3) the distinct solubility of nitric oxide in aqueous liquids, a fact which vitiates the results of determinations of ethyl nitrite in this way.

The method of estimation adopted by Dr. Squibb is the gasometric one of Mr. A. H. Allen, depending upon the measurement of the nitric oxide liberated by the interaction of nitrous acid and hydriodic acid, a pair of Lunge's nitrometers being employed for the purpose. The use of Lunge's nitrometers for the estimation of nitrates and nitrites was first brought under the notice of the Society by Professor Dunstan in 1879 (*Pharm. Journ.*, [3], ix., 1014), and in 1885 Mr. Allen introduced for the estimation of spirit of nitrous ether the simple and useful form known by his name (*Pharm. Journ.*, [3], xv., 673). An "extemporaneous or rude substitute for the nitrometer" is recommended by Dr. Squibb for the use of the pharmacist. The nitric oxide evolved is measured indirectly by the amount of mercury it displaces. The method cannot be relied upon to give a result within half a gram of the truth, and may be dismissed as unworthy of consideration. It would seem that a pharmacist is not to be permitted to make exact determinations of the value of his preparations, even when it is as easy to obtain good results as bad ones. It is a popular fallacy that an exact process is necessarily difficult to conduct. On the contrary, the simplest processes are often the most exact. It is accuracy of manipulation that is required, and it may justly be expected of a pharmaceutical chemist that he has had the scientific training necessary to ensure this.

A series of experiments are described in this paper to show the greater loss by evaporation of strong than of weak solutions of ethyl nitrite, and the action of water in inducing the decomposition of ethyl nitrite in alcoholic solutions. Experiments which prove this have already been made (see *Pharm. Journ.*, [3], xviii., 861), but they seem to have been overlooked, as well as those on the action of glycerine in retarding the evaporation of ethyl nitrite from alcoholic solutions.

Dr. Squibb finds the specific gravity of ethyl nitrite to be ·8977 at 15·6° C. Owing to this temperature being nearly the boiling point of ethyl nitrite, the determination is made by an indirect method. It is asserted that when equal volumes of alcohol and ethyl nitrite at 4° C. are mixed together expansion occurs, for the specific gravity of the mixture is lower than the mean of the specific gravities of the ingredients. It is assumed that the same expansion will occur if the mixture is made at 15·6° C., an assumption for which, I believe, there is no justification, and it is thus possible to calculate the specific gravity of the ethyl nitrite at 15·6° C. from the specific gravities of the alcohol and of the mixture of alcohol and ethyl nitrite at that temperature. It is extremely unlikely that expansion does occur when these liquids are mixed, and I believe the diminution in specific gravity is not due to expansion but to loss of ethyl nitrite. Even if the experiment were satisfactory, the calculation appears to be wrong, for from the figures given I find the specific gravity of ethyl nitrite to be ·9003 and not ·8977.

The advisability of the use of a pure solution of ethyl nitrite in place of spirit of nitrous ether is also discussed in this paper. The solution referred to is that proposed by Professor Dunstan and myself, the method for the preparation of which is given in the *Pharmaceutical Journal* ([3], xviii., 861). A mixture of alcohol and sulphuric acid is added to a cooled solution of sodium nitrite, and the ethyl nitrite which separates is washed and dried. A 2 per cent. solution in absolute alcohol containing 5 per cent. of glycerine we recommended for medicinal use. Dr. Squibb objects to the use of such a solution on the following grounds, and these objections are substantially the same that have been urged against it in this country.

I. The favourable experience of six hundred years should not so easily be set aside.

II. Only three-fifths of the complex ethereal constituent of spirit of nitrous ether is ethyl nitrite, the remaining two-fifths having a definite physiological effect.

III. The keeping properties of a pure solution are no better than those of a neutral spirit made with equally strong alcohol.

I will reply to these objections *seriatim*. 1. Unfortunately for the first contention, the favourable experience of almost the whole of these six hundred years refers to the spirits rich in aldehyde and free acid, now universally condemned. Spirit of nitrous ether as now employed is undoubtedly a valuable medicine, but Dr. Squibb himself points out that much of that now sold in the United States is made from a "concentrated nitrous ether" consisting almost entirely of ethyl nitrite (90 per cent.), and no evidence has been adduced that a spirit thus made is less efficacious than that made by the official process.

2. The two-fifths of the "complex ethereal liquid," which no one seems to have taken the trouble to analyse, but which undoubtedly chiefly consists of paraldehyde and acetic ether in varying proportions, has of course a definite physiological action, but that it is the ethyl nitrite which is the therapeutical agent required, the fact just mentioned, and the experiments of Dr. Leech, so far as they have gone, have shown. No evidence on this point can be more weighty than that of Nothnagel and Rossbach, who state that the "other constituents are, to say the least, highly unnecessary." It is ethyl nitrite which is regarded by therapeutists as the active constituent of spirit of nitrous ether; it is ethyl nitrite the proportion of which it has been designed to increase in the successive processes for its preparation; it is ethyl nitrite which is alone estimated when the value of the preparation is determined; it is on the presence of a certain proportion of ethyl nitrite that the British Pharmacopœia insists, and it is the absence of this proportion on which proceedings under the Food and Drugs Act are based. If, however, it were shown that a mixture of ethyl nitrite, paraldehyde and acetic ether were a more valuable therapeutic agent, let such a mixture be made in definite proportions, and thus avoid the risk and uncertainty of the use of a preparation which, from the nature of the

reaction by which it is made, must necessarily vary in composition.*

3. The stability of a pure solution of ethyl nitrite is indeed no greater than that of a neutralized and purified spirit made with alcohol of equal strength, but it is far greater than that of the spirit of the British Pharmacopœia, in which the water and free acid invariably present rapidly decompose the ethyl nitrite. Even if the spirit be neutral when freshly prepared, it soon becomes acid, for the water in the rectified spirit employed hydrolyses the ethyl nitrite with liberation of nitrous acid. In the paper in the *Pharmaceutical Journal* already alluded to, it is shown that ethyl nitrite disappears from a solution in rectified spirit twice as fast as from a solution in absolute alcohol. The loss of ethyl nitrite from spirit of nitrous ether is a constant source of annoyance to the pharmacist, and there is no doubt that this loss is as often due to decomposition as to volatility.

In advocating the introduction of a solution of ethyl nitrite stress must be laid on the far greater ease with which it is made. It is well known that the production of spirit of nitrous ether is a process attended with a good deal of difficulty and even danger. Large retorts are required, and elaborate condensing arrangements if loss is to be avoided, and after all precautions are taken, the operator is sometimes unable to control the violence of the reaction, and great loss occurs. Ethyl nitrite is prepared easily and quickly in quantities sufficient to make from 1 pint to several gallons of the solution. Distillation is avoided, and the only apparatus required is a tall glass cylinder, a long thistle funnel, and a stoppered separator. The cost of the ingredients is no greater, except that as absolute alcohol is employed for dissolving the ethyl nitrite instead of rectified spirit, the cost of the solution is about 20 per cent. more than spirit of nitrous ether, an increase which will not be grudged when the increased stability of the preparation is considered.

The advantages which would be gained by the introduction of such a solution of ethyl nitrite may be thus summarized :—It is easily prepared, its active constituent does not decompose, it has a definite and constant composition, the ethyl nitrite does not escape from it readily, it possesses the full therapeutic value of spirit of nitrous ether as far as present evidence has shown. Such being the case, I believe that to pharmacists the replacement of the old spirit by the new solution will be a great advantage, and it is for them to bring it under the notice of the medical profession. The chemistry and pharmacy of the question are complete, and it remains for therapeutists to give their opinion upon its employment. If that opinion is favourable the preparation could be inserted in the Pharmacopœia as an alternative to spirit of nitrous ether. By this means the old spirit would be gradually replaced by the new solution, and another advance made in the application of scientific methods for the production of pharmaceutical preparations.

The discussion on this paper is printed on p. 762]

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* Among occasional products of the reaction are, carbon dioxide, nitrogen, oxalic acid and hydrocyanic acid. The variability is due to the difficulty of conducting the distillation at a constant temperature, and for this reason it is desirable to avoid distillation altogether.

The Pharmaceutical Journal.

SATURDAY, MARCH 15, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

AMENDMENT OF THE PHARMACY ACTS.

Now that the further progress of the Pharmacy Bill is suspended for a while it may be suggested that a favourable opportunity is afforded for a thorough discussion of the principles involved in the draft that is before the members of the trade. As yet we have not received any communications on this subject dealing critically with the various proposed provisions of the Bill, though there is reason to believe that great differences of opinion prevail in regard to them. So long as that continues to be the case there can be little prospect of the attempt to obtain amended legislation being successful. To secure that result it is of first importance that there should be a very general acquiescence with the objects of the measure and some considerable interest felt in the passing of it through Parliament. In suggesting, therefore, that each of the clauses of the Bill should be made the subject of discussion by correspondents as well as by provincial associations it may be useful to consider what are the limits within which any legislative action may be looked for that would operate in such a way as to promote the interests of pharmacy and of pharmacists. Looking to the tenour of various letters that have appeared in this Journal within the last year or two, it may be inferred that with no small part of the trade the idea is entertained that the sale of all drugs and medicinal preparations should be restricted to those who possess a legal qualification. Admitting that such a condition of things would be desirable, and that it would be to the advantage of the public as well as of pharmacists, it is impossible to disguise the fact that circumstances are not in favour of its realization by any legislative enactment. It is rather by means of the influence which chemists can exercise individually and collectively upon the public that such a result may be attained or approximated to. The existing Pharmacy Acts impose restrictions not for the advantage of chemists, but solely on the ground that those restrictions are deemed to be requisite for the benefit of the public. It is for chemists to make use of their opportunities in such a manner as to foster the idea that in the sale of drugs and medicine qualification is requisite for the safety of the public, and to extend its application beyond the narrow limits of the regulations relating to the sale of poisons. The great thing is to develop the value attaching to the individuality of the chemist's position, and to encourage its appreciation by the public. If the skill and knowledge that the chemist possesses are understood, his services will be sought for in preference to that proffered by unknown proprietors of nostrums, who merely carry on a purely trade concern combining the supply of medical advice and drugs.

Though from the point of view above described it would certainly be desirable to discourage the sale of patent medicines, and the proprietary preparations which are commonly classed under that designation, it is perhaps too much to hope that this can generally be done at the present time. Unfortunately for the true professional interests of pharmacy that kind of business has become too well established. But it appears to be a short-sighted policy for the chemist to desire the repeal of a law which does impose some degree of restriction upon a business that is at once an infringement upon their province and upon that of medical practitioners. There is also another aspect in which the repeal of the medicine stamp duty is undesirable, though it is one which we do not suggest is deserving of much respect. For those who desire to carry on a trade in drugs and medicinal preparations together with advice as to their utility the medicine stamp offers opportunity for them to do so legitimately, and, as pointed out by the Commissioners of Inland Revenue, they would thus be enabled to put forward any recommendations as to the utility of their articles, as well as those directions for use which the pharmacist is properly required to furnish. For carrying on such a trade no qualification is required beyond the use of the medicine stamp; it is open to anyone, and would no doubt be largely extended if the value of the medicine stamp were to be reduced. Such a result could not fail to be detrimental to the best interests of pharmacy, and should not be rashly promoted.

Bearing in mind the desire above mentioned that the sale of all drugs and medicinal preparations should be restricted to persons who are qualified by registration, it seems strangely paradoxical that there should have been a tendency to oppose the sixth clause of the draft Pharmacy Bill, providing for the restriction to qualified persons of the compounding of medical prescriptions. That is a restriction that would certainly protect the rights of qualified persons, and might be contended for on the ground of advantage to the public more effectually than the restriction of the sale of all drugs and medicinal preparations could be. We confess that it is difficult to comprehend the reason for this opposition, which seems to suggest that it is thought the qualified man is entitled to delegate his qualification to others who are not qualified. So far as that may be the case it would involve a total sacrifice of the value of his qualification in the eyes of the public. There would be no guarantee that the persons to whom the chemist delegated the work which his qualification fitted him for would always be competent to perform it properly. We believe that the actual practice of chemists is generally in accord with this view of the matter, and that as a rule the dispensing of medicines is conducted by the persons who are legally qualified to carry it out. Hence there does not appear to be any sufficient ground for the objection to make this restriction specific, or for the apprehension that it would prevent the qualified pharmacist from being adequately assisted in his work or limit his ability to instruct apprentices.

An Evening Meeting of the Pharmaceutical Society will be held on Thursday next, the 20th inst., at 36, York Place, Edinburgh, when papers on "The Estimation of Urea," "Litmus" and "Uralium," will be read by Mr. D. E. Dott, and a paper on "The Future of Pharmacy as a Trade and as a Profession," will be read by Mr. Storrar. The chair will be taken at half-past eight o'clock.

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At a meeting of persons interested in the Annual Dinner of the Pharmaceutical Society, held in the Society's house on Wednesday last, it was decided that the dinner should take place at the Freemasons' Tavern on Wednesday, the 21st of May, and that the price of the tickets and the general arrangements as to extra expenses, etc., should be the same as in previous years. The following were appointed a Committee to carry out the detail arrangements in connection with the dinner. The President, Vice-President and Treasurer of the Society, Professor Attfield, Dr. Paul, Messrs. Allen, Bourdas, Hills, Taylor, Tupholme and Umney. Mr. R. Bremridge was requested to act as Honorary Secretary, and will be glad to receive the names of any gentlemen who may be willing to act as Stewards.

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Subscriptions have been invited by the St. Petersburg Pharmaceutical Society towards the foundation of a Dragendorff Scholarship for Pharmaceutical Students.

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The German Government has forbidden contractors to supply the navy with articles of food preserved with boracic acid, in consequence of the experience that persons partaking of meat preserved with that agent had suffered from gastric derangements.

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We regret to state that information has been received of the death, on the 10th instant, of Henry James Bellingham, aged 66, who was elected an annuitant on the Benevolent Fund in 1874.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, March 12, 1890.

THE TREASURER, MR. JOHN ROBBINS, IN THE CHAIR.

An Evening Meeting of the Society was held on Wednesday last, at 17, Bloomsbury Square. The chair was taken at eight o'clock by the Treasurer.

The proceedings commenced by the Curator calling attention to some

RECENT DONATIONS TO THE MUSEUM.

The notes are printed on p. 749.

OPIUM ADULTERATED WITH LEAD.

Mr. Powell called attention to a sample of opium containing an admixture of lead, the adulteration having been observed while using the opium for making laudanum. He stated that after the opium had been broken up his attention had been directed to several bright metallic particles at the bottom of the dish, which the application of the usual tests showed to be lead. Sections of the opium were cut, and it was noticed that the bright metallic particles were along one surface, and that they were just inside the leaves and not in the interior. Twenty-four grains were obtained from 2 ozs. of opium, but of course the quantity would vary in different samples. He had made inquiries of the wholesale house that had supplied the opium and had been told that there had been very few complaints of adulteration with lead for some time past, but that last year or so there had been a good many instances, all discovered in the same way, in the making of laudanum. The particles showed signs of tooling and might be lead raspings. An opium eater might eat half an ounce a week, and with such a quantity no doubt symptoms of colic would be produced. If laudanum were made from opium containing lead, it would be just as well to ascertain the amount and make the quantity good.

A paper was then read entitled—

A NOTE ON RECENT RESEARCHES ON THE OIL OF BETEL LEAVES.

BY D. S. KEMP, F.C.S.

The paper is printed on page 749, and gave rise to the following discussion:—

Mr. UMNEY said the paper was not an easy one to discuss, but still there were one or two points mentioned in it of very great interest. There were very few drugs which yielded two essential oils on distillation. Cinnamon was one drug which yielded both a light and heavy essential oil, and he learned from the paper that the betel leaf yielded an oil of a greater specific gravity than water and one of less specific gravity. He did not, however, remember that any other drug at one particular season of the year yielded a light essential oil, and then at another season a heavy essential oil. The betel leaves were very common, and though he had never seen the essential oil he was sure the paper would be very interesting to students of pharmacy as well as to those who were in the trade.

Mr. MACEWAN said as he had placed a specimen of that oil on the table he might be allowed to make one or two remarks with regard to it. It was early in 1887 that he heard that the oil was proposed to be introduced by pharmacists having connections with Java, where the leaves are largely used for certain affections of the throat. The knowledge that the dried leaves did not have the same therapeutic effect induced them to subject the fresh leaves to the distillation process for the oil, in the hope that it might be found to have the same effect in this country as the fresh leaves have in Java. As the result of an application he had received the specimen referred to, which he found had a specific gravity of ·943. One remarkable thing about that specimen was that it had a very strong odour of ethyl ether. Mr. Kemp had suggested that probably ether had been used for extracting the oil from the distillation water, but whether that was so or not he could not say. He might mention that the specific gravity of that oil was very close to that which Professor Eykman had examined.

Mr. MOSS said he came there to learn something about betel, and he was glad to find that it was attracting a good deal more attention than it had done for some time past, Betel leaves had been known in this country for a long time, and in the East from time immemorial. It was surprising that greater interest had not been shown in them here, and an exhaustive examination made of them before. Betel leaves appeared to have in them something which produced the same physiological effect as tea and coca, and other leaves of the same character, and it would be extremely interesting for an examination of the leaves to be made with the view of seeing whether they contain any alkaloid or compound of a similar character. So far as he knew, no examination of that kind had been made or attempted. He had seen the papers referred to by Mr. Kemp, and the chief recollection he had of Eykman's contention with regard to his oil and that of the Leipsic firm was that the oil of the Leipsic firm had no claim to be called oil of betel. He thought Mr. Kemp had given some sort of explanation, or at any rate hinted at one, which would show that the oils obtained from different sources would be expected to differ. One was oil of Siam betel, the other was oil of Java betel, and they all knew that plants coming from different parts of the world, grown in different places, yielded different results; sometimes the difference was slight, at other times it was considerable. In conclusion he would mention that oil of betel was a commercial article, although there was no very great demand for it.

Professor ATTFIELD thought the thanks of the Society were due to Mr. Kemp for having brought forward his experiments, as well as the chief of the researches of Eykman and Bertram and Gildemeister, for Mr. Kemp's experiments threw light on their results, and their results threw light on his. He thought that in the betel leaves there was but one essential oil, and that they had here an illustration of the fact that essential oils were mixtures. He and others had insisted on the uselessness of attempting to find chemical or physical constants in essential oils as obtained in the raw condition from the leaves and other parts of plants. In the present case of a plant which yielded several light hydrocarbons and more than one phenol, they had an unusually strong illustration of how much any given essential oil might differ in chemical and physical characters.

Mr. HOLMES said that Mr. Kemp had also mentioned another point beside those alluded to by previous speakers, and that was that chavicol was an antiseptic stronger than carbolic acid. Antiseptics that could be used internally were comparatively few, and he should like to know if Mr. Kemp could say whether that antiseptic had any action on albumen, like some of the stronger antiseptics, such as carbolic acid, or, in other words, if it was free from caustic action. Mr. Moss had alluded to the possibility of an alkaloid occurring in these leaves, but the other peppers did not yield alkaloids as far as investigation had gone at present, but comparatively inert bodies like cubebin and piperin.

Mr. KEMP, in reply, said that in the distillation of the oils the two came over at the same time, but the heavy oil fell to the bottom of the receiver, and the light one floated on the top. They were not actually separated, because they were never mixed at all. He did not observe whether one oil came over at the commencement of the distillation in greater quantity than the other. Mr. MacEwan had been kind enough to show him a specimen of oil distilled from betel leaves collected in Java. He could not help thinking it had been distilled with the addition of something like ether, and possibly it might have been prepared from a different species of leaf. At all events it seemed to him to be an entirely different oil. With regard to what Mr. Holmes had said about the antiseptic property of betel oil he was unable to say whether it would be suitable for internal adminstration, or a more valuable remedy than phenol. There was one important point he might mention, namely, that it had a burning taste, but not a caustic taste, whereas phenol had a caustic action, so that perhaps betel oil could be administered in larger doses than phenol. With regard to the question of the seasons he would mention that the two oils were obtained by him in hot weather, and the light oil was obtained in January in cold weather. Which of those conditions corresponded with the climate of Java or the climate of Siam he was unable to say.

The **Chairman** felt sure the meeting was very much obliged to Mr. Kemp for the pains he had taken with the subject. The paper was one which required to be read very carefully so as to be able to understand it; those who were new to the subject could not take it all in at once. It was something unusual to find such a diversity in one oil from plants grown in the same district. When plants were grown in different districts they expected to find a difference, sometimes a considerable difference, but from the same district they did not find the same difference when grown at different parts of the year. He moved a hearty vote of thanks to Mr. Kemp, which was carried unanimously.

The next paper was on—

Resin Soap as an Emulsifying Agent.

BY H. COLLIER.

The paper is printed on p. 751, and gave rise to the following discussion:—

Mr. **Kemp** said that the subject reminded him of what passed under the name of creolin. He understood that one kind consisted of coal tar emulsified by resin soap. Another kind contained no resin soap, but remained as a perfect emulsion when mixed with water. The question was in what way that kind was emulsified.

Mr. **Gerrard** said he had taken some little interest in that subject. He had had some creolin in his possession, and after it was exposed to the air for some time he was surprised to find that it became a sort of semi-fluid saponaceous mass, which suggested to him that it contained something in the nature of resin soap. The result of an examination brought him very much to the same conclusion as Mr. Collier had probably arrived at, that resin soap was a most remarkable emulsifying agent. There was just one point Mr. Collier had not referred to in his paper, and that was its action on carbolic acid. If they took liquefied carbolic acid and put it into a few grains of the soap they might go on adding water without separating it at all; and it would act in the same way with cresol. It was known that some of the popular antiseptics consisted of perhaps the bye-products of carbolic acid manufacture, and probably coal tar. The ordinary coal tar when treated with resin soap and diluted with water gave a much darker product than when they diluted the creolin of commerce, and probably the manufacturers were either careful in the selection of their coal tar, or they used mixtures. He was pleased to hear Mr. Collier deal so fully with the preparation of emulsions of essential oils. They wanted some good plan of diluting essential oils, so that the dilutions would remain permanent for some time, and in this direction Mr. Collier had given valuable information.

Mr. **Williams** said it was only natural to assume that with different resins the composition of the soap would vary, but that given any particular resin, if the instructions were followed the same kind of soap would result. He should like to know if Mr. Collier had examined the soaps he had prepared to see if they were neutral. In using them for the emulsification of the essential oils if there were any excess of alkali present it might hold back the volatile oil, and so prevent its use in that direction. In an inhalation an excess of alkali might defeat the purpose of the preparation entirely; but of course it was quite possible that the soap was entirely neutral and that the objection did not arise. He should like to know the best formula for the fixed oils, as certain oils usually required less emulsifying material than others.

Mr. **Helbing** said on the continent attention had been given to a resin soap which was very similar to the one Mr. Collier had brought before them, and the saponification was effected by simply heating the resin with carbonate of soda in water, and then pressing the product in a cloth, and afterwards drying it at a low temperature. That was recommended against blennorrhoea in the form of pills in 16, 20, or 30 grain doses. Attention was called a few years ago to a fluid creolin which was brought out as a non-poisonous antiseptic. There was resin soap in it, and that was only used to emulsify. It was evident from several analyses made in Germany that the creolins were prepared from the higher homologues of phenol, which were easily emulsified and non-poisonous.

Professor **Attfield** inquired whether Mr. Collier had tried the emulsifying power of yellow soap, which was at least one-fourth resin soap, and whether the flavour of the resin soap interfered at all with that of any of the emulsions. Had Mr. Collier any hypothesis to offer as to the alleged superiority of resin soap over fatty soaps as an emulsifier?

The **Chairman** said it struck him when Mr. Collier was pouring the solution containing the soap into the glass that it made a splendid emulsion, and he was almost tempted to taste it, but he should like to know whether it would be agreeable to do so. With regard to the spirit of camphor experiment, it was a very old form to use gum myrrh for the purpose, and other gum resins he supposed would do the same.

Mr. **Collier** in reply said that Mr. Kemp had mentioned that there were two sorts of creolin, one containing resin and the other not. Coal tar could be emulsified without resin by means of an alkali. A gentleman had asked whether the soaps were neutral. The particular specimen he had there contained ·02 of free alkali, determined in the way in which free alkali in soap was usually determined. The fixed oils varied a good deal in the amount of soap required. Cod liver oil required the least soap, and with five grains he got a mixture which would not separate for some hours. Almond oil came next, and then castor oil, and olive oil, which was the worst. If allowed to stop for an hour a layer of liquid would be seen at the bottom. Resin soap might be given internally but the taste was by no means agreeable. It could, however, be covered very well. He had made a cod liver oil emulsion with it on the lines of the Unofficial Formulary recipe, which had been very much appreciated. The only reason he did not at present recommend its use internally was that he did not exactly know what effect it might produce, and he should like some one to make experiments to determine this. It might be given up to 30 grains. Carbonate of sodium might be used, but he thought the solution of caustic soda was better. The percentage of alkali varied with different resins. He found that if he went up to a soap of 1 in 7 or 1 in 8 it was rather difficult to dry it, and so he thought 1 in 6 would be a very good formula. It would be remembered there were such things as basic soaps. An ordinary neutral soap when boiled with alkali would take up more alkali, but of course that soap when it was put into water would break up and liberate alkali. His attention was drawn to the superiority of that soap by using common soap. Resin was now used in the manufacture of ordinary soaps, though they contain fatty acids as well. Strong solutions of ordinary soaps could not be made. They might make a solution of 1 in 10, but with resin soap they could make one of 1 in 5. Another advantage was that it was much easier to obtain a definite product than it was with ordinary soap.

The CHAIRMAN proposed a vote of thanks, which was carried unanimously.

The next communication was on—

THE ESTIMATION OF ETHYL NITRITE IN SPIRIT OF NITROUS ETHER.

BY JOHN C. THRESH, M.B., D.SC.

The paper is printed on p. 752, and gave rise to the following discussion:—

Mr. UMNEY said that the test Dr. Thresh had described was so beautifully simple, and also so expeditious, that it left nothing to be desired, and they were all greatly indebted to him for his very practical paper.

Professor ATTFIELD quite agreed with Mr. Umney as to the practical character of this paper. A few years ago they had no means of estimating in any useful way the nitrites in spirit of nitrous ether, but now they had three good methods; that with the nitrometer, the vacuum-titration process, and now the modification of the latter proposed by Dr. Thresh. It would be for all pharmacists, according to their predilections or requirements, to select one or other of those methods. All three had been tried in his laboratory by an assistant, Mr. Fuge, and by a student, Mr. Simons, and all answered admirably.

Mr. FUGE said he had had an opportunity of trying that process some few weeks ago, and he could confirm what Dr. Thresh had said. Accurate results could be obtained with very great facility after a few trials, which did not vary from each other more than ·01 or ·02 per cent. A great advantage was that two estimations could be made in the same flask; and another that the presence of air was immediately shown by the return of the blue colour.

Mr. SIMONS said he had tried all the three methods and found Dr. Thresh's gave very accurate results. He had also obtained very good results by the vacuum process, but found the flask broke at times and spoilt the experiments; and it was not so easy to work that process as with coal gas. The introduction of the spirit of nitrous ether into the vacuous flask was somewhat difficult. Sometimes he could not get it all in, and in putting the hyposulphite solution into the burette some of it was liable to come over the side of the burette, and therefore the result was not always satisfactory.

Mr. WILLIAMS said he had used all three methods and thought closer results could be obtained by the vacuum process. One of the chief charms of chemical experiments was, he thought, the glorious uncertainty attending them, and that was particularly well shown in the vacuum process, where, if they had a flask with a slight flaw in it, it was very likely to burst. By Dr. Thresh's method they lost one of the charms, but perhaps the loss was not altogether to be deplored.

Dr. THRESH said he laid the process before Dr. Attfield a week or two ago, and one or two of the students of the Institution had tried it. If he had not assured himself that it was a workable process and would give accurate results he would not have troubled the meeting with it.

The CHAIRMAN moved a vote of thanks to Dr. Thresh for his interesting paper, which was carried unanimously.

The subject was again referred to in the course of the reading of the succeeding paper by Mr. DYMOND, who said: The method described by Dr. Thresh in the foregoing paper closely resembles that proposed by Professor Dunstan and myself last year for the estimation of all organic nitrites (*Pharm. Journ.*, [3], xix., 741). Both processes depend upon the titration by hyposulphite of sodium of the iodine liberated by the interaction of nitrous acid and hydriodic acid, and the value of each lies in the fact that the whole experiment is conducted in an air-free space, and thus the reproduction of nitrous acid by oxidation of the nitric oxide liberated is avoided. Mr. A. H. Allen has endeavoured to avoid this by allowing the reaction to take place in a nitrometer. The nitric oxide gas that is evolved is ejected, and the liquid is afterwards removed, and the iodine it contains, titrated in the usual way. Owing, however, to the aerial oxidation of the nitric oxide which remains dissolved in the liquid, the process gives erroneous results. Dr. Thresh states that our "process yields accurate results, but is quite unsuited for the use of the ordinary pharmacist!" Yet in construction the apparatus is quite as simple as his own, and the method of using it presents no difficulty whatever; while if a flask of good stout glass be employed, there is no fear of fracture. In point of accuracy, there is no possibility of error in the process proposed by us, if the experiment is carefully performed, but the interchange of tube and pipette in Dr. Thresh's process renders it not only possible, but probable, that some loss of ethyl nitrite or entrance of oxygen will occur, and inaccurate results be obtained. The numbers obtained with solution of ethyl nitrite of known strength which are brought forward to show the amount of error to which the method is liable appear to have been afforded by the modification in which the oxygen dissolved in the hydriodic acid solution is removed by a current of coal gas bubbling through the liquid, and the accuracy of which depends upon the freedom of the coal gas from oxygen. As the presence of oxygen is always possible in coal gas, it is obvious that this method may give incorrect results, and it would have been more satisfactory if we had been enabled to judge of the accuracy of the process when the dissolved oxygen is removed by the addition of a little of the nitrite.

[The presence of oxygen in London coal gas was demonstrated by allowing coal gas to enter a partially vacuous flask containing nitric oxide gas and a colourless solution of hydriodic acid and starch. Deep blue iodide of starch was immediately produced by the action of the oxygen on the nitric oxide and the liberation of iodine by the nitrous acid thus formed.]

Professor ATTFIELD: I desire to state, not with regard to Mr. Dymond's paper, but with reference to the speech he has interpolated on Dr. Thresh's paper, that Dr. Thresh, who was obliged to leave before Mr. Dymond had finished, has asked me just to say that he does not contend that this modification of his, as regards apparatus, of the titration method, is quite so highly accurate as the modification suggested by Messrs. Dunstan and Dymond, but that the difference is so extremely slight that it is of no practical importance as regards the use of the method or methods by pharmacists in estimating nitrites in spirit of nitrous ether. He desires me to draw the attention of the meeting to the figures he has put upon the board and to what he has stated respecting those figures, namely that of a hundred parts of the nitrite of ethyl taken he finds something like one hundred within one or two either way, and that the figures given in Messrs. Dunstan and Dymond's paper show that of one hundred parts they get within one of one hundred, and he points out that though that contrast of figures shows that their process is somewhat the more accurate of the two, still to get within 2 parts of 100 is practically as useful, when you consider how dilute the solution of spirit of nitre is. In other words, if in estimating nitrite in spirit of nitrous ether you get an indication of 2·23 of nitrous ether or 2·28 matters little, for either figure shows practically 2¼ per cent., which is quite near enough in the case of a spirit allowed officially to vary from something like 3 per cent. down to about 2 per cent. These, I believe, are Dr. Thresh's views on Mr. Dymond's speech. I will reserve, for a moment, my own remarks on Mr. Dymond's paper.

Professor **Dunstan** said that two methods had been put in contrast that night, but this was quite unnecessary, since they were on different footings. The purpose Mr. Dymond and he had primarily in view was not the estimation of ethyl nitrite in sweet spirit of nitre, but to devise a method of ascertaining whether certain organic nitrites with which they were working, ethyl, butyl, amyl, and other analogous nitrites, were absolutely pure or not. Since the process they had devised was not only highly accurate but extremely simple, they had brought it under the notice of pharmacists. Dr. Thresh only claimed for his process the estimation of ethyl nitrite in sweet spirits of nitre. His method was simple, ingenious, and apparently sufficiently accurate for pharmaceutical purposes. He wished to say further with reference to nitrous ether that having worked out in the Research Laboratory a method of preparing ethyl nitrite in a pure state, and of producing it in the form of a stable solution, pharmacists might render very great service to pharmacology if they would prepare this solution and bring it under the notice of medical men. A very strong *primâ facie* case had been made out in favour of a solution of pure ethyl nitrite as an alternative for the old spirits of nitre, but further therapeutic trials of it would be very valuable, and would doubtless lead to its official recognition.

The last communication read was entitled—

A Review of Recent Work on Spirit of Nitrous Ether and Ethyl Nitrite.

BY T. S. DYMOND.

The paper is printed at p. 755, and gave rise to the following discussion:—

Professor **Attfield** said he should like to say, first of all, that Mr. Dymond's suggestion that such a solution should be an alternative to the present official solution was a much more practical suggestion than that such a solution should displace the present one, because he could not agree that the old solution was, as Mr. Dymond had said, universally condemned. If it were, Dr. Squibb would not have written his very long paper in the *Ephemeris*; it would not have been necessary for Mr. Dymond to reply to the objectors in this country, nor would Mr. Dymond have been there that night as an advocate of, as well as part sharer in, the paternity of the solution of pure nitrite of ethyl in absolute alcohol. Medical practitioners would find a good deal to say in favour of the old solution. Following what Dr. Leach had stated, that he could find no important therapeutical difference between the present official spirit of nitrous ether and the solution of nitrite of ethyl in absolute alcohol, many would deduce from it that the official solution which they have been accustomed to was good enough for them. In the opinion of some the official spirit was more efficacious or had some therapeutical action which the solution of ethyl in absolute alcohol had not, valuable as the precise action of the latter solution might be. Therefore it was undesirable to unduly "rush" the new solution. But he did think, with Professor Dunstan, that manufacturers and pharmaceutical chemists should prepare the solution and introduce it to medical men in order that it might be fully tried, for the Medical Council had decided that nothing should be introduced into the Pharmacopœia which had not been previously fairly well tried and recognized by the profession. The solution of pure nitrous ether in absolute alcohol with, he thought, glycerine, had been brought forward by one firm in the country and introduced to medical notice in the midland counties, but that was not sufficient; he should like to see it made by some other manufacturers in the north and south, and especially should he like see it made on the small scale by chemists and druggists themselves and introduced to the notice of their local medical practitioners. Then if they had short papers or letters to the journals of pharmacy stating what the result was, they would know what position they were in as regarded the relations of the new solution to the Pharmacopœia and to future therapeutics.

Mr. **Allen** said the position of the pharmacists and medical men in England was a somewhat delicate one, and English pharmacists did not insist upon the use of certain drugs or new articles to the extent that was done in some other countries. When Professor Dunstan first introduced the 2 per cent. solution of nitrite of ethyl he (Mr. Allen) had been at considerable pains to bring it under the notice of some medical men in his own neighbourhood. He found a very great disinclination on their part, but one or two men, one especially of some considerable repute, gave the solution of ethyl nitrite a trial, and his report was distinctly unfavourable; he said it was in no sense as good as the spirit of nitre. He went back to the use of the old spirit of nitre again, and said whatever it contained it contained something which was of more therapeutic benefit than the plain solution of ethyl nitrite.

Mr. **Umney** thought if they had their grand old man, Professor Redwood, there, who had spoken in that Institution for hours on the spirit of nitre, there would be no doubt as to the turn the debate would take. They could not force the ethyl nitrite on the medical profession, but they certainly ought to have experiments made with it, and he hoped at no distant date it would be put forward as an alternative. As a manufacturer he could say that he knew of no distillation which required more care than that of spirit of nitrous ether. The process wanted conducting with some knowledge other than rule of thumb. He should certainly look up the paper of Dr. Squibb, which was an interesting one, and should also look forward to a good discussion between him and Mr. Dymond in that matter.

Mr. **Lomas** said he for one thought it would be a long time before they would be able to get medical men to adopt ethyl nitrite in place of the old spirit of nitre. He had listened to all that had been said on the point, and he failed to find any proof that ethyl nitrite was the only active ingredient in sweet spirit of nitre. In those cases where sweet spirit of nitre were prescribed, the actual spirit had something to do with the effect, and especially would it be so with those who were total abstainers.

The **Chairman** said he quite agreed with some of the speakers that a great many people did not believe much in ethyl nitrite, and thought the old spirit of nitre was a great deal better. For a long time it was supposed that the action of the spirit of nitre depended on this nitrite of ethyl, but it turned out that a great deal of the spirit of nitre which was sold and which acted very well as a medicine contained no nitrite of ethyl at all, so their faith had been somewhat shaken in it. However, he wondered that the solution of ethyl nitrite had not been more tried than it had been, considering that it had been before the public for nearly two years.

Mr. **Dymond** in reply said he was very sorry that Dr. Thresh had not been able to remain to reply to what he had said about his process. This had been said in consequence of Dr. Thresh's statement that there was no other simple method of accurate estimation suitable for pharmacists, while in his opinion the apparatus that had been introduced last year was perfectly simple, and gave accurate results. With regard to the therapeutic action of ethyl nitrite there had been a difference of opinion about it, but he thought one of the speakers rather represented the feeling of those members of the medical profession who would not try the action of new and improved preparations. If it were only possible to get over that conservative feeling it would be a very great advantage. There was so much evidence now on the point that if one would only carefully weigh it, one could not help coming to the conclusion that ethyl nitrite was the active ingredient, and it seemed to him that the sooner the old spirit of nitre gave way to the new solution the better.

The **Chairman** moved a vote of thanks to Mr. Dymond for his very excellent paper, which was carried unanimously, and the proceedings terminated.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 5th inst., at No. 11, Harcourt Street, Dublin, at three o'clock, the President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President, Mr. Wells, Professor Tichborne, Dr. Burnes, and Messrs. Beggs, Merrin, McCormack, Hayes, Hodgson (Treasurer), and Simpson.

The Registrar, Mr. Ferrall, read the following letter from the Attorney-General for Ireland, Mr. Madden, M.P.:—"February 10, 1890. Sir,—Your letter of the 6th was forwarded to me here. Having left Dublin, I regret that it will not be in my power to receive a deputation from your Society. Should a Bill dealing with the subject to which you refer be introduced during the present session by any Member, I shall be glad of any information which your Society may consider of importance,—Faithfully yours, D. H. Madden, A. T. Ferrall, Esq."

The President: That does not look as if it were his intention to introduce a Bill at present.

Mr. Hodgson: I suppose it is known that the Belfast gentlemen are taking active steps in reference to a Bill.

The Vice-President: They are making incorrect statements to the Attorney-General. One of them is that Mr. Hodgson has resigned his connection with this Society. Another assertion in the memorial which the chemists and druggists have sent to the Attorney-General is that we are becoming bankrupt, and must soon collapse unless we get help from some source.

Professor Tichborne read from the *Chemist and Druggist* the statement contained in the memorial alluded to, which was as follows:—"At the last moment a section of the Council of the Pharmaceutical Society repudiated the compromise come to, and intimated its intention of opposing the Bill, the result being that the President, Vice-President, Honorary Treasurer, and most influential members of the Council, resigned."

Mr. Hayes: Well, that is the truth. I think Mr. Hodgson did resign.

Mr. Hodgson: Oh, yes.

Mr. Hayes: But he was asked to reconsider his resignation and did so.

The President: The statement does not convey that impression.

The Vice-President: The idea conveyed is that he went away from the Council.

Professor Tichborne: There had been some resignations previously in consequence of offence taken at some observations made here.

The Vice-President: Mr. Hodgson resigned but afterwards withdrew his resignation. Mr. Allen resigned, but his resignation had nothing to do with the Bill. He had been ordered by his doctors to do so on account of his health.

Mr. Hodgson: Since that little difficulty there has been a re-election of your officers, and I was one of those who were re-elected.

Professor Tichborne: I suppose our financial position is very good?

Mr. Hodgson: It has improved.

Professor Tichborne: Our income has increased in spite of the striking off of names.

Mr. Hodgson: These gentlemen, headed by Sir James Haslett, had a meeting in Dublin last week.

The Vice-President: And the same Journal said of them that they made a great deal of talk, and had a great many reunions and dinner parties, but that there was very little to show for it.

Mr. Hayes: Supposing that the chemists and druggists do not bring in any Bill, but that they continue in the same course which some of them are pursuing by selling poisons, and in many cases compounding, are we to allow that to continue?

The Vice-President: I agree with a great deal of what is being said in the north of Ireland. I believe that we have not been carrying out the Act of Parliament that we have got, and that by carrying it out we could stop those things.

Mr. Simpson: Where are we to get the funds to do so?

The Vice-President: Where did we get the £150 to spend last year on a Bill that was not worth anything to us? If you prosecute in a few good cases you will soon stop the others.

Professor Tichborne said his reading of the Attorney-General's letter was that he did not want to be bothered about the subject at present.

Mr. Hodgson: I think it a courteous letter, and that we ought to acknowledge it, and say that we are not at present propounding any Bill, but that there are defects in our existing Act which we are very desirous to have remedied. That will show that we are not connected with those gentlemen who are urging their point with the Government and doing it continually.

Professor Tichborne: I think we ought to discuss the matter in committee; we have done so heretofore.

Mr. Beggs: I second that proposal.

Mr. Hodgson: Why not let them know what our views are? We have no secrets.

Professor Tichborne: My view is that we should be prepared with a Bill showing how far we are prepared to go, even though we should not place it before the Attorney-General.

Mr. Hodgson: You have already acceded to a Bill.

Professor Tichborne: No, this Council has not.

Mr. Hayes: We promoted a Bill and gave way on a great many points.

Professor Tichborne: That very Bill was one of the causes of quarrel. The late president resigned on a point in it that you would not accept. That Bill had become quite a travesty of the original Bill promoted by the Council.

Mr. Hayes: There were only one or two clauses that we differed on.

The Vice-President: I do not think that if it had gone back to the House of Lords they would have recognized it as the same Bill at all.

Mr. Hayes: I do not think there is any necessity for going into this now.

Mr. Hodgson: The Government have no intention of promoting a Bill now; and I maintain that no Bill propounded by the chemists and druggists will be considered by the Government unless it is endorsed by the Pharmaceutical Society. We are a recognized body who have been working under an Act of Parliament for years; and I do not think that any alterations proposed to be made in it by any outside body would be accepted without consulting us.

Mr. McCormack: What the Attorney-General wants to know is whether in the event of anyone bringing in a Bill we will give him every information in our power.

It was then ordered that the Registrar should write to the Attorney-General expressing the thanks of the Council for his letter, and stating that they are not taking any steps to promote a Bill at present, but that should they do so they would certainly lay their views before him for his advice and counsel.

A letter was read from Mr. William N. Allen, M.P.S.I., enclosing a copy of a letter which he had forwarded to Sir William Kaye, Q.C., Clerk to the Privy Council of Ireland, pointing out that the establishment by the Society of a School of Chemistry was at present illegal because the sanction of the Privy Council to the resolution in favour of it had not been obtained.

The Vice-President observed that Mr. Allen stated in his letter that on January 28, 1890, he verbally informed the Registrar of the necessity of obtaining the sanction of the Privy Council to the institution of the school in question. Had any intimation to that effect come before the President of the Council?

The President: I received none whatever. Mr. Ferrall, did you?

The Registrar: I got no letter. In reply to the Vice-President, Mr. Ferrall added that Mr. Allen made a verbal statement to him on the subject and that he informed the Vice-President of it.

The Vice-President: You did not mention any name. When I was acting for the President Mr. Ferrall asked me if this matter should be brought before the Council by a motion. I said I thought we were acting perfectly within our rights, but that if there were any doubt about it a notice of motion could be given. I was not told that Mr. Allen had made the statement, and I think that if a complaint is made to the Registrar representing the Society that we are not acting legally it is his duty to inform the President very fully about it.

The Registrar: Mr. Allen called to pay his subscription, and made the statement in a casual way, and at the moment it did not strike me as of such importance that it should be noticed immediately. On reflection, after he had gone, I saw that it was necessary to bring the matter under the President's notice; and as he was absent through illness, I brought it before the Vice-President, mentioning simply that a member of the Society had stated to me that he considered we were acting illegally. I did not think at the time that Mr. Allen would have taken the course he has done. I acted *bonâ fide*, and if Mr. Wells had asked me for the name of the member I would have mentioned it.

Professor Tichborne said he did not think a mere conversational mention of the matter to an officer of the Society was notice to the Council.

Mr. Hodgson: Unless a person thinks it worth his while to send in a formal notice that we are acting illegally we have no right to take notice of a chance conversation with the Registrar. Are we to be bound by a statement of that kind?

The Vice-President: Did Mr. Ferrall inform him that we had not taken any steps, or, if not, where did Mr. Allen get the information?

The Registrar: How Mr. Allen got his information I cannot say, but he seemed to be thoroughly informed beforehand.

Mr. Hodgson: I think the answer to give Mr. Allen is that no official communication has been received by us from him in the matter, and that we cannot recognize a chance conversation with the Registrar.

The Vice-President: I think we should also tell Mr. Allen that we think an old member of the Council should have treated us with more courtesy than behind our backs to write such a letter finding fault with us. He might have written to us objecting to the thing, and then if we took no action he might have found fault.

A letter was read from Mr. T. R. Connolly, of Clanbrassel Street, Dundalk, stating that on the preceding Monday an election was held for the office of Apothecary in the Louth Infirmary. The writer and two other licentiates of the Society presented themselves as candidates, but were declared ineligible; and a licentiate of the Apothecaries' Hall was elected. Mr. Connolly asked that the Pharmacy Act should be amended so as to render licentiates of the Society eligible for such positions. Four years ago he brought a similar case under the notice of the Council, and the then President, Mr. Brunker, endeavoured to have the matter set right but failed.

The Vice-President: Under what clause of our Act does he say that he has a right to the appointment?

The Registrar: Under clause 34, which says that licentiates of the Society are eligible to be appointed apothecaries to district lunatic asylums, public jails and prisons in Ireland; but that they are not to prescribe.

Mr. Hodgson: In an early stage of our history, after a big fight, we established our right to appointments of apothecaries to poor law unions and dispensaries.

Professor Tichborne: Sometimes in hospitals the resident apothecary is supposed to do medical work and act as a medical man. We have nothing before us to show that that is not the case here.

Mr. Simpson: You should ascertain that from the writer of the letter. In most hospitals and infirmaries the resident is the compounder.

Mr. Hodgson: Wherever an apothecary is allowed to hold a situation in a public institution we ought to make a fight that our licentiates shall be placed on an equal footing. It is our duty to our licentiates to do so.

It was ordered that inquiry should be made into the case, and in particular as to the duties of the apothecary to the infirmary.

A letter was read from the General Medical Council requesting information respecting the Preliminary examinations which had been held by the Society during the past year.

The President: The highest percentage obtained by any candidate was 72 and the lowest of those who passed 44; 31 candidates passed and 28 were rejected. The calendar containing the examination papers will be forwarded. An order was made that the information required by the General Medical Council should be forwarded in detail.

A letter was read from Mr. Eugene MacSweeny, requesting the Council to accept from him a certificate of having attended the prescribed course of practical chemistry at the City School of Chemistry and Pharmacy, London. The writer stated that that school was conducted by a staff of highly-qualified gentlemen, and that its certificates were recognized by the principal examining bodies of England. The school was specially adapted to the requirements of students of pharmacy, being provided with the most modern appliances necessary for the successful study of chemistry, botany and pharmacy.

It was ordered that inquiries should be made in reference to the application.

A report from the Law Committee was adopted.

A donation was received from the Pharmacy Board of Victoria of a copy of their Pharmaceutical Register for 1889.

Thanks were voted to the donors.

On the motion of the Vice-President, seconded by Professor Tichborne, Mr. James Hartford, of 3, Cedar Street, New York, was elected a member of the Society.

Some payments having been ordered, the Council adjourned.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, February 20. Dr. W. J. Russell, F.R.S., President, in the chair.

It was announced that the following changes in the Council list were proposed by the Council:—

As Vice-Presidents: Professors Crum Brown, F.R.S., and W. N. Hartley, F.R.S.; *vice* Professor McLeod, F.R.S., and Mr. Ludwig Mond.

As Members of Council: Messrs. Henry Bassett, C. F. Cross, Professor R. Meldola, F.R.S., and Mr. M. M. P. Muir; *vice* Professors A. H. Church, F.R.S., and F. Clowes, Mr. C. W. Heaton, and Dr. H. F. Morley. Messrs. Bernard Dyer, R. H. Davies, and R. J. Friswell were appointed by the meeting to audit the Treasurer's accounts.

The following papers were read:—

The Behaviour of the more Stable Oxides at High Temperatures. By G. H. Bailey, D.Sc., Ph.D., and W. B. Hopkins.—The authors chiefly devote attention in this notice to oxide of copper. Previous experimenters had obtained cuprous oxide by heating the oxide to redness. From the results obtained by the authors, it appears that at higher temperatures oxygen is given off, and that an oxide having the composition Cu_3O is formed. This is insoluble in mineral acids and even in boiling aqua regia. It can, however, be changed into a soluble form by fusion with caustic potash, from which it separates on treatment with water. The oxides of lead and tin seem to behave like that of copper at high temperatures.

The Influence of Different Oxides on the Decomposition of Potassium Chlorate. By G. J. Fowler, M.Sc., and J. Grant.—The object of the experiments has been to systematically examine the influence of the chief metallic oxides and certain unstable salts on the decomposition of potassium chlorate. Upwards of a hundred experiments have been made, the most significant of which are recorded in the paper. In each case, the temperature at which oxygen is evolved, the amount of chlorine given off, and the composition of the residue after heating have been determined. The variation of the results according to the acid or basic character of the oxide added, its physical condition and the relative masses of the oxide and chlorate has been recorded. This has been done, not only with a view to explaining the change in the special case of manganese dioxide, but also to throw light on the general course of the interaction of potassium chlorate and other admixed oxides, whether oxygen be evolved or not. The results obtained may be summarized as follows:—(1) Acid oxides, such as V_2O_5, WO_3 and U_3O_8, cause the evolution of oxygen at a reduced temperature; a metavanadate, tungstate or uranate being formed. Chlorine is evolved in these cases in large quantity, but the whole of the oxygen of the chlorate is not evolved, as the compound of K_2O with the oxide is not being decomposed by heat or by chlorine: $4KClO_3 + {}_2V_2O_5 = {}_2K_2OV_2O_5 + {}_2Cl_2 + 5O_2$. (2) Alumina probably acts similarly but less energetically, the attraction between the K_2O and Al_2O_3 not being so great. (3) In the case of chromium sesquioxide, the oxygen is evolved at a reduced temperature, accompanied by chlorine. The decomposition may be supposed to be brought about by the affinity of the Cr_2O_3 for O, and the affinity of the CrO_3 thus formed for K_2O, but all the oxygen of the chlorate is not evolved, since $8KClO_3 + {}_2Cr_2O_3 = 4K_2CrO_4 + 4Cl_2 + 7O_2$. (4) In the case of the sesquioxides of iron, cobalt and nickel, cupric oxide and manganese dioxide, oxygen is evolved at a comparatively low temperature accompanied by only a little chlorine; the oxide is left but little altered at the end of the experiment. Accepting Mr. McLeod's theory of the action of manganese dioxide ('Chem. Soc. Trans.,' 1889, 184), which is fully in harmony with the results of the experiments under consideration, it would seem that manganese dioxide first acts by reason of its affinity for oxygen, and the affinity of the higher oxide thus formed for K_2O. The permanganate first formed, however, is unstable (here there is a difference between the oxides of this class and those of the preceding), and is resolved into $K_2MnO_4 + Mn_2O_3 + O_2$. The K_2MnO_4 is decomposed by chlorine into KCl and MnO_2, which is thus regenerated. The addition of sodium carbonate retards the evolution of oxygen, probably because the manganate is thereby rendered more stable. The action of the other oxides (*cf.* Spring and Prost) of this class can, it is believed, be explained in a similar manner to that of manganese dioxide. (5) The monoxides of barium, calcium and lead cause no evolution of oxygen when heated with chlorate, but the latter breaks up below its normal temperature of decomposition, potassium chloride and a peroxide being formed Here the affinity of the oxide for oxygen induces change. (6) On the other hand, potassium chlorate may act as a reducing agent in the presence of such oxides as silver oxide and the peroxides of barium and lead, a perchlorate being formed. No oxygen is evolved. Here the change is brought about by the affinity of the chlorate for oxygen. In the case of the oxides of calcium, barium and lead, the extent to which the chlorate is oxidized evidently depends on the relative masses of the interacting substances. (7) Water of hydration appears to diminish the activity of an oxide, owing doubtless to the absorption of heat necessary for its conversion into steam. (8) The physical condition of the oxide is of influence. Copper oxide prepared in the dry way is almost inactive. (9) Certain substances, although apparently they undergo no chemical change, assist the decomposition, *e.g.*, powdered glass, sand, kaolin. (10) Oxides such as those of zinc and magnesium are completely inactive.

Dr. Hogkinson said that he had noticed that all the chlorine was expelled from potassium chlorate by heating it with either uranic or tungstic or vanadic oxide—was this because these oxides expel the chlorine from chlorides? In the case of stannic oxide, everything depended on the state of the oxide. The native form had no action, but metastannic acid expelled chlorine.

Professor McLeod thought that the decomposition of potassium chlorate was promoted in some cases by a mere action of presence similar to that which charcoal exercises on the boiling of water: for instance, platinum black appeared to act in this way, and probably basic oxides exercised a similar influence.

Professor Ramsay expressed the opinion that in some cases the oxides were converted into corresponding chlorates: that copper oxide, for instance, became converted into copper chlorate, which was thereupon resolved into copper oxide and an unstable oxide of chlorine; it was desirable from this point of view to study the behaviour of various chlorates.

Professor Thorpe said that much had already been done in the direction suggested by Professor Ramsay; and difficulty arose, as many chlorates were hydrated salts which decomposed during dehydration. After calling attention to Teed's and Frankland and Dingwall's experiments, he said there was no evidence that when, for example, manganese dioxide was used manganese chlorate was formed. Mr. Eccles had several years ago made experiments in his laboratory to test this point, and had found that no alkali was formed when manganese dioxide was used, as must have been the case if any chlorate of the oxide were produced. The non-production of perchlorate was the most remarkable feature of the change in presence of manganese dioxide (*cf. Chem. Soc. Journ.*, 1876, 856).

In reply to a remark by Professor Ramsay, Professor McLeod said that the formation of permanganate accounted for the fact that no alkali was obtained, although chlorine was given off.

The Interaction of Hypochlorites and Ammonium Salts. Ammonium Hypochlorite. By C. F. CROSS and E. J. BEVAN.—No mention is made of ammonium hypochlorite in the later text-books and dictionaries; in the last edition of *Gmelin* (vol. 2, 479), however, there is a short paragraph headed "Ammonium hypochlorite?" in which its probable existence is spoken of on the authority of Schönbein. This chemist observed that when ammonia is added to chlorine-water a pungent odour is developed, and that the liquid exhibits bleaching powers and the property of decomposing hydrogen peroxide with liberation of oxygen: hence it was supposed that the destructive action of chlorine on ammonia is preceded by the formation of ammonium hypochlorite. The authors have recently had occasion to study the subject more closely. On treating a dilute solution of bleaching powder with the equivalent quantity of an ammonium salt, no sensible loss of "available chlorine" takes place provided interaction occurs at a low temperature (10°). The pungent odour already mentioned as noticed by Schönbein suggested that the resulting compound was volatile, and, therefore, in order to obtain evidence as to its composition, a current of water was passed through the solution, and subsequently through water and through a solution of potassium iodide acidified with normal acid; eventually the liberated iodine was titrated with thiosulphate, and the excess of acid was determined in the same solution by means of normal alkali. The iodine liberated was taken as equivalent to the chlorine, and the amount of acid saturated as equivalent to ammonia; the results obtained were:—

(1.) $Cl=0·0365$ $NH_4=0·0090$ 2·06 : 1
(2.) $Cl=0·0316$ $NH_4=0·0081$ 1·98 : 1

These correspond with the formula NH_4OCl, in which the ratio of oxidizing chlorine to ammonium is that of $2Cl : NH_4$. Further evidence as to the composition of the compound was obtained by extracting the aqueous solution with ether, and after diluting the extract with alcohol adding potassium iodide and the necessary quantity of thiosulphate; the resulting mixture was neutral. The compound was also volatilized by means of a current of air, and after washing this was passed into a solution of sodium sulphite; the oxidation of the sulphite was the only change observed, the solution remaining neutral, whereas had no ammonia been present it would necessarily have become acid. The evidence of the formation and existence of ammonium hypochlorate in solution would seem, therefore, to be complete; the isolation of such a compound, however, is necessarily attended with considerable difficulty, and all attempts in this direction have hitherto failed to give a result. At ordinary temperatures solutions prepared as described containing from 1 to 2 grams Cl per 100 lose oxidizing chlorine comparatively rapidly: thus one containing 1·6 grams per 100 immediately after preparation contained after filtering and standing two hours 0·12 gram; after forty-eight hours 0·06, and after seventy-two hours 0·04. The ammonia product presents curious anomalies in oxidizing properties in comparison with other hypochlorites, and thus it is without action on many colouring matters, *e.g.*, those of the vegetable fibres; a solution tinged with a drop of a solution of indigo sulphonate retains its colour for some hours, although it at once liberates iodine from potassium iodide; and it does not peroxidize hydrated lead oxide, nor does it oxidize potassium ferrocyanide in presence of acetic acid. But it oxidizes sulphites and arsenites, and its effect on aniline salts is identical with that of ordinary hypochlorites. The compound is easily formed by the electrolysis of ammonium chloride solutions.

Professor Ramsay said that a few months ago he also had attempted to prepare ammonium hypochlorite, and had found that on adding ammonia to hypochlorous acid nitrogen was not given off. It was to be noted that the formula of ammonium hypochlorite was equivalent to that of hydroxylamine hydrochloride.

In answer to Professor Dunstan, Mr. Cross said that the addition of acid did not alter the properties of the liquid as an oxidizing agent.

Dr. Armstrong suggested that probably the authors were dealing with a chlorinated derivative of ammonia, *e.g.*, NH_2Cl: Gattermann's experiments showed that such compounds are more stable than is usually supposed.

The Action of Phosphoric Anhydride on Stearic Acid. By F. STANLEY KIPPING, Ph.D., D.Sc., Heriot Watt College.

Semithiocarbazides. By AUGUSTUS E. DIXON, M.D.

Note on the Production of Ozone by Flames. By J. TUDOR CUNDALL, B.Sc., University College, Cardiff.—It is stated by L. Ilosvay de N. Ilosva (*Ber. Referate*, 1889, 791 *et seq.*) that when all the products of combustion of various kinds of flames are collected, they do not exhibit the smell and taste of ozone. This is confirmed by the results of some unpublished experiments made by the author in a similar manner in 1886. Recently, however, the author has found that the air aspirated through a tube (3 mm. in bore) whose mouth is fixed about 5 mm. above the tube, and 5 mm. away from the flame of a Bunsen burner, both tastes and smells strongly of ozone. Similar results were obtained both from luminous and hydrogen flames. It was not found possible to confirm this fact by any other test for ozone, owing to the impossibility of finding any which was sufficiently sensitive which was not common to dilute nitrogen oxides. At first sight, it seemed that Houzeau's papers (impregnated with red litmus and potassium iodide) would give the necessary distinction, as an acid gas could not be expected to give an alkaline product. Ilosva states, however, that nitrogen oxides turn these papers blue, and the author has confirmed this result. Papers impregnated with thallium hydroxide were employed with negative results, but, on testing them in a stream of ozonized oxygen from a Siemen's tube, they were found to be far from sensitive. The same applies to an acidified solution of sulphanilic acid and α-napthylamine, which certainly gives a yellow colour with a fair amount of ozone, but this colour is completely masked by the rose-red produced by small traces of nitrogen oxides which may be present simultaneously. The gas aspirated in this way both from coal gas and hydrogen flames gave definite indications with mercury of the peculiar behaviour of ozone, but the quantity present was not sufficient to make the mercury adhere completely to its containing flask. In conclusion, the author agrees with Ilosva in so far that he regards the smell and taste of ozone as the only tests for it that are at all reliable when it is present only in traces, but differs from him as regards its formation by flame. For, although nitrogen oxides are undoubtedly formed by flames, yet at the same time ozone can be detected by aspirating the air surrounding the flame in such a manner as to get a minimum of the products of combustion, and at as low a temperature as possible.

The Kekulé Festival.

At the meeting on March 6 the President announced that the Senior Secretary would attend the meeting to be held in Berlin on March 11, to celebrate the 25th anniversary of Professor Kekulé's benzene theory, and present an address from the Society.

The following papers were then read:—

Some Crystalline Substances obtained from the Fruits of Various Species of Citrus. By WILLIAM A. TILDEN, D.Sc., F.R.S., and CHARLES R. BECK.—The authors have examined the solid matters which are deposited from freshly extracted oils of limes, lemons, and bergamot made by hand. The substance from oil of limes (*C. limetta*), after purification by repeated crystallizations from alcohol containing a little potash, forms small, pale-yellow needles, united in tufts, which melt at 121°–122°. It is proposed to name this substance *limettin*. It is not an acid nor a glucoside. It is not acted on by acetyl chloride nor by phenylhydrazine. Analysis leads to the formula $C_{16}H_{14}O_6$. When submitted to the action of bromine it affords a tribomo-derivative, $C_{16}H_{11}Br_3O_6$, which crystallizes in colourless scales. When boiled with a concentrated solution of soda limettin loses an acetyl-group, yielding a substance very similar to itself in appearance and properties, $C_{14}H_{11}(OH)O_4$. When fused with potash it yields phloroglucol and acetic and formic acids. Essence of lemon yields a substance similar to limettin in appearance, though the crystals are more lustrous and melt at 116°. Concordant analyses lead to the formula $C_{14}H_{14}O_6$, which contains 2C less than the formula of limettin. Bergamot yields a crystalline compound differing from both the preceding. It forms colourless, distinct prisms melting at 270°–271°. The examination of this substance will be continued when a supply of material has been obtained. These substances are entirely distinct from the compounds which, under the names of aurantiin, hesperidin, limonin, have been obtained by other chemists from various fruits of the orange and lemon tribe. The two former of these are glucosides. Hesperidin has been shown to be a derivative of phloroglucol, and in its origin is probably connected with the substance described under the name limettin in this paper.

Reduction of α-Diketones. By FRANCIS R. JAPP, F.R.S., and FELIX KLINGEMANN, Ph.D.

Studies on Isomeric Change, No. IV. Halogen-derivatives of Quinone (first notice). By ARTHUR R. KING.

Note on a Phenylic Salt of Phenylthiocarbamic Acid. By AUGUSTUS E. DIXON, M.D.

Contributions to the Chemistry of Thiocarbamides. Interaction of Benzyl Chloride and of Allyl Bromide with Thiocarbamide, Phenyl- and Diphenylthiocarbamides. By EMIL A. WERNER.

Parliamentary and Law Proceedings.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* ONION.

Before his Honour Judge Chalmers at the Birmingham County Court on the 11th inst., the Council of the Pharmaceutical Society of Great Britain sued Thomas Onion, of 135, Gooch Street, Birmingham, to recover two penalties of £5 under section 15 of the Pharmacy Act, 1868, incurred by the defendant on August 22 and November 11, 1889, in selling poison, to wit "belladonna," or a preparation thereof known as "belladonna liniment," and a preparation of "opium" called "laudanum" on those dates

Mr. Granger appeared as counsel for the plaintiffs.

Mr. Hugo Young appeared as counsel for the defendant.

Mr. Granger stated that the action was brought under the provisions of the Pharmacy Act, 1868, the object of which was for the protection of the public against the indiscriminate sale of poisons by unqualified persons. In reply to his Honour, he mentioned that the recovery of the penalties was under the statute by civil and not criminal procedure. The proceedings were brought and the penalties were incurred under section 15, the dates of the offences being August 22 and November 11 of last year. On each of these occasions a "preparation of belladonna," and on the first occasion a "preparation of opium," known as "laudanum," was sold by the defendant, who was the managing director of the business carried on at 135, Gooch Street, Birmingham, under the style of "Thomas Onion and Co., Limited." He especially laid stress on the words of the section "any person who shall sell . . . . poisons."

Mr. Hugo Young drew his Honour's attention to the case of the Pharmaceutical Society *v.* Wheeldon, in which the judgment of the Divisional Court has not yet been delivered, and after a short discussion it was agreed that his Honour's ultimate judgment should be governed by the judgment of the Divisional Court in that action.

Mr. Harry Moon, examined by Mr. Granger, stated that he was a clerk in the employ of the plaintiffs. That on August 22 last he went to the shop numbered 135, Gooch Street, Birmingham, and noticed the name of Thomas Onion and Co., Limited, chemists and druggists, on the front of the shop. He went in and handed a prescription (containing belladonna) to the defendant, and asked him to make it up. The defendant handed it to an assistant with instructions to enter it and make it up. While it was being made up, he (the witness) asked defendant for two-pennyworth of laudanum, and the defendant took a bottle from the shelf and handed it to the assistant, instructing him to put it up.

In reply to a question from his Honour as to how he knew the defendant, witness stated it was from the description he had received of the defendant, and, being asked whether he could recognize him again, he at once pointed defendant out in the Court as the man who had sold the poisons to him.

The assistant made up both the prescriptions and the laudanum, and handed them to the defendant, who gave them to witness, who paid the defendant. He went to the defendant's shop again on November 11 last, and saw the defendant and the same assistant, and handed to the defendant the envelope which had enclosed the prescription, and which showed the number of it in the company's books. Defendant referred to the book and passed it to the assistant, but he (the witness) did not hear the instructions. The assistant made it up and put the directions on the bottle, and handed it to defendant, who affixed the poison label himself, and after payment handed the bottle to witness, saying that he could have the prescription at any time.

His Honour: Supposing the money not to have been paid who would be the person to sue? Would not this be the test as to the seller?

Mr. Hugo Young replied that in this case the party to sue would be the Limited Company. He referred to the decision of the House of Lords in the Pharmaceutical Society *v.* the London and Provincial Supply Association, and urged that under the ruling in that case that as in this case the defendant was only a managing director of a limited company (with a registered chemist on the register of shareholders), that the defendant could not possibly be liable to the penalties. He acknowledged that the registered person was not in the shop now, but this he contended was immaterial. He read extracts from the arguments of Mr. Finlay, Q.C., before the Divisional Court in the case of the Pharmaceutical Society *v.* Wheeldon, and argued that there is one person who makes up, and another who only hands over the counter, taking the money for the article so made up by that other, that the person making up is the one liable, and that accordingly the defendant was not liable in the present case, but that if any one was liable at all the assistant would be.

Thomas Onion, examined by Mr. Hugo Young, stated that he was the defendant, that he could not remember for certain or be positive as to circumstances stated by Mr. Moon. He stated the name of the registered chemist who was a shareholder to be William Adcock, and added that he had had to discharge him as he was of no use. In answer to his Honour witness stated that the assistant (Attwood by name) was not qualified. To the best of his belief his instructions to Attwood on the first purchase were "make this up and write the label, and I will come and superintend," and, witness continuing, Attwood made it up, every item. He did not recollect the purchase of November 11 at all.

His Honour: What age is Attwood?

Defendant: 18 years of age.

His Honour: What experience has he had?

Defendant: Two years under apprenticeship to the company.

His Honour: Is he allowed to make up all prescriptions?

Defendant: He never makes up poisons unless I am at the back of him superintending.

His Honour: And you are not a qualified registered man?

Defendant: No, your Honour.

His Honour intimated to Mr. Granger that it was not necessary to cross-examine the witness.

Mr. Hugo Young: This is another instance, your Honour, of the disadvantage of counsel acquiescing in his client's earnest desire to go into the witness box.

His Honour: I find as a fact that these poisons were sold by the defendant, but pending the judgment of the Divisional Court reserve my formal judgment.

Mr. Granger applied for costs on the scale above £20, which his Honour granted.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* G. F. RESTALL.

This action, which was called on for hearing in the Birmingham County Court on the 11th instant, was owing to the arrangement of the business of the Court ordered to stand over until after April 14 next.

A Loyal Chemist.—The subject was under consideration in 1883, and at the request of the Council the Government consented to the introduction of an amendment of the clause in the Patents Bill relating to the use of the royal arms. See *Pharm. Journ.*, [3], xiv., pp. 16, 91, 96 and 268.

Obituary.

Notice has been received of the death of the following:—

On the 21st of February, Mr. John Keith, Pharmaceutical Chemist, Kirkgate, Leeds. Aged 33 years.

On the 21st of February, at the Crofts, Nantwich, Mr. William Alphonse Jenkins. Aged 24 years. Mr. Jenkins was a Registered Apprentice of the Society.

On the 22rd of February, Mr. William Willey Broom, Chemist and Druggist, Queen Street, Exeter. Aged 49 years. Mr. Broom had been a Member of the Pharmaceutical Society since 1869.

On the 25th of February, Mr. John Newton Watts, Chemist and Druggist, Edgware Road, London. Aged 48 years. Mr. Watts had been a Member of the Pharmaceutical Society since 1883.

On the 26th of February, Mr. Alfred Stevens, Chemist and Druggist, Borough High Street, Southwark. Aged 68 years.

On the 26th of February, Mr. James Bell D. Adam, Chemist and Druggist, Fernhead Road, Harrow Road, London. Aged 36 years.

On the 4th of March, Mr. Harry Eugene Field, Chemist and Druggist, Oxton Road, Birkenhead. Aged 48 years.

On the 5th of March, Mr. Jonathan Hall, Chemist and Druggist, Barnard Castle, Durham. Aged 65 years.

On the 6th of March, at 21, Camden Road, N., Mr. Alexander Young Stewart, formerly of Apothecaries' Hall. Aged 48 years.

On the 8th of March, Mr. Thomas Hill Roper, Chemist and Druggist, Church Street, Newent, Gloucestershire. Aged 43 years.

On the 10th of March, Mr. Henry Higginson, Chemist and Druggist, New Ferry, near Birkenhead. Aged 74 years.

BOOK RECEIVED.

THE EXTRA PHARMACOPŒIA. By W. MARTINDALE and W. W. WESTCOTT. Sixth Edition. H. K. Lewis.

Correspondence.

THE MEDICINE STAMP ACT.

Sir,—I have not always seen eye to eye with Mr. Carteighe, but fully believe with him that if the Patent Medicine Stamp Act were abolished it would be a bad day for the poorer chemists. There would be a host of 1d. drugs on cards pushed on to the grocers, and, as Mr. Carteighe truly says, "the public would cease to go to the chemist for advice" and guidance, which would be an incalculable loss. The Patent Medicine Stamp Act may be an evil, but let those who desire its abolition pause, and choose the least of two evils. VERAX.

NOTICES.

Chemists' Assistants' Association.—At the next meeting of this Association on Thursday, March 20, a paper will be read on "Antipyrin and its Incompatibilities," by Messrs. E. J. Millard and A. O. Stark.

Glasgow Chemists and Druggists' Assistants' Association.—A meeting of the Association will be held on Wednesday evening, the 19th inst., in the Waterloo Rooms, Wellington Street, when Mr. John MacMillan, Vice-President, will deliver the closing address, the subject being "Attention to Details in Business."

Liverpool Pharmaceutical Students' Society.—The next meeting will be held on Thursday the 20th at 8.30 p.m., when short papers will be read by Mr. A. Shaw on "The Estimation of Pil. Pot. Permang.;" Mr. R. H. Mitchell on "Cannabis Indica;" and Mr. J. R. Johnson on "Carum Ajowan."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Johnston, Dott, Smith, Grierson, Henderson.

GLYCERINUM BELLADONNÆ.

BY WILLIAM JOHNSTON.

Prescribers frequently order, "glycerine and extract of belladonna, of each equal parts," and dispensers are occasionally puzzled to know what proportions are actually intended in such an order. Thus it might mean equal parts by volume or equal parts by weight; or the physician, actuated by the usual custom, might wish one part by weight to be mixed with one part by measure, and probably this is the intention in most cases. A formula for the preparation is published in the 'Extra Pharmacopœia,' but even that is not quite so definite as it might be, inasmuch as the final measure of product is left undecided. In making several ounces, particularly at the dispensing counter and in a hurry, one likes to have precise data to work upon, and it would be a distinct advantage to have authoritative directions laid down in the forthcoming Appendix to the British Pharmacopœia. The following slight modification of Mr. Martindale's recipe gives excellent results both as regards rapidity of manipulation and consistence of finished preparation. The latter is quite thick enough to please both physician and patient, and still not too thick to pour comfortably into a poison bottle.

Take of—

Extract of belladonna . . .	2 ounces.
Glycerine	2 fluid ounces.
Warm water, 5 fluid drachms or a sufficiency.	

Place the extract in a warm mortar, and rub it smooth with four drachms of the water gradually added; mix in the glycerine, and transfer to a bottle; rinse out the mortar with the remainder of the water, and shake the rinsings with the main portion, making the final measure four fluid ounces.

LESSONS FROM FIELDS AND LANES.

MARCH.

River banks, sheltered hedgerows, and railway embankments furnish the bulk of the March flora. Among catkin bearers the alder (*Alnus glutinosa*) has now taken the place of the hazel. The present season appears to be a particularly fruitful one in the matter of blossom, and had it not been for the frosts of the present month succeeding the growing weather which characterized January and February, we should probably have had a plentiful fruit season to look forward to. Be that as it may, the alders were fortunate in not having opened their flowers before the advent of the frost, and are now at the first touch of real Spring bursting forth with all the impatience of youth and vigour. The alder is, in habit, one of our most variable trees, and when not in flower is neither graceful nor attractive. It is generally from twenty to thirty feet in height, with an irregular, somewhat stunted appearance, although we have seen some specimens reach a height of seventy or eighty feet and almost as graceful as the birch. The alder and birch belong to the same order (*Betulaceæ*) and differ mainly in the nature of their female catkins. These in the birch have thin scaly bracts and are *deciduous*, while in the alder the bracts are woody and the catkin *persistent*; it would, therefore, be quite correct to describe the female catkin of the alder as a *cone*. The mature cones of last year are still to be found on the trees although many of them have dropped off and may be found lying about on the ground. This is the best condition in which to study the structure of the female catkin, as the scales have separated and show the position of the little fruits at their base. The female catkins of the alder, like those of the hazel, are found on the same tree as the male catkins (*monœcious*), and are later than the males in coming to maturity. It is most interesting to note the relative position of the male and female catkins. The female all grow in groups on the upper side of the branches and point upwards, while the male hang downwards from the lower side; in this way the fertilization of the female flowers by the pollen of male flowers on the same branch is effectually prevented, a modification which, although not absolutely preventive of self-fertilization, is a distinct step in that direction. One of the best possible lessons in flower morphology may be derived from the dissection of the male inflorescence. First it should be noted that the inflorescence is pendulous and unisexual; when looked at from above it is seen to consist of a number of *peltate* or shield-shaped, reddish scales or *bracts*, with a number of little red anthers just peeping out between them. If one of the scales be separated it will be found to enclose three flowers, each generally consisting of four stamens and four minute scale-like sepals; each of the stamens has two distinct anther lobes; petals there are none. It will be remembered that in the hazel the stamens were generally eight in number; there were no sepals, and the bracts were wedge-shaped, so that similar as the catkins of the two plants appear to be there is a very distinct difference in structure. The red tint possessed by the scales and outer anthers of the alder in their early life is also distinctive, and points to the alder being somewhat higher in the scale of development, although it does not appear to have left behind yet the crude method of *wind-fertilization*, as evidenced by the immense quantity of very light pollen which it produces, and the production of flowers before leaves. Were it not for the large quantity of pollen produced by plants which are dependent on the wind for fertilization, this method would be in its results most uncertain. As it is, however, it is almost certain that every female flower has at some time a chance of catching some of the fertilizing material. It is stated by Darwin that bucketfuls of pollen have been swept off the decks of vessels approaching North America, and that the ground in Missouri has been seen covered by pollen, which must have come from the pine-forests at least four-hundred miles to the south. Pollen has been found in large quantities on the snow of the higher Alps, and in early summer almost everything of a sticky nature exposed to the wind gets dusted with it, although it exists in much larger quantities in the higher regions of the atmosphere than in the lower. It will thus be seen that for every ovule fertilized there must be an enormous quantity of pollen wasted, and that from the fact that pollen contains a large amount of nutritive material it would be a distinct advantage to any plant if it could attain the same result with less waste. We shall find that the higher we go in the plant scale the less waste there is in the attainment of any given result.

Railway embankments are just beginning to have their dull winter hue relieved by the bright yellow star-like flowers of the coltsfoot (*Tussilago Farfara*). This is one of the provident flowers which during summer and autumn lays up a store of nutritive material in its thick underground stem or *rhizome*. This material is used up in the production of flowers which are thus rendered for a time independent of their "bread-winning" organs, the leaves. As soon, however, as the flowers have reached maturity the leaves begin to make their appearance, and by absorbing from the atmosphere fresh nourishment, assist the flowers in the exhausting work involved in ripening their seeds. They then go on with their work, and all nutritive material which is not used up in forming new tissue is stored up in the rhizome for the use of next year's flowers. The leaves sometimes measure as much as ten inches across when the season is well advanced; in shape they are cordate and angled, the under surface being white and downy. Although there are no true leaves accompanying the flower, it will be found that the flower-stalk is densely covered with *scale leaves*, which to some extent take the place of true leaves, although their main function is a protective one. The *capitulum* of coltsfoot is of the usual composite structure and should be compared with the description of the order given in the article of last July.* The dandelion and daisy also referred to in that article have already sent out a few skirmishers, but their main body will not appear for another month. The ubiquitous groundsel (*Senecio vulgaris*), which flowers almost all the year round, if not showy enough to attract the attention of the rambling student, is nevertheless well worth a little attention, and if compared with its more "petted" relatives just mentioned cannot fail to furnish a very useful lesson. It is particularly interesting to note the relation between the composites in their methods of fertilization, and the different modifications assumed by their inflorescences to secure the same end. The groundsel, from the small unattractive nature of its flowers, is seldom visited by insects, and has therefore to be content with self-fertilization. If some of the florets be examined it will be found that the style in growing carries by means of its hairs some of the pollen from the anthers with it. When the stigmas expand, this falls on them, and that it is effective is proved by the fact that *Senecio* always produces plenty of seed, even in bad weather, when the chances of an insect visiting it are small. It is a remarkable fact that many plants which flower at a time when the weather is unfavourable for insect visits are provided with contrivances for fertilizing themselves; self-fertilization being in nature's economy preferable to sterility. The daisy with its gaudy ray florets, whose corollas are developed at the expense of their more essential organs, is favoured with numerous insect visitors; flies, butterflies and bees unite in paying it homage. The flowers of the daisy close up towards night and in dull weather, and in this respect resemble the coltsfoot, which requires a considerable amount of light to coax it into full bloom. In the coltsfoot the central flowers of the capitulum are all male, their ovaries being in an abortive condition; surrounding the male flowers are the females, which, unlike the males, are destitute of honey. The honey secreted by the nectaries on the top of the abortive ovary of the male flowers form an attraction for hosts of flies, small beetles and bees. In the dandelion (*Taraxacum officinale*) the flowers are all provided with fully-developed stamens and pistil, while their corollas have all become *ligulate*, the flat portion having become of considerable size, with the result that the capitulum forms in bright weather a very conspicuous object, and is consequently favoured with a proportionate number of insect visitors. Müller states that he has seen the dandelion visited by over a hundred species of bees, butterflies and other insects. In spite, however, of the great certainty of fertilization being effected by this means, the dandelion has another string to its bow. It will be remembered (*Pharm. Journ.*, vol. xx., p. 22) that the outer sides of the stigmas of many composites are furnished with a brush which, on the style growing outwards from the cylinder formed by the anthers, carries with it the pollen from the anthers (which always ripen before it), and so places it more in the way of insect visitors. Now, if by any chance the sensitive surface of the stigmas has not received a supply of pollen they curl round, and so come in contact with any pollen which has been left on the brush. It will at once be seen that this must be an immense gain to those flowers which appear early in the season, before insects are plentiful, and there can be little wonder that a plant which makes so sure of producing offspring, and which in addition takes such pains to distribute its seeds, should be so plentiful and so widely distributed.

In the present condition of "fashion" the student cannot afford to be ignorant of a flower which is now the chief feature in the London and provincial flower markets. If asked to give the habitat of the daffodil it would not be a great crime for the Londoner to give as answer "Covent Garden." Most of the daffodils which are found in such shoals in fashion's haunts are either cultivated or imported, and numerous are the varieties which have been evolved by the skill of the florist in response to the enormous demand which has lately sprung up for them. It is hardly credible that such a lovely flower should flourish in the open air in an English March; yet in many parts of England the daffodil is to be found growing wild and luxuriant at the present time. There are few things more inspiriting to the wandering botanist than a field of daffodils in full bloom; all flowers to be appreciated must be looked for in their native haunts, and the daffodil of the market is but a poor thing when compared with the daffodil which has cost the plant-hunter a hard day's walking, and the sight of which in his herbarium never fails to recall the hours of simple enjoyment spent in its quest.

Narcissus Pseudo-narcissus was the name given by Linnæus to the daffodil. If one of the wild specimens—which we assume the student has been fortunate enough to find—be dug up it will be seen that the whole plant springs from a *bulb*; this bulb is simply a form of underground stem on which a number of fleshy scale-leaves have become crowded together through the non-development of the *internodes* or spaces between the leaves; the root is seen at the base of the bulb. The sword-like leaves spring from the apex of the bulb and in their centre stands the flower stalk or peduncle, which is long and leafless (*scape*). At the apex of the scape, and just where it bends over, is a sheathing bract or *spathe* which envelopes and protects the flowers in their youth, but withers as soon as they have attained maturity and require it no longer; this spathe shows in great perfection the *parallel* venation which is characteristic of the leaves of monocotyledonous plants, and this, in conjunction with the fact that all the parts of the flower are in threes or multiples of three, shows us at once to which class the daffodil belongs. The floral envelope of the daffodil is known as a *perianth*—a name given by botanists to envelopes in which calyx and corolla appear to be combined and from being of the same colour are indistinguishable. The original meaning of the term perianth was simply the part surrounding the essential organs of the flower, and in this general sense it is now frequently used in standard works on systematic botany. By morphologists, however, the term is generally confined to the envelopes of monocotyledonous plants of the daffodil and lily type. The perianth is in this case *gamophyllous*, because its parts are joined, and *sixpartite*, because they are partly separated at the top. The bell-like organ which occupies the centre of the flower is not an essential part of the perianth, but is simply an appendage, and is known as a *corona* or crown. This crown is in the daffodil the most conspicuous part of the flower, but in many flowers of the daffodil type it occupies a much less important position, and in the catch-fly it takes the form of a number of separate scales. The stamens are on the perianth (*epiphyllous*), and it should be noticed that they dehisce along their inner side (*introrsely*), as this distinguishes the order to which the daffodil belongs (*Amaryllidaceæ*) from the crocus order. The ovary is three-celled and *inferior*, the perianth springing from the top of it (*epigynous*). In the order *Liliaceæ*, which closely resembles the daffodil order, the ovary is superior, and this forms an important means of distinguishing the two orders. The *placentation* or arrangement of the ovules is well seen in the ovary of the daffodil. Both transverse and longitudinal sections of it should be made, when it will be seen that the ovules, although in separate cells, are arranged along the same axis (*axile placentation*). In the snowdrop (*Galanthus nivalis*), a plant still to be found in flower in gardens, although seldom found wild, a distinct resemblance in structure to the daffodil will be noticed, the perianth being, however, destitute of a crown. Some of the green spots on the perianth secrete honey, which is sheltered from rain by the drooping position of the flowers. The anthers dehisce by slits at the apex, and are provided with processes which insects come in contact with when in search of honey; in doing so they shake the anthers, and so get dusted with pollen.

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* *Pharm. Journ.*, [3], xx., p. 21.

THE CHEMICAL PROBLEMS OF TO-DAY.*

BY VICTOR MEYER.

(*Concluded from page* 610.)

Kekulé in times past had recognised that carbon shows a particular disposition to form *closed* chains of six atoms. The discoveries of Baeyer and his followers, as well as Fittig's work on lactones, taught that such closed chains or rings formed of fewer atoms also exist. But while rings of six or five atoms easily form, it is more difficult to combine fewer atoms, four or three, to a closed chain. The cause of this fact Baeyer recognized as lying in the stereometric conditions. The angles which the sides of a regular hexagon and pentagon form with each other very nearly coincide with those in which the directions of the valencies of the carbon atom intersect each other, and thus, in linking five or six atoms together, the circle, so to speak, closes itself, while if more or less atoms are present this can only be arrived at by strong deviation of the directions of affinity.

But still more surprising discoveries were hidden in van't Hoff's theory. The gifted Dutch thinker had penetrated to the idea that two atoms which are linked together by a single valency rotate freely around an axis, the direction of which coincides with that of the linking valency, but that this rotation is stopped as soon as double linking takes place. This latter is an immediate consequence of the tetrahedric conception. If I stretch out my forefingers and let their points touch each other, then the hands can rotate round them as an axis; but if I stretch both thumbs and both forefingers and allow their corresponding points to touch each other, then a system results in which rotation is impossible.

These two propositions of van't Hoff having remained almost unnoticed for a decade, have lately come into great prominence. In a series of important researches Johannes Wislicenus has proved that, applying these propositions and at the same time considering the specific affinities of the groups or elements present, the stereometric aggregation of the atoms in certain molecules can be determined with probability. In an ingenious manner he has utilized the additional phenomena shown by carbon atoms trebly linked together for an interpretation of a stereometric aggregation of the atoms in the compounds formed.

Wislicenus, applying van't Hoff's ideas with courage and strictness, has advanced organic chemistry in an important manner, and has opened a field for experimental research, which heretofore had been avoided with a precaution suggestive of timidity.

New discoveries came from other sides. An intimate research into the oxims of benzil lead to the surprising result, that the validity of the second proposition of van't Hoff is not without exception. Cases were noticed, in which the free rotation of carbon atoms united by a *simple* bond, which van't Hoff disclosed, did not obtain. Further inquiry into this subject led to a renewal of the question, "What does *chemical valency* really mean?" A question to which the mind incessantly demands an answer. It had long since been suggested that valency had some relation to the electric behaviour of the atoms. The chemistry of the day expresses Faraday's fundamental electrolytic law thus: an electric current which flows through several fused electrolytes, severs in each of them the same number of *valencies*—not of *atoms*.

It was found by von Helmholtz that those quantities of electricity which, during the electrolytic process, move with the ions, are distributed among the valencies. Riecke, in virtue of his pyroelectric researches, was led to the view that the atoms are surrounded by certain systems of positive and negative electric poles.

Uniting these results with those of purely chemical experimentation, we arrive at the idea that the valencies do not appear as *points* of attack proper, but as having *linear* dimensions. The carbon atom represents itself as a sphere, surrounded by an envelope of ether which contains the valencies. The latter seem to be determined by the presence of two opposite electric poles which rest at the ends of a very short straight line. Such a system is called a *dipole*. The attachment of two valencies to each other consists in the attraction of their opposed poles. It is evident that in a radial position of the dipoles, they form an axis around which the atoms are able to rotate, but that this rotation is upset in case of a tangential position. In what has been said so far and through further considerations in regard to the electrical charge of the atoms and of the dipoles, a reason is found for the repulsion of the four valencies, and consequently for the tetrahedric grouping of the same.

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* An address delivered at Heidelberg at the first general session of the sixty-second meeting of the Association of German Naturalists and Physicians. Translation from the Journal of the American Chemical Society.

The fact that the valencies can deviate from this position now becomes intelligible; we perceive why the valencies of *one* atom cannot unite with one another, while those of different atoms can combine; it is clear that there can exist two kinds of simple linking, one of which admits of rotation, while the other does not; finally, that in cases of manifold linking the free rotation must be annulled. Hence this hypothesis opens to us an understanding of the most important properties of chemical valency.

So much may be said of the problems relating to the theory of valency.

But the doctrine of substitution has likewise experienced a peculiar enlargement. Dumas first showed that the properties of organic compounds are generally little changed when the hydrogen of the same is replaced by univalent elements or groups. Now it has been learned from later experiments that even much more radical changes in the composition do not materially influence the properties of the substance. If, for example, we replace in the hydrocarbon *benzol* two carbon and two hydrogen atoms by one atom of sulphur, the resulting product, *thiophen*, resembles benzol, chemically and physically, so closely as to be mistaken for it. We learn from this that the sulphur atom is able to take upon itself the functions of four atoms of entirely different nature. Similar facts have been found in regard to oxygen and to the imido group, which is equivalent to it.

Turning away from these researches to cast a glance upon general chemical studies which lie some years behind us, we must above all consider one of the most far-reaching discoveries of our epoch, the revelation of the *natural system of the chemical elements*. We owe this to the far-seeing Demetrius Mendelejeff. By the side of the titanic figure of the Russian scholar we see the Englishman, Newlands, and our own countryman, Lothar Meyer, successfully co-operating in the foundation and the structure of this work. What these men created has since become generally known; *they showed that the properties of the elements are functions of their atomic weights*. Mendelejeff taught us to predict the existence and the properties of chemical elements as yet unknown, with a certainty that reminds us of Le Verrier's prediction of the discovery of the planet Neptune. We can say with accuracy that even to-day numerous elements, the qualities of which, as well as the place which they will occupy in the system, can be minutely foretold, wait merely to be discovered.

The natural system has imposed upon us a problem of the greatest significance in the new determination of the atomic weights, the numerical values of which are now of increased interest. But numerous other problems are presented by the new system of the elements. Above all we are not at a loss to discern the cause of the inner nexus of the elements as the system offers it. Also by diligent work the less studied elements must be properly brought within the system. Fortunate circumstances may allow us to discover the numerous elements indicated by the periodic law. Here let us note a peculiar coincidence. We know to-day about seventy elements, but Mendelejeff's table indicates so far two small periods of seven elements each and five large ones of seventeen elements respectively. To these must be added hydrogen forming a "group" in itself.

By addition of these figures, $2 \times 7 + 5 \times 17 + 1$, we obtain exactly the number 100.

It is true that no one can say whether the missing elements will really be discovered or if further new periods might not be indicated by which this number 100 would be exceeded. But, as far as positive data are at hand, they indicate exactly the number mentioned and nothing points beyond it. An odd coincidence which seems to ally the number of the existing elements with the number of our fingers.

The discovery of the system of the elements leads us back to the question whether the chemical elements are separate worlds in themselves or whether they represent different forms or conditions under which *one* ultimate substance exists; a question that has occupied the philosophical mind since very early times. The same question was raised anew by the discovery of spectral analysis. Whosoever regards the numerous lines of the spectrum of a metal will hardly be convinced that the metal from which they emanate should be an eternally indecomposable element. In a similar manner the compound nature of the elements is indicated by comparison of the regularities in numbers of the atomic weights with the homologous series of organic chemistry.

In the pursuit of this question, which, since Prout's hypothesis and the surprises offered by Stas's determinations of atomic weights, has not been allowed to rest, positive results are not to be found. The decomposition of substances called elements into simpler ones has not been accomplished.

Nevertheless, something has been achieved, since an increased interest has been drawn towards pyrochemical research.

To-day, new methods of experiment permit of a comparatively easy determination of the vapour density, and consequently of the molecular state of the substances at the highest temperatures.

Numerous inorganic compounds, above all the very elements, have been studied in regard to their vapour density at a white heat.

While many of them, as oxygen, nitrogen, sulphur and mercury remain unchanged under such conditions, the molecules of chlorine, bromine and iodine respectively, were split into two atoms, in conformity with Avogadro's surmise of the compound nature of elementary molecules.

In the same manner, the vapour density and the molecular condition of the less volatile substances, zinc, thallium, antimony and bismuth was successfully determined at a white heat.

Careful research resulted in the exposure of the old fallacy of the existence of a sulphur molecule containing six atoms.

But how many of the problems which crowd around us at this point are for the time being entirely beyond the reach of the experimenter!

To-day, pyro-chemical work is limited to a temperature of 1700° C., because vessels of porcelain and platinum, to the use of which we are limited, fuse above that temperature. The possibility of performing quantitative experiments at these temperatures seemed to us some years ago to be an unexpected progress, but to-day we complain that the trivial cause of a want of proper vessels forbids us to increase the temperature up to 2000° or 3000° C. There is no doubt that we should arrive at new unthought of facts, that the splitting of still other elementary molecules would be possible, that a new chemistry would be revealed to us if, being provided with vessels of infusible material, we could work at temperatures at which water could not exist, and at which detonating gas would be a non-inflammable mixture!

Let us now enter other fields of physical chemistry. Golden fruit, daily increasing, has been harvested upon this field during these latter days. Again we see van't Hoff take the lead. His keen eye has enabled us to penetrate the nature of *solution*, which forms the beginning of a new epoch in molecular physics. The quintessence of his discoveries may be thus expressed:—

"Solutions of different substances in the same liquid, which contain in the same volume *an equal number of molecules* of the dissolved substance, show the same *osmotic pressure, the same vapour pressure, and the same freezing point.*"

This surprising generalization offers the possibility of determining *the true molecular weight of substances* by experimenting upon them in *solution*, while heretofore this has only been possible by transforming them into the gaseous state, hence only for volatile substances, since *dilute solutions* behave in regard to the molecular state of the dissolved substance like *gases*.

In this manner new methods are given for the determination of molecular weights, which we are now able to determine by means of measurements relating to the *freezing point*, the *vapour pressure* or the *osmotic pressure* of a solution of the substance to be tested.

These results are of the highest possible practical importance for chemistry, since they widen in an unexpected manner the possibility of the determination of molecular weights, and in a still higher degree we are surprised by the elucidation which they offer in regard to *the nature of solution*. Clausius had already admitted within narrower limits, that in solutions of electrolytes, some of the dissolved molecules were decomposed into their ions, but now this has been proved in a larger measure, particularly by Arrhenius. What a change our conceptions will have to undergo if we have to accustom ourselves to regard a dilute solution of sodium chloride as one containing, not undecomposed molecules of this salt, but separated atoms of sodium and chlorine!

We owe these revolutionizing innovations to the investigations of van't Hoff, Arrhenius, Ostwald, Planck and de Vrie, but in regard to experimental research, especially to the splendid work of Raoult, which during recent years has effected this mighty theoretical progress.

Thus we see physical chemistry moving on in weighty development. Special laboratories are opened for her and a special journal also has been started which is open alike to the records of experiment and to theoretical discussion. Through the foundation of this organ physical chemistry has been furthered in a most active manner. All the questions of the time and all those in dispute belonging to this department of science receive in this paper a thorough discussion. Dynamical-chemical questions are successfully studied, a significant impetus is given to the study of structure and affinity (widened as our knowledge of the nature of solutions has made necessary) by means of the study of the relations between chemical nature and electric conduction.

The inquiry into the intimate relations that exist between physical and chemical properties, which was inaugurated half a century ago by Hermann Kopp, is now being deepened and widened.

It is true that the great hopes which sprang from the study of thermo-chemical questions have so far been only partly fulfilled, but consecutive measurements offer more clearness also in this case.

There is no field of our science in which we may expect greater revolutions in the time near at hand than in that of physical chemistry! The value of these for general chemistry will be greater in proportion as the representatives of the same will recognize their task in this: above all to remain upon the *chemical* standpoint and to improve *chemistry* by the application of *physical* modes of thought and experiment. Those who tried to further the progress of chemistry by the use of physical methods but with insufficient consideration for chemical relations have been led into serious errors. The respect due to work of the highest merit, continued for years, has thus been lessened. Apparently, this has even been overdone, and it is much to be deplored if the interest of chemists for physical chemistry should be diminished because some of its representatives are inclined to overrate the value of their results. He who swims in the midst of high waves is unable at times to see over the crests.

Innumerable also are the problems which meet us in the domain of organic chemistry.

After the astonishing harvest of synthetical results which has been reaped here, hardly any problem of synthesis seems unapproachable. Since the artificial preparation of alizarin by Graebe and Liebermann, of indigo by von Baeyer, of conine by Ladenburg, of uric acid by Horbaczewski and particularly by Behrend, since Emil Fischer and Kiliani have elucidated the chemistry of the sugar group and Wallach that of the terpenes, we may well look hopefully for a clearer knowledge of the bodies comprised under the name albumin, and to its synthesis.

But even such success tends only to render us more modest, since they show us at the same time how narrow are the limits within which chemical synthesis moves. Assuming even that the preparation of albumin had been achieved—how infinitely far we should still be from a conception of the nature of *organized* bodies! Perhaps science is separated by an impassable chasm from the artificial preparation of a simple cell. Such an achievement lies at least beyond the sphere of chemistry.

But shall we really never succeed in sounding the process of *assimilation*, which in spite of its simplicity presents itself to us so enigmatically? Will it be found impossible to prepare artificially in our laboratories from carbon dioxide and water, sugar and starch, a process which Nature performs unceasingly in the green parts of plants?

The chemist, however, should not step prematurely upon the field of biology, while so many great problems remain untouched in his own peculiar sphere of investigation.

The *method* of research in organic chemistry, in spite of the brilliant successes already recorded, forces us even to-day to confess that only a very minute proportion of known substances is within its reach. In order to isolate an organic substance we are generally confined to the purely accidental properties of *crystallization* or *volatilization*. Have not those thousands of amorphous substances, which cannot be characterized by any chemical property, and which the chemist is forced to lay aside because he is unable either to purify them or to transform them into volatile or crystallizable bodies; have they not the same claim upon our interest as their more beautiful and more manageable comrades?

The most significant progress of organic chemistry does not consist in single discoveries, nor in further expansion of synthetical success. What we want are: *New methods for recognizing the individuality of substances.* The black substances of earthy nature, the innumerable formless and resinous products in the bodies of plants and animals, the colouring matter which gives beauty to flowers, all of these to-day mock our efforts to know them; they will form a new and inexhaustible field for the prosecution of chemical research when *methods* shall have been found with which to begin this research.

And as in organic chemistry, so in *mineral chemistry* every step leads to questions, which we have as yet no means of answering. The synthesis of minerals and of rocks has made important progress, it is true, and this as well as the application of the doctrine of structure to the study of mineral species gradually lead to the understanding of their constitution. But we are, as yet, unable to use, in the study of minerals, the method of *analytical decomposition* which has been so successfully used to study the constitution of organic substances, and above all we lack the least knowledge in regard to the *true molecular weight* of minerals.

Quite recently we have been presented with no less than three new and fruitful methods for the determination of the molecular weight, but not *one* of them gives us an indication of the true molecular weight of the most simple oxides, such as silicic anhydride or calcium oxide.

We know to-day very well that silicic anhydride cannot have the formula SiO_2, that this must be multiplied by a very large factor; but of the numerical value of this latter we have no indication. And thus also in mineral chemistry we must aim not exclusively at finding new *facts*, but *new methods of research* in the first place, if a period of new discoveries is to be attained in this branch of our science.

But how can we conclude this brief review without mentioning also the *applications of chemistry to the industrial arts*, the progress of which has mainly contributed to spread the splendour of our science most widely? The infinite variety of the tar colours, surpassing the colours of flowers in number and brightness, is daily increased by new discoveries. The industry of these forms the most brilliant triumph of purely scientific laboratory work applied to manufactures. This industry in the simplest manner and on the largest scale performs the synthesis of compounds the complex nature of which is indicated by the names they bear. The unscientific man is frightened when a beautiful and brilliant dye is referred to as *Hexamethylmethoxytriamidotriphenylcarbinol*; for the initiated there lies in this unpleasant name a full account of the synthesis and the constitution of the dye.

Industry has learned to derive not only colours but healing medicines also from coal tar. Antipyrin, discovered by Knorr, upon the basis of Emil Fischer's fundamental research upon the hydrazines, brings to thousands suffering from fever relief at least, if not cure. Let us hope that the time is not far distant when *real* fever curatives, which like the natural alkaloids of the cinchona bark, not only temporarily *suppress* the disease, but really *cure* it, may be prepared by synthesis. Until then be patient and do not chide chemistry if, for the time being, she offers only silver instead of gold.

Events in this field of the great chemical industries are significant. We are the witnesses of a great combat taking place between the older process of Leblanc for the preparation of soda and the new one of Solvay, called the ammonia-soda process. The intelligence and inventive genius of manufacturers have added, under the pressure of this competition, a large number of improvements to the manufacture of sulphuric acid and of soda and new and valuable methods for the preparation of chlorine. Here, more than in any other branch of chemical industry, the struggle for existence is fierce.

The manufacture of iron, that most important chemical industry, is transformed by innovations. The imposing changes wrought by the older process of Bessemer, by the new one of Thomas, are they not based purely upon chemical reactions? The grandest application of a complicated chemical reaction to a great manufacture is, perhaps, the dephosphorizing of pig iron by lining the Bessemer converter with basic material, an invention which we owe to Thomas and Gilchrist. From this, again, agriculture derives an advantage in the use of the Thomas slag containing the phosphorus which heretofore rendered iron ore less valuable. This, then, is truly a transformation of stone into bread, similar to the older manufacture of soluble fertilizers from mineral phosphates. Nevertheless, the era of bliss which was prophesied three years ago at the Berlin meeting of naturalists by our illustrious colleague, Ferdinand Cohn, has not yet dawned. He held that all struggles for existence amongst men, arising from want of food, the bread question, will be done away with when chemistry shall have learned to prepare starch from carbon dioxide and water. But since time immemorial the farmer is occupied in this very chemical industry, and it would hardly be great progress if the farm were merely replaced by a chemical factory. But we may reasonably hope that chemistry will teach us *to make the fibre of wood a source of human food*.

Indeed, if we consider how small is the quantity of starch which the grain furnishes us, and further that the wood fibre has exactly the same chemical composition as starch, we see the possibility of increasing the production of food infinitely by solving this problem: *to transform cellulose into starch*.

If this problem were solved we should find an inexhaustible source of human food in the wood of our forests, in grass, and even in straw and chaff. The beautiful researches of Hellriegel have recently disclosed the fact, which in former times was disputed, that certain plants transform atmospheric nitrogen into albumin, and that this process can be improved by suitable treatment.

The increase of albumin in plants, according to a plan, together with the production of starch out of cellulose—this would in reality signify the abolition of the bread question.

May it some day be granted to chemistry, through such a discovery to inaugurate a golden age for humanity.

I have tried to give a review of the most important problems which are set before chemical science. I have mentioned a goodly number, but the short time of one hour permits me to touch but slightly upon the greater ones. There are so many problems before us which await an immediate solution, as to justify what I said in the beginning; that to-day the chemist has no time to complain because the epoch of a mathematical treatment of his science has not yet arrived.

Nevertheless, the brilliant successes which have been gained, the wonderful results which are immediately within our reach, have not the power to turn our eyes from this final problem.

The Newton prophesied to chemistry by Emil du Bois Reymond, may he appear at a later period; until he comes, may many a generation honourably plough on in the sweat of its brow! We must remember that Nature is not understood by us until we are able to reduce its phenomena to simple movements, mathematically traceable.

The time will come, even for chemistry, when this highest kind of treatment will prevail. The epoch in which the foremost impulse of its research was a serenely creative phantasy will then have passed; the joys, but also the pangs and struggles, peculiar to youth will have been overcome.

Reunited to Physics, her sister Science, from whom her ways at present are separated, Chemistry will run her course with firm and unfaltering steps.

The Pharmaceutical Journal.

SATURDAY, MARCH 22, 1890.

THE RELATION OF PHARMACISTS TO THE PUBLIC.

At the last meeting of the Manchester Pharmaceutical Association a very excellent and thoughtful paper was read by Mr. Kirkby, which we are enabled to publish in full this week. The subject dealt with was the purity of drugs, and stress was laid upon the importance of the pharmacist's position in this respect to the public and to the medical profession. If it be admitted that pharmacists should be regarded as the only trustworthy distributors of drugs to the public, and that on that ground the dealing in drugs should be practically restricted to them, it naturally follows that it is their duty to apply their special knowledge and skill to ensure the purity of the drugs they supply. It is only to the extent to which pharmacists succeed in impressing the public with a conviction that such special knowledge and skill are necessary and are actually exercised that it can be expected that they will be held in higher esteem than grocers or drysalters. The plea that articles are sold as they were bought might suffice in the latter case, but it cannot be relied upon in the former, if the true position of the pharmacist is to be maintained and if his claim for a fair remuneration is to be recognized. It is solely in virtue of the individual qualification of the pharmacist, by means of his special education, to choose for the public in matters that ordinary laymen are unable to judge of or appreciate, that he can expect to be the recipient of confidence and of the advantages attaching to that position. This important principle was well expressed by Dr. Leech at the Manchester meeting of the Pharmaceutical Conference, when he said that in the future each pharmacist must be the guarantor of the purity of his medicines. These words are very appropriately quoted by Mr. Kirkby in his paper as indicating the very essence of what is necessary for the attainment of the objects contemplated by the Pharmacy Acts. But when the existing conditions under which the distribution of drugs to the public are considered, there are a host of circumstances which show that side by side with the desire for the restriction of the trade in drugs there is no sufficient recognition even by qualified men of the principle above expressed. And as Mr. Kirkby remarks, it is too much to expect of a thoughtless public that the importance of pharmacy should be properly understood when so many trained in its lap are slow to apprehend its true relation to the public.

It must not be thought from these remarks that the trade aspects of pharmacy are not duly regarded by Mr. Kirkby. On the contrary, he seeks to show that the proper relation of remuneration to pharmacy does not depend solely or mainly upon the questions of profit and loss, which are all that is necessary in other kinds of business. Some excuse is to be found for the disregard of this truth in the conditions under which the trade in drugs is sometimes carried on, even by men who have a legal qualification. While some are striving to have it classed as a profession, and anxious to push into the background the trading element by which it differs from the occupation of the medical man, others under the pressure of necessity find themselves compelled to take in hand a variety of accessory trades, and proportionately to disregard the scientific and professional side of their calling. Such men are impatient that some of their fellows are unwilling to be ranked as tradesmen, while their own demands for relief of their trading difficulties are not listened to. But Mr. Kirkby does not trust to legislation for such relief or for general improvement in the position of pharmacy. As regards trade grievances, he seems to consider that the dissimilar conditions of individuals, and the consequent utter absence of concordant opinions, preclude the possibility of any benefit being effected through Acts of Parliament. The want of agreement between the owners of the better class dispensing establishments and of those where the business carried on is but little above drysaltery he regards as an insuperable obstacle. Though both are qualified by law, and each claims to have a voice in the framing of any law affecting them, they cannot be expected to agree in their views as to what is for the benefit of pharmacy. On this point Mr. Kirkby speaks out very plainly, since he holds that nothing is to be gained by hiding our heads ostrich-like in the sand, and he adds that there are many possessing the certificates of the Pharmaceutical Society examiners who have no claim to be pharmacists beyond that certificate. The same view has often been put forward before, though less pointedly, and it has been made the basis of an anticipation that before long there must in the nature of things be a separation of the pharmaceutical section of the body from that which by choice or necessity adheres to the more purely trading portion of the business. With these few remarks on the leading tendency of Mr. Kirkby's paper we commend it to the attention of our readers as being, under present conditions, a valuable contribution towards the solution of the problem as to the future of pharmacy.

A recent application from the French Minister of the Interior to the Academy of Medicine, for advice as to whether he should authorize pharmacists to supply antiseptic substances upon the orders of qualified midwives, led to the appointment of a committee to inquire into the present practice in France and other countries where restrictions are placed upon the supply of medicinal substances except upon the prescriptions of medical practitioners. It was found that in Saxony the midwives are under the supervision of a district doctor, from whom they may obtain two orders for each lying-in, one for 50 grams of carbolated vaselin and the other for 150 grams of liquid carbolic acid. Directions are given with the carbolic acid as to the preparation from it of 2 per cent. and 5 per cent. solutions, and the containing bottle must bear an "attention" label. In Prussia a very precise regulation of a similar nature was issued in 1888. In Belgium the antiseptic allowed for midwives varies with the province. That in Liége consists of 10 grams of corrosive sublimate dissolved in 100 grams of alcohol and coloured with indigo, a teaspoonful of the solution in a litre of water giving a 1 to 2 per 1000 solution. Carbolic acid is allowed to be supplied in some districts, whilst in others the midwife is permitted a choice between the two. In France, since 1882, the accoucheurs at the hospitals have been allowed to supply associated midwives gratuitously for each case with a litre of a strong solution of 250 grams carbolic acid in 750 grams of denaturized alcohol, with 20 grams of oil of thyme added. After consideration of the information collected the committee reported in favour of midwives in France being allowed to obtain supplies of a suitable antiseptic, mercuric chloride being the one selected. It is incidentally mentioned in the report that in the Brussels Maternité, the puerperal mortality, which whilst carbolic acid was used as an antiseptic had amounted to 0·96 per cent. on 3442 cases, has entirely ceased since mercuric chloride had been substituted, whilst in the Paris Charité not a single woman has succumbed since February, 1886, to septicæmia contracted in the hospital. The Academy was therefore recommended to advise that pharmacists in France should be allowed to supply to midwives packets containing 0·25 gram of mercuric chloride, 1 gram of tartaric acid and a milligram of Bordeaux red, each packet to bear a red poison label, with a statement as to the quantity of mercuric chloride it contains and a direction that the contents are to be dissolved in a litre of water. The tartaric acid is added to facilitate the solution of the mercuric chloride in the water and to prevent the formation of insoluble albuminates of mercury. In addition it was thought that it should be allowable to supply 30 grams of vaselin containing 1 per cent. of sublimate. Some discussion arose in the Academy as to the tinctorial agent recommended, as giving a colouring resembling that of wine, and it was ascertained by experiment that Coupier's blue, in the proportion of 5 milligrams to the litre, gives a liquid sufficiently coloured, but which does not stain linen. Eventually the recommendation was adopted by the Academy, with the exception of the part as to the colouring agent, which was left an open question.

* * *

We understand that at the instance of the Treasury proceedings are being taken against the chemist who sold the preparation which was the cause of the death of a child, as reported at page 671 of the Journal. The ground of action is for the sale of poison without being properly labelled, as directed by the 17th section of the Pharmacy Act. The case is set down for hearing this week after the Journal goes to press, but a full report will be given next week.

On Thursday next, the 27th inst., the Anniversary Meeting of the Chemical Society will be held as usual in the Society's Rooms at Burlington House, at 4 p.m. for the election of office bearers and Council for the ensuing year. We are informed by the Honorary Secretary it is also intended that on this occasion the fellows and associates of the Society and their friends shall dine together after the meeting at the Whitehall Rooms of the Hotel Metropole. It is expected that many fellows of the Society will be present at the dinner, and we understand that a number of distinguished guests have accepted invitations. The dinner is to take place at 7 for 7.30, and fellows of the Society who desire tickets should apply for them at once to the Honorary Secretaries at Burlington House. The idea is entertained that if this proposal to hold a dinner is well supported, it may in future be possible to make such a gathering of the fellows an annual event, and conducive to the advancement of the objects for which the Chemical Society was founded.

* * *

A circular dated from the Royal Society has been issued stating that at a meeting of the Committee appointed by the Council to set on foot a memorial to the late James Prescott Joule, it was resolved to raise a fund for establishing some international commemoration of Joule's work, having for its object the encouragement of research in physical science, as well as the erection of a tablet or bust in London. The service rendered by Joule, as the discoverer of the law of conservation of energy, both to science and industry, is so well understood that it may be expected there will be an abundant response in support of this suggestion by those who appreciate his work, and by those who have profited from it. A large number of eminent scientific men have already consented to serve on the Committee in course of formation for the purpose, and the donations already promised amount to a considerable sum. Those who desire to contribute to the fund can send their subscriptions to Sir Henry Roscoe, the Honorary Secretary of the Committee at Burlington House, marked "International Joule Memorial Fund."

* * *

We have received from a wholesale firm a sample of spirit of sal volatile that, we are informed, is being sold at a low price in bottles which purport to be four-ounce, but really contain only three ounces. Though described on the label as "prepared according to the British Pharmacopœia," it is stated to be of inferior gravity, deficient in spirit and in aromatic constituents. It would therefore appear to be an article illustrating the pernicious "Cheap Jack" trade in medicinal preparations that is too extensively carried on, and, though really a form of imposition, gains too much support from the uninformed section of the public, while tending to degrade the pharmacist to the position of a mere vendor of ready-made articles of which he has no personal knowledge. Any person aggrieved in this way by the sale of defective medicinal preparations has a remedy under the provisions of the Food and Drugs Act, or if the case involves detriment to the public interest the police authorities have power to take the requisite proceedings for the punishment of offenders.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The last ordinary monthly meeting of the session was held in the rooms of the Chemical Club, Victoria Hotel, on Wednesday, March 12, Mr. W. Wilkinson, Vice-President, in the chair. The following paper was read.

THE PURITY OF DRUGS.

BY W. KIRKBY, F.L.S.

While the pharmaceutical mind is being so violently agitated with rumours of new Acts of Parliament and with law court decisions, it may not be amiss if attention is once more called to the *raison d'être* of pharmacy. It is well that we should carefully consider our relation to the public and see if there is not something solid on which we can take our stand amid the wearying conflict of opinions. A foundation which will answer our requirements seems to have been furnished by Professor Attfield in his two celebrated Conference addresses, in which he teaches that the pharmacist is, or should be, the ultimate distributor of drugs to the public. That this was the idea involved in the Pharmacy Act of 1868 is undeniable. Granting this almost self-evident proposition then, I should like this evening to consider some of the conditions under which the drug distribution has to take place. If we can lay aside our prejudices and put out of our minds the question of profit and loss, so much the better; but do not imagine that I wish you to understand that pharmacy has no relation to remuneration. It has; and I hope to indicate how a fair remuneration may be obtained by those who are willing to think of something beside. There are those with whom the first question is, "How will it pay?" For them the subject of this paper will have but few attractions.

In endeavouring to examine our position we may take into our confidence some lay-friend and ascertain his views on the necessity or otherwise of our body. To the public powdered rhubarb is the same by whoever's hand supplied. There are exceptions doubtless. Education in the matter of drugs and their uses is very uncommon, hence the lack of appreciation of the qualified man. It is no unusual experience to find that people will readily buy their simple drugs at the stores, at the same time that they take their prescriptions to be compounded at a dispensing establishment. Although some of our own body admit that a pennyworth of Epsom salts can be sold as well by a grocer as a chemist, we may safely question it by adding the rider, "supposing it is Epsom salts and not sulphate of zinc." It is not in the act of selling that so much discretion is needed as in the act of buying. The selling of poisons has been the text of many a speech and letter; but the selling of pure drugs has, in the lay mind particularly, received but scant notice. Too frequently the public has been taught to look upon us as the guardians of poisons; as watch dogs to see that no one obtains unnoticed the means to do himself or his fellow an injury; instead of looking upon us as men qualified to choose for them, by means of our specialized education, the best and most efficient means of restoring them to health and strength. Every pharmacist ought to feel proud when he thinks of the confidence to which he is entitled, but too seldom obtains, frequently through his own obtuseness. It is perhaps too much to expect of a thoughtless crowd that the importance of pharmacy should be properly understood when so many trained in its lap are so slow to apprehend its true relation to the people. Much excuse can be made even for this when we consider what a variety of trades are linked with it. Some are striving to have it ranked as a profession, being wishful to push into the background the trading element, out of the sight of the medical men and our other scientific coadjutors; others are made to feel the keen competition in obtaining a livelihood too sorely to pay much attention to the scientific aspect of their calling, and are impatient that some of us are unwilling to be called by the name of tradesmen when their claims to have their trading difficulties ventilated are met with a deaf ear. A little above one rank we are yet below the other. Let us accept our unique position as followers of the art of pharmacy.

The hope to obtain any alleviation of our hardships by means of Acts of Parliament is vain. Our Legislature might do something for us if we could agree, but how can we do so when we have such dissimilar elements as the high class London and provincial dispensing establishments, and the miscellaneous stores of our country towns, where the assistant is measuring gallons of oil one minute and making up a prescription the next, as well as the drysalteries of the back streets, where a prescription is seen probably once a week, all owned by qualified men having a voice in the framing of any law affecting their legitimate calling. There are many possessing the certificates of the Pharmaceutical Society's examiners who have no claim to be pharmacists beyond the said certificate. I trust no one will feel offended at a fair presentation of the matter. Nothing is to be gained by hiding our heads ostrich-like in the sand. These having had what they are pleased to call a course of training, scramble through the examinations with the sole idea of getting the title "chemist and druggist," with its valuable (?) right to sell poisons; henceforth the greater part of the life is spent in the business of drysaltery. To make laws beneficial to the true pharmacist and to the drysalter is not to be expected; yet we must listen to the drysalter's claims because he has passed his examination, and is entitled to call himself a "chemist and druggist."

Having looked at one reason why we cannot expect much from legislation, namely, the necessary division among ourselves as to what we need, let us consider another with a very different bearing. It involves a great principle which is frequently lost sight of by promoters of Bills affecting only one or few sections of the community. The fundamental axiom of all truly wise government is "the greatest good for the greatest number." In attempting to obtain anything of the nature of a monopoly, unless we are prepared to make an adequate return to the public, which shall be for their good, we should be attempting to stem a current which is most surely breaking down the prejudices of class, and is equally surely overturning all obstacles to the equal rights of the people. So much for the broad principle. Expediency has the power of modifying everything in this make-shift world; but it is nevertheless right to examine the spirit of the times in which we live. Henceforth, no class can obtain government protection without giving the nation a fair equivalent. It may be contended that our examinations are of the nature of a surety for our fitness for our work, and that they merit greater recognition than they have yet received. That may be open to question; but possibly some kind of an answer to the contention will be suggested by our further remarks.

If the distributor of drugs is to fulfil his duty to his fellow citizens his first care will be to see that his goods are pure. In the words of Dr. Leech, in his address before the Pharmaceutical Conference, "*each pharmacist must be in the future the guarantor of the purities of his medicines.*" To insist on the importance of reliable drugs may seem somewhat out of place here; but I will venture to emphasize their importance. Notwithstanding all the recent additions to our pharmacological knowledge and to the numerous aids to successful diagnosis, medicine still remains, especially in the case of the ordinary practitioner, for the most part, a system of empiricism. Experience is still the touchstone by which new drugs are tried. Unless they be free from admixture with foreign substances and in a clean condition, how can it be possible for the medical man to be sure that the required result will follow their administration? In view of our comparative ignorance of the active principles of vegetable drugs it is possible that a large amount of harm may follow from the use of an admixture of an unknown kind. Beside this possibility of mischief there is the probability that the purposes of the doctor may be entirely frustrated, and not only so, but he may be induced to think that his diagnosis has not been a correct one, and may alter his treatment so as to prejudice the chances of the patient's recovery. To obtain like results in similar diseases it is absolutely essential that pure drugs be given.

That useless, stale and adulterated drugs, crude and elaborated, are supplied to the public is not to be doubted. It is not to the point to say that only such and such a percentage of adulterated samples is returned by the analysts in their reports. There should not be one solitary instance if it can possibly be avoided. We find that vegetable drugs, and it is to these I would now more particularly direct your attention, not infrequently are replaced in the drug sales by substitutes appearing under the same name. In proof of this we have the cases of the West African pareira brava, the false East Indian ipecacuanha, and the false chiretta (*Ophelia alata*). It also happens that fraudulent admixtures are brought into the country and find their way into commerce; for instance, cubebs mixed with other piperaceous fruits; saffron mixed with foreign vegetable and mineral matters of nearly every kind; admixtures of kamala with sand; and others. Numerous instances of admixture are directly traceable to the ignorance of the people who collect the drugs. Aconite is a familiar example. That many of these substitutes and admixtures are detected at the drug sales is greatly to the credit of the buyers who attend. While rendering honour to those wholesale houses which buy only the very best articles, we must bear in mind that the keen competition of business is a powerful incentive for comparatively unknown and small houses to yield to the temptation of buying these worthless goods. Then we must not forget that the law demands no evidence of a knowledge of materia medica from wholesale druggists. They are liable to make mistakes. And not having studied botanical science they cannot be expected to know the limits of variability in plant structures. It is probably for some reason like this that the medical practitioner has almost ceased to use strophanthus. Some specimens which have appeared in the market have been found to contain no active principle. The buyers in the drug market, not being acquainted with the distinguishing physical characters of these inert samples, may occasionally have bought them and used them for preparing the tincture, with the result that the remedial action of the physician's medicine has been lost and he himself disappointed.

While speaking of the relations existing between pharmacists and wholesale houses it is right to mention, with deprecation, the almost complete confidence existing between them. In some degree this is gratifying. The plant, however, which delegates its function of food production to another, in other words, trusts to another for a proper supply of provision, is a parasite; becomes degraded in the scale of existence. The analogy is plain. The man who trusts to another for a proper supply of drugs, crude or elaborated, forfeits the confidence of his customers. The habit of buying tinctures and other galenical preparations is a bad one. It is a proof of trustfulness, but no proof of the care which the law expects the pharmacist to exercise in his calling. Good wholesale drug houses do, without doubt, exercise the greatest possible care in the manufacture of their preparations; but should the retailer take upon himself the moral responsibility of the possible mistakes of every laboratory labourer that may have handled the preparations? I say moral responsibility, because too frequently it is to be feared many mistakes are never detected. No doubt most of you can call to mind articles that have not been correctly labelled, and which, but for your carefulness, might have been taken into stock and used.

The possibility of impure drugs being received and stocked by assistants and apprentices is not a remote one. It needs but to be mentioned. The education of the qualified man is usually of such a meagre description as to be of but little assistance to him when he has to deal with powdered drugs. How many are sufficiently well equipped as to be able to tell whether a sample of powdered rhubarb is pure? Indeed, the pharmaceutical knowledge displayed behind the counter is not always even approximately accurate. Perhaps you may think I am drawing a needlessly dull picture of the state of pharmacy, and may feel ready to reply that the information possessed is of a sufficiently high order to satisfy the public, and is quite proportionate to the profits businesses usually yield. It must be owned that information is a commodity people usually endeavour to obtain gratis; nevertheless, in these days of keen criticism, it is not possible to palm off a lot of high flown nonsense as sound knowledge. To illustrate what I mean. A little while ago I had occasion to visit several chemists' shops in search of some powdered ipecacuanha. At one establishment the proprietor, a man of probably 36 to 38 years of age, informed me that he was very sorry he had not any as he had used it all the previous week for making the wine. This was excelled, however, by another, who, on my first inquiry, doubted whether he had any, but if I wanted it "for making the wine the contused seeds were generally used," at the same time opening a parcel of the coarsely powdered root.

There are many ways in which drugs become unfit for sale. Leaves are found to be mouldy through being kept in damp places; roots worm-eaten; powders infested with insects; tinctures deficient in spirit through ineffectual stoppering; extracts dry and hard, and in the case of standardised extract of nux vomica this means increase of strength; other examples will occur to most of you. Cleanliness is not always a strong feature in the storing of drugs, particularly in drawers, which are often badly made. The dust finds easy access and the contents become deteriorated. I have endeavoured not to exaggerate in this matter. What I have put before you has all been said many times before by men far better qualified for the task than myself. My desire is simply to accentuate their words and try to lead you to some remedy. For it must be admitted that we do not possess in our ranks more than the average number of honest and fair dealing men. As a body we are as wishful as any to make the most of our goods; to have nought left on our hands; and in consequence of the exceptional nature of our wares, and the absence of special pharmaceutical knowledge in the public, we can do this in the majority of cases without let or hindrance. If a customer does obtain an article at two shops which happen to differ slightly in appearance or taste, the poor unfortunate who happened to supply the second demand, no matter how good his article or how honest his intention, is almost sure to be branded as incapable, if nothing worse.

To ensure the proper management of pharmacies the Pharmacy Act of 1868 was passed. In this the most prominent attention is given to the supplying and dispensing of poisons, and to restricting the use of certain titles. The only provision made for the supply of pure drugs is implied in the sections requiring evidence of specialized knowledge at the hands of persons desirous of entering the trade. Of these sections the Council of the Pharmaceutical Society have made such use as has seemed desirable. They have drawn up a scheme of examinations which, if a man conscientiously endeavours to pass them, will ensure him having a fairly liberal education. But examinations can only gauge the student's memory; his method of thought is not exhibitable at the word of command. They are, therefore, but a poor substitute for a proper course of training. So short a time is usually spent by our students in the study of chemistry and materia medica, preparatory to presenting themselves before the examiners, that it is fair to assume that their studies must be very superficial and quite inadequate to qualify them for testing and examining their drugs. That this means of protecting the public was of little value is shown by the need for a Food and Drugs Adulteration Act. This also has almost completely failed in its purpose, so far as drugs are concerned; and this for several reasons. Unlike articles of food, concerning the quality of which almost every purchaser is able to form an opinion, drugs are only occasionally used by the public. This comparative unfamiliarity with them forbids the buyer to judge of their purity. If he should suspect there is anything not quite right he would prefer to throw away the article rather than hand it to the analyst. When examinations of pharmaceutical goods are undertaken, it is usually at the suggestion of a district analyst. Frequently a raid is made upon several chemists, and if we may judge from recent experiences the results are not greatly to our credit. The training of public analysts in the examination of vegetable drugs is in many instances an unknown quantity. Crude drugs are as a rule ignored by them in their spasmodic efforts to put the law in force. Knowing their inefficiency, it is natural they should hesitate to invite the cross-examinations of the law courts. These crude substances might, therefore, continue to be adulterated without any legal interference whatever. And if it were not for the efforts of the officers of the Pharmaceutical Society, and of many pharmacists, impure drugs would find their way into the hands of the public very frequently, and there would exist little possibility of detection. These persons exercise a decided moral influence upon the trade by reporting in the journals instances of admixture and adulteration, together with means for discovering the same.

It is matter for regret that so few pharmacists concern themselves with the scientific aspect of their calling. They neglect to keep up to date the knowledge acquired in their student days, and thus allow to rust their only weapon of defence against the negligent wholesale dealer. It was to help these helpless ones that the Pharmaceutical Society in 1883 elected a standing committee, which should collect, examine, and report on adulterated drugs. The reports were to appear periodically in the pharmaceutical press. The idea was most excellent. Whether the result was equally so I cannot say, as I have carefully searched the pharmaceutical journals down to the present day, and have not met with a single report.

It is evident, therefore, that such supervision as does exist is purely of a voluntary kind. That it has accomplished its purpose so well under such peculiar conditions is astonishing. We may doubt whether it will continue to do so. We will look at the supervision exercized abroad, which, though it does not always answer the end desired, is decidedly far in advance of our happy-go-lucky system. I am aware that any comparison I may make between this country and those of the Continent will be answered, some may think effectively, by a shrug of the shoulders and a drawling intimation to the effect that we are above that sort of thing. It is unpleasant to have to acknowledge that they manage these things better abroad; but we had better realize it now, while it is possible to hold our own, than to ultimately find we are completely in the rear. But to return to my immediate subject. In most continental countries the embryo pharmacist has to undergo a thorough course of instruction. In some the period of collegiate training is clearly defined, as well as the period of practical training; this is the case in Germany, where the examinations are of a very much higher standard than anything we have. Even in Belgium our Pharmaceutical Chemists would cut but a sorry figure at the examinations. Subjects which we ignore altogether take a prominent place, such as toxicology, mineralogy, analysis of food and drugs, and microscopy. In this high class training we have the chemist's guarantee for the purity of his articles. But the continental governments are not usually satisfied with that. Knowing the frailties of the flesh, they make provision for such as may yield to indolence, avarice and other vices, by appointing inspectors, who make periodical visits for the purpose of seeing that the pharmacies are kept in proper condition. These examine the drugs and see that the poisons are kept in suitable places. They are authorized to take, for the purposes of analysis, samples of any drugs that are of doubtful quality. The inspectors in France are appointed from among the pharmacists of the first class. It is worth remembering that this inspection of pharmacies has been sanctioned by our own Government and is in force in the island of Jamaica. In connection with this subject, let us note that the number of pharmacies in many of these countries is strictly limited and the sale of the greater part of the materia medica is restricted to them. The owner of a pharmacy in Germany is practically the possessor of a fortune.

In America we find another means of preventing drug adulteration in force, namely, the appointment of experts to examine all consignments of drugs from abroad. In this way many suspicious articles are kept out of the country.

It would appear that in this country we are extremely lax in this matter of drug adulteration. That the Government and the public have not as yet seen the importance of providing pure drugs must be confessed; but when they do realize its importance it seems almost certain that we may expect the enactment of very stringent regulations. It will not avail us to plead that there are vested interests to be considered. That cry has a diminishing power every year. Neither will it avail us to protest against the visits of inspectors as an unwarrantable interference with trade. The ingrained belief of the English mind that a man can do what he will with his own is gradually, but surely, being eradicated. We have factory inspectors, sanitary inspectors, cruelty to animals inspectors, school board inspectors, coal mine inspectors, and it is expected that there will shortly be boiler inspectors. These facts indicate very plainly in what direction we are going. In view of all this I would ask, is it not advisable that we should anticipate the action of the Government? It is possible now for us to take such action that shall enable us to utilize the rising of the tide to our own advantage.

We must concede that our present system of education and examination allows a man with the veriest minimum of scientific knowledge to obtain the pharmaceutical licence. If we were considering the whole matter of education I should say that at least one or two modern languages, besides our native one, should be required, together with toxicology, zoology, analysis of foods and drinks, the anatomical and histological examination of the vegetable materia medica in addition to the present subjects. It is this latter subject that is of peculiar import. England is in the van in everything relating to the mechanism of the microscope. That the scientific and commercial usefulness of this instrument is not more generally recognized is remarkable. For the pharmacist it is invaluable, especially when combined with a systematic training in vegetable anatomy and histology. It is not an uncommon error to suppose that one only needs to look down the brass tube to see and understand at once the structure and composition of an object. Whereas it requires as careful a study of the article under examination as if it were undergoing chemical analysis. Of nothing is it more pertinent to say,—"Never believe all you may see, or you may believe more than you see." The pharmacist's education is, or should be, the greatest guarantee the public can have of the wholesomeness of his drugs. But we are, as I have indicated before, touched with the infirmities of the generality of mankind. This brings us to the adoption of some means of keeping the pharmacist up to his duty. To do this there should be the inspection of pharmacies by experts, who should be armed with authority to bring away for examination samples of all unsatisfactory articles. They would also, no doubt, see that proper provision was made for the safe keeping of poisons and for the dispensing of prescriptions. A great deal of opposition would be encountered in the carrying out of this suggestion. The force of this would be diminished if this visitation were extended to all persons selling drugs, as is done in France. The consequence of such a regulation would be to cause stores, and unqualified persons generally, to look upon drugs as involving too much trouble and annoyance, and there would take place the surrender of them into the hands of the legitimate distributor. A laboratory for the examination of such articles as the individual pharmacist found beyond his analytical powers should most certainly be established. That the officers of the Pharmaceutical Society are always willing to give an opinion upon any article submitted to them has been proved again and again. The members of the trade ought to feel that they owe a debt of gratitude to the gentlemen at Bloomsbury Square, who are willing to spend their time upon questions which are so constantly brought before them. The knowledge so freely placed at our disposal is not ours by right. Every member of the Pharmaceutical Society ought to have the right of sending to a central laboratory for analysis any drug or preparation which he may consider as not being of the quality demanded by him from the wholesale dealer. Of course this would be, like everything else, open to abuse, and would need fencing round with proper rules and restrictions. Questions frequently arise which are quite outside the ken of the ordinary man of business, and these require answering with the aid of expensive apparatus, or in a well-furnished library, or in the presence of numerous specimens. The providing of some help of this kind would be looked upon by members of the Society as some equivalent for their subscriptions. I do not mean that the subscription should be expected to pay for the expenses incurred; but that it would give a member the right to appeal to this central laboratory. The serviceableness would be apparent if the visitation of pharmacies was an accomplished fact, as chemists would hasten to assure themselves that their goods were of the right quality. In the same establishment it might be arranged that all questionable articles collected by the inspectors should be examined. In short it would be a pharmaceutical Somerset House.

When the Food and Drugs Adulteration Act was passed, a clause was inserted for the appointment of an expert to examine all teas immediately on importation. The reason given for making this appointment was that it had been represented that tea comes adulterated from abroad. We have seen that many of our drugs are imported in an adulterated condition. It is reasonable, therefore, to suggest that what is done in the case of tea, and what is done so successfully in the case of drugs in America, should also be done in the case of drugs in this country. The Royal Commission on Adulteration of Food said in their report that they considered that the public were more cheated than poisoned. But when dealing in drugs the public may not be cheated only, but possibly poisoned. Hence we conclude that the necessity for the examination of imported drugs is more urgent than the examination of tea.

There is one more suggestion that arises; this likewise being a spur to the pharmacist. Any pharmacist found guilty of wilful negligence in the performance of his duty as dispenser or distributor of drugs should be liable to have his name struck off the register of chemists and druggists. I think this needs no comment. It is a practice found in other professions and prevails in other countries. It is time that we improved ourselves. Pharmacy is what we make it. If we wait for the government to improve our condition it will most probably be in very undesirable directions. Many of the things I have put before you, may have the appearance of hardships, and you perhaps think you have plenty of them to bear already. The Pharmaceutical Society had considerable powers put into its hands in 1868, which powers it has used for improving the position of the chemist and druggist, while the only burden it has laid upon him has been the passing of the examinations for the licence. As I said before we cannot expect any kind of protection unless we are willing to submit to restrictions. Emerson says: "Nature hates monopolies." We may enlarge this by saying: Nature makes no gifts. What we desire we must work for. The law of compensation is universal. We are conversant with it in science as conservation of energy: no return without an expenditure. Let us try and make the bargain while we have the power to dictate the terms, otherwise we shall have to make it when others have the power to dictate. To epitomize my remarks. We all admit the importance of drugs being pure; but are obliged to confess that very often they are not of the best quality or in the best condition. I have tried to show that the present means of preventing adulteration of drugs has practically failed. In most other countries very stringent regulations are in force to accomplish this end. The methods adopted falling under two heads, namely, the qualification of the pharmacist, and a system of supervision compelling him to utilize the knowledge gained in his course of training. In England some slight attempt has been made to effect the proper qualification of the pharmacist; but nothing has been done towards obliging him to use the skill acquired in his studentship. The first may possibly be of service without the second; more probably it will not. Lastly, I have tried to indicate how a proper balance between these two elements may be brought about, so as to give a resultant that shall be beneficial to the public and to the pharmacist.

A hearty discussion took place, in which many of the members present took part, which was followed by a vote of thanks to the author for his communication.

A specimen of *Scopola carniolica* was sent by Mr. W. Spencer Turner for the inspection of the members.

Mr. G. S. Woolley, in a few well-appointed remarks, spoke of the valuable services that had been rendered to the Association by Mr. William Elborne, who had held the office of Honorary Secretary for over six years, but who was now resigning the office, previous to removal to Cambridge.

After the vote of thanks, which was accorded on the motion of Mr. Woolley, and carried unanimously, Mr. Elborne suitably responded.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the twelfth session was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, March 12, at 9·15 p.m., Mr. A. Russell Bennet, President, in the chair.

The minutes of last meeting having been read and approved, the following "Laboratory Notes" were read:—

A DISPENSING QUERY.

BY CLAUDE F. HENRY.

You will probably have heard of the advice given by an old clergyman to a younger brother who was troubled with doubts about the meaning of some of the statements in sacred writ. "My dear friend," he said, "when you come to a difficulty, look it boldly in the face and pass on." I think, however, that you will agree with me in saying that chemists should never adopt the convenient plan here so ingeniously suggested. When a difficulty is met with in our business—and we meet with many—we should never be satisfied until we have probed it to the bottom. It is part of our business in fact to do so. Instances of such difficulties are to be found in the reaction between sweet spirit of nitre and antipyrin, and also between sweet spirit of nitre and salicylate of soda. Another such instance came under my notice about twelve months ago, when the following prescription was handed in to be dispensed:—

℞ Ammon. bromid. . . . . . gr. iv.
Potass. iodid . . . . gr. ½.
Saccharini . . . . gr. i. Misce.
Tales vi.

These powders were to be taken by a baby. When the crystals were rubbed down in a glass mortar the powder became tinged with a yellow colour which, after a few days, became of a reddish hue. The following questions arose:—(1) What was the cause of this change in colour; was it due to the ammonium bromide, or to the potassium iodide, or to the saccharin? (2) Was the physiological action of the powders in any way altered, and was any dangerous compound produced? (3) Was the change due to the natural action of any of the powders acting on the others, or was it due to an impurity in any of the salts?

I need only mention the chief experiments made in endeavouring to answer these several questions.

When ammonium bromide and potassium iodide were rubbed down together no coloration resulted. When ammonium bromide and saccharin were so treated there was again no coloration, but when potassium iodide and saccharine were rubbed down the coloration was at once produced. Experiments were then made which established the fact that the potassium iodide was the primary cause of the reaction. Its purity was next investigated, and curiously enough it answered satisfactorily all the B.P. tests, both alone and when combined with the saccharin. That the change was due to some impurity, however, was proved by the fact that a sample from a new stock of potassium iodide recently procured, failed to give any colour reaction with saccharin. So much in answer to questions one and three.

To obtain an answer to query number two, the physiological tests which follow were next applied. One grain of the reddish compound was first taken without producing any apparent effect. Then various doses of the powder were taken, and the temperature, pulse and rate of respiration before and after carefully noted. The doses were taken two hours after breakfast, and the changes produced were noted about two hours afterwards, no food being taken meantime. The following typical results may be detailed:—

Two grains red compound consisting of equal parts KI and saccharin, were taken, and after two and a half hours the following results were noted:—Temp. +1, pulse −1·4, respirations −1.

Five grains of same powder after one and a half hours had this result:—Temp. −·4, pulse −10, resp. −1. The reduced fall in the rate of pulsation with an increased dose of the powder is accounted for by the difference of one hour between the two determinations.

Two grains pure KI after two hours affected temp. −·1, pulse −7, resp. −2.

Two and a half grains pure KI after two hours affected temp. −·2, pulse −8, resp. =0.

Two and a half grains pure KI and 2½ grains pure saccharin taken separately after one and a half hour affected temp. −·5, pulse −4, resp. −1.

You will observe from these various determinations that the effect which the red compound produces on the system is to increase the tendency of the potassium iodide to lessen the rate of pulsation.

The conclusions drawn from these experiments, so far as carried out, are as follows:—

(1) The cause of the coloration was due to the potassium iodide or some impurity, probably hydriodic acid. Whether the saccharin was altered in any way I cannot say.

(2) The physiological action of the powders was slightly changed by the reaction, the natural effect of the KI being increased, so far as the pulse rate is concerned. The temperature and respirations were not materially altered.

(3) Apart from these results the red compound developed no dangerous or poisonous symptoms.

GUM GHATTI.

BY CLAUDE F. HENRY.

In this paper the author gave a minute description of the characteristics and properties of this gum, agreeing generally with the statements of Mr. Mander. He described the taste of the mucilage (1–3) as bland and mucilaginous and not at all unpleasant. Only 75 per cent. of the gum dissolved in water, the remaining 25 per cent. being insoluble also in hot water, even after prolonged boiling. It, however, swelled up considerably. A 1 to 3 mucilage was found to be of greater density than B.P. Mucilago acaciæ. The gum when incinerated left 1·7 per cent. of ash, which was of a whiter hue than that of gum acacia and contained both calcium and potassium salts. The ash of gum ghatti and acacia also differed in the amount of carbonate, that of ghatti containing much the larger proportion.

The paper concluded with a reference to the relative costs of the two gums and a strong recommendation of ghatti as an adhesive agent. While equally efficacious in this respect one ounce of ghatti would produce about twice as much mucilage as a similar quantity of acacia, and that, too, at one-twelfth part of its cost.

"SHAKE THE BOTTLE" ON SAL VOLATILE MIXTURES.

BY CLAUDE F. HENRY.

In this communication the author stated that he had made several experiments with aqueous mixtures containing varying proportions of sal volatile. He had observed that two different separations invariably occurred. After standing twelve hours, if the bottles were gently canted over, a clear liquid would be easily discerned at the bottom of the otherwise milky mixtures. A white deposit also formed at the top of the liquid which adhered to the glass, but when shaken separated in flocculent masses. What these two separations consisted of must be left to a future time, or to others to determine. 10 per cent. of s.v.r. tended to prevent the formation of the first deposit. The author submitted that, in view of the above facts, a "shake the bottle" label should always be attached to bottles containing mixtures of water and sal volatile, a practice which is not, as a rule, at present carried out.

NATURAL AND ARTIFICIAL SALICYLATES OF SODA IN MIXTURES CONTAINING SAL VOLATILE OR SWEET SPIRIT OF NITRE.

BY CLAUDE F. HENRY.

The author stated that about a year ago attention was drawn at one of the association meetings to a reaction between artificial salicylate of soda and sweet spirit of nitre, a dark reddish colour being gradually developed. He had recently made a few experiments with the object of ascertaining whether this coloration was due to the impurity referred to by Professor Charteris, of Glasgow, as existing in artificial salicylic acid, or not. As sal volatile and mindererus spirit also produce a similar coloration the inquiry was also extended to mixtures of the former. Four mixtures were prepared, each containing 20 grains of natural or artificial salicylate of soda to the half-ounce of aqueous mixtures containing two drachms of sweet spirit of nitre or sal volatile respectively.

The result was that, instead of the natural salicylate preventing the reaction before mentioned, the coloration was much more pronounced with it than with the artificial preparation. It formed much more quickly, becoming, with sweet spirit of nitre, at first olive-green and then reddish-brown, and with sal volatile, at first reddish and then dirty brown, along with a deposit which was almost entirely absent from the artificial salicylate solution.

The solution of salicylate of soda as prepared from the natural acid was itself of a yellowish hue, but whether this was due to an impurity or not the author could not say.

From the experiments made it was evident that the coloration in mixtures containing sweet spirit of nitre, sal volatile, or other ammonia preparations, was intensified when the natural salicylate was used. The author did not mean to depreciate the natural salt in any way, but merely to show that the coloration of these various mixtures was not due to the impurity in the artificial acid referred to in the communication of Professor Charteris.

Samples of the natural acid and salicylate of soda were handed round as well as the various coloured mixtures.

The discussion which followed was taken part in by Messrs. Bennet, Dougall, Duncan, Hill and Lunan, and on the motion of the Chairman a cordial vote of thanks was awarded to Mr. Henry.

Mr. Rutherford Hill then gave a lecture on the manufacture of hydrochloric acid. The lecture was fully illustrated by numerous experiments and diagrams, and at the close a unanimous vote of thanks was awarded to Mr. Hill.

The next meeting arranged by Mr. Lunan, Ex-President, takes place on Wednesday, March 26.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

This Association held its usual fortnightly meeting on Wednesday evening, the 5th inst.

The President occupied the chair, and, after approval of minutes, called on Mr. Thomas Robinson to read an essay on "Patent Medicines." At the outset the author gave an interesting account of the rise and development of stamp duties, from their inception in Holland early in the 17th century and their application in this country to medicines in the time of William and Mary. He briefly noticed the Acts passed from time to time to regulate duties on medicines, giving some curious instances of impositions and reliefs under the operations of the Acts—peppermint and ginger lozenges being relieved from duty in 1804. The importance of the medicine duty and licences to the revenue was also noticed and commented on. The difficulty of understanding the patent medicine regulations as at present operative was declared to be a bugbear of the druggists who wish to put up specialties. Cutting prices had made the trade in patent medicines not worth having, while the league between makers and the press made it difficult to get quit of it. It was doubtful if any means that could be taken could restore it to its former position, even if that were desirable, which was questionable, because the cultivation of such a trade was really a prostitution of medical and pharmaceutical science. A healthier trade might be done by educating the public in the use of remedies of known composition through the issue of popular hand-books of medicine and therapeutics. The formation of an association to look after the interests of druggists in the West of Scotland, and the spread of education among the masses, were shadowed forth as being in the interests of the legitimate pharmacist.

Mr. Gilmour sympathized with the strictures of the essayist on the Inland Revenue authorities, declaring their action to be vexatious to legitimate traders; questioned the practicability of a defence association, bearing in mind the fate of a similar organization in England, and hoped a good deal from the spread of education and consequent intelligence among the public.

The President thought legislation in the direction of monopoly was impossible, and he had no hope from increased education, when he considered the encouragement given to advertising by a public daily increasing in education. He thought the position of the press with regard to advertising was inevitable, being a purely business matter. While chemists were ready to condemn others for reading and believing advertisements of patent medicines, they should be careful that their own hands were clean, by abstaining from encouraging puffing (not to say lying) advertisements in other branches of trade where the harm to legitimate business was as great as in their own case.

The essayist, having briefly replied, was accorded a hearty vote of thanks.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The usual weekly meeting of the Association was held on Thursday, March 6, at 9.15 p.m., the Vice-President in the chair.

After the minutes of the previous meeting had been read, the Chairman called on Mr. William Mair to read an essay on "Progress in Pharmacy," this being the first prize in the recent competition.

The essayist traced in an able manner the evolution and progress of pharmacy as an art and as a science from its earliest stages. The Pharmaceutical Society, had, he said, since its foundation contributed largely to the advancement of pharmacy, and the author showed that education had all along been the criterion of progress, and that it had prepared the way for advances in other directions. The influence of the sciences upon pharmacy and the possibilities open to those engaged in the art were noted among other important points. The future of pharmacy was treated in a like able fashion.

Mr. James Petrie, who gained the second place, then followed with his essay. The lines taken up by this essayist were similar to Mr. Mair's, though not quite so exhaustive in character.

At the close some discussion took place, and a very hearty vote of thanks was awarded to both essayists.

The rest of the evening was set aside for reading short papers, but there was only time for two.

The first was by Mr. Mair, who read a short supplementary paper dealing with "Recent Progress in Pharmacy." In this paper the author took up in a more practical style some of the details of the subject which were wanting in his previous essay, as pointed out by the adjudicator, Mr. J. R. Hill. Most of the comparatively recent introductions and improvements in pharmaceutical processes were noted and described. The multiplication of new remedies was not he thought one of the most hopeful signs of progress in pharmacy, and the methods by which these were supplied was converting the pharmacist into a simple automatic machine. He concluded by urging on all to encourage even the simplest improvements and developments in pharmacy.

Mr. James Petrie then described an apparatus for generating H_2S, which had recently been introduced into the University College, Dundee, and which he thought would prove helpful to many.

The usual weekly meeting of the Assistants' and Apprentices' Association was held on Thursday, March 13, at 9.15 p.m. Mr. R. M. Lindsay in the chair. The work of the evening was an essay by the Vice-President, Mr. D. McD. Skinner, on "The Advantages derived through Retail Chemists making their own B.P. Preparations." The author dwelt first on the advantages derived by the employers themselves, showing conclusively that not only was such a course economical, but it also gave the pharmacist a feeling of certainty regarding his preparations. With all due respect to wholesale dealers, Mr. Skinner said it was a matter of pleasure for the pharmacist to be able to meet any inquiry regarding goods sent out with the answer that they were correctly prepared, having been done by himself. The author then proceeded to speak on the advantages derived by the assistants and apprentices in establishments where all, or nearly all, galenical preparations were made. These advantages were numerous, and amongst the more important he placed the aid they received where such a course was followed when studying for their Minor examination.

The paper all through showed a very intimate acquaintance with the subject and it was listened to with marked attention. The criticism which followed was mostly one sided, just bearing out the truth of Mr. Skinner's remarks.

In proposing a vote of thanks to the author it was mentioned the loss the Association would sustain through Mr. Skinner's departure to start business in a western town and also that he would carry with him the good wishes of every member. Mr. Skinner having suitably replied, a vote of thanks to the Chairman concluded the proceedings.

Proceedings of Societies in London.

ROYAL INSTITUTION.

ELECTRICAL RELATIONS OF THE BRAIN AND SPINAL CORD.

A lecture on this subject was given on Friday, the 7th inst., by Mr. Francis Gotch. The lecturer first showed some fine sections of the spinal cord as a whole, and of individual nerve-fibres and nerve-cells, and explained the respective functions of the fibres and cells. He referred to the experiment of Helmholtz, showing that if the nerve which caused a certain muscle to contract were stimulated, the nearer the point where the stimulus was applied the quicker was the response of the muscle, as proving that the nerve did not awake as a whole, but that the stimulus was passed along from part to part, the rate of progression of a nerve stimulus being about 100 feet per second or a mile a minute, thus being very much slower than the progression of light or electricity. However, a stimulus given to a nerve produced electrification of the nerve-fibre, as was shown by attaching the terminals of a galvanometer to a point in a nerve and to its cut extremity; on then stimulating the nerve further up a deflection of the needle was produced. Referring then to the distinction between sensory and motor nerves, the lecturer stated that there was no difference in the fibres themselves, but only in their starting points and terminations, the sensory ending in touch organs in the skin and the motor ending in the muscles they actuate. He compared them to the up and down lines in a railway, with the nerve cells as stations, the sensory or up line only carrying impressions from the touch organs to the brain and the motor or down track only carrying impulses from the brain to the muscles. And as trains might be despatched from intermediate stations, as well as the termini, so stimuli might be conveyed to and impulses sent from some of the nerve cells on the line, causing the phenomena of reflex action. A peculiarity of the nerve cells is the comparatively long time required to arouse them to action. The cell has also to some extent a will of its own and power of selection, for it stops some impulses altogether and others it breaks up and delivers by instalments, so that although it cannot act without an original stimulus, having received that stimulus it becomes potentially automatic. The lecturer then explained that stimuli applied to certain spots on the surface of the brain produce effects in corresponding muscles on the opposite side of the body, and that the portion where the impulses to the hind limbs, for instance, originate, could be localized. It was probable that the impulses had not one, but several paths from their origin to their destination, some of these paths being easier, and others more difficult. These paths were of course very difficult to trace, any attempt at tracing them directly with the microscope being only possible in the embryonic stages. The method which had proved most useful was to prevent the use of a path by injuring the nerve, and so causing a change in its appearance beyond the break. Thus if the injury were to a sensory or up-track the degeneration would be between it and the brain, but if it were to a motor or down-track the degeneration would appear on the side further from the brain; if a portion of the brain were injured there would be degeneration of the corresponding down-track. These marks of injury can be traced down the spinal cord, but do not enter the issuing nerves, showing that there are junctions with other down-tracks in those regions. Experiments had been undertaken by the lecturer to ascertain the character of the impulses transmitted along the motor fibres in certain characteristic epileptic muscular contractions. For this purpose a Lippmann's capillary electrometer was used, the galvanometer needle not acting sufficiently quickly. By this means it was proved that when the electrometer was attached to the spinal cord there was an exact correspondence between its indications of electrification and the muscular contractions. This being the case, it was evident that the electrical effects were not altered in quality by the nerve cells of the cord before passing into the issuing nerves. On attaching the instruments to the nerves, however, it was found to be very much diminished in quantity. By dividing the spinal cord along the middle and testing the halves it was found that the stimuli to one side of the brain go down both sides of the spinal cord, although mainly on the side opposite to the stimulated part. In the more highly organized animals the proportions passing down the two halves would be about one to twenty, and in those less highly organized about one to four. It was also found that although a stimulus to a nerve fibre produces an electrification which travels in both directions, its progress in one direction is stopped by the nerve cells, which thus prevent impulses travelling up the down-track or down the up-track, and no sensory impression could be sent up a motor nerve and meet a motor impulse coming down. Finally the method was being employed for the localization of special fibres in the spinal cord, but this required so much time and labour that as yet little had been attained in that direction.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, February 6, Mr. Edmund White, Vice-President, in the chair.

A paper was read by Mr. C. E. Boucher entitled "Dissociation," which will be published in a future number of the Journal.

The paper was followed by a discussion, in which the Chairman, Messrs. Sherlock and Fuge took part.

In the absence of the author the following report was read by Mr. Fuge:—

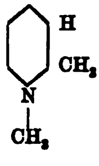
REPORT ON PHARMACOLOGY.

BY MISS M. E. BUCHANAN.

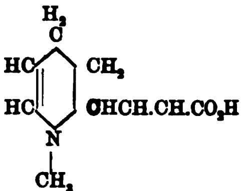
I. *Sorbite* exists in the fruit of all the Rosaceæ, especially in pears, cherries and plums, which contain ·7-·8 per cent. It takes its name from *Sorbus Aucuparia*, the rowan or mountain ash. Sorbite was formerly believed to have the formula $C_6H_{12}O_6$; it now, however, has been proved by Vincent and Delachanel to be $C_6H_8(OH)_6$. If heated with concentrated HCl sorbite yields β hexyl iodide identical with that yielded by mannitol under the same circumstances. If heated with alcoholic KOH, sorbite gives β hexylene, and when oxidized, acetic and butyric acids. When heated with acetic anhydride and small quantities of $ZnCl_2$, sorbite gives a hexacetate $C_6H_8(OAc)_6$, a thick colourless syrup. Thus it follows that anhydrous sorbite has the constitution $C_6H_8(OH)_6$.

II. *Cocaine.*—Ecgonine, the decomposition product of cocaine, is a derivative of pyridine, and stands closely connected with tropine, the decomposition product of atropine. If ecgonine is distilled with zinc dust and lime, α-ethyl-pyridine is obtained, the other products being H, H_2O, methylamine, and ammonium carbonate. The distillate, which separates into an oily and an aqueous layer, gives, on further purification by $KMnO_4$, and redistillation, α-ethyl-pyridine.

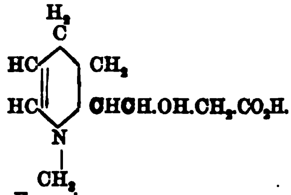
If anhydrous ecgonine is heated in a closed tube to 270° to 280° C., with HCl, a number of different bodies are obtained, some hydrocarbons. Then on making the solution alkaline, NH_3, methylamine and pyridine can be detected by smell. There are also both a secondary and a tertiary base, the latter probably a tetrahydrated α-picoline with a methyl-radical linked to the N atom, thus:—



Ecgonine and anhydro-ecgonine, in the form of hydrochlorides dissolved in water, are optically active and lævorotatory. Ecgonine differs from anhydroecgonine in containing a second asymmetrical carbon atom, thus:—



Anhydro-ecgonine.



Ecgonine.

(Black C's represent the asymmetrical carbon atoms)

III. *Laurene and Menthene.*—Wallach, having studied the physical properties of laurene and menthene, came to the conclusion that they differed from all other terpenes. They both were said to boil at 173°–175, and thus closely resemble citrene and dipentene. Their saturation formula is also the same. They, however, differ in having only one double link, and are also different from the pinenes having the same saturation formula. Wallach's investigation goes to prove that laurene, and very probably menthene have no existence.

Oil of laurel, obtained from leaves, was carefully fractionated and separated into two portions, boiling respectively above and below 180°. The latter was again carefully fractionated and separated into a small portion boiling at 158°-168°, and three much larger fractions boiling between 170°-178°, the lowest of which contained oxygen. The fraction 158°–168° was proved to contain small quantities of pinene. The three fractions boiling at 170°–178° were mixed, diluted with light petroleum, and HBr passed into the solution, when a large quantity of a colourless compound was precipitated. The precipitate was separated by filtration, pressed, decomposed by alkali, and the resulting oil fractionated. The portion boiling at 176° solidified when cooled by freezing mixture, and proved to be cineol.

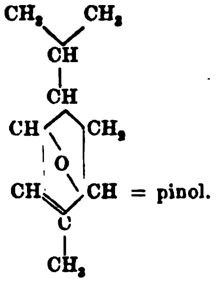
Oil of laurel obtained from other parts of the plant also yielded pinene and cineol, but "laurene" has no existence.

IV. *Artificial Borneol*, $C_{10}H_{18}O$, obtained from colophony, is chemically indistinguishable from true Borneo camphor. Its alcoholic solution is, however, optically inactive, the natural product being dextrorotatory. The artificial compound is also heavier than water, and its melting point is 199° C.

V. *Urechitin* ($C_{28}H_{42}O_8$) and *Urechitoxin* ($C_{13}H_{20}O_5$) are two exceedingly poisonous glucosides contained in a plant called *Urechites suberecta*, a native of Jamaica. The former (urechitin) is very bitter, and almost insoluble in water. Another worker on this plant has recently isolated from it an amorphous glucoside and an acid resin, both highly toxic. Urechites appears to be closely allied to strophanthus in its effects, and is also an antidote to curare.

VI. In this connection may be mentioned *Tanghinia*, the judicial poison of Madagascar, a toxic principle contained in the almonds of *Tanghinia venenifera*, nat. ord. Apocynaceæ. Tanghinin has been obtained crystalline by extracting the almonds with CS_2, which dissolves out all fatty matter, etc. (about 75 per cent.). Then the mass left is boiled with strong alcohol and the solution evaporated. Tanghinin has a strong action on the heart, resembling strophanthin and ouabain; also a more general convulsive action than these. Tanghinin forms colourless, rhombic, anhydrous crystals, which melt at 182° C., difficultly soluble in water, but very soluble in strong alcohol. It is lævorotatory. It contains no nitrogen; therefore it is not an alkaloid. Neither is it a glucoside.

VII. *An Isomer of Quinine* described by Otto and Wallach is remarkable from its property of fluorescence. Its physiological action has not been investigated. This base has been prepared synthetically by treating oil of turpentine with ethyl nitrite and HCl, in presence of acetic acid, the product being a camphor-like body, $C_{10}H_{16}O$, to which Wallach gives the name "Pinol." This body readily forms a dibromide, $C_{10}H_{16}Br_2O$. When oxidized, oxalic and terebinic acids result, the following constitution has therefore been assigned to it:—



Pinol, when treated with amyl nitrite and glacial acetic acid, yields a crystalline nitroso-chloride, $C_{10}H_{16}O.\ NOCl$. This body combines readily with NH_3 and amines, with the liberation of HCl; the compound with β-naphthylamine is isomeric with quinine.

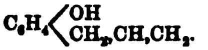
It is a crystalline body, melting at 194°–195°, insoluble in water, slightly soluble in hot alcohol, and readily soluble in ether.

Its formula may be represented as—

$$C_{10}H_{16}ONO.NHC_{10}H_7.\ (=C_{20}H_{24}N_2O_2.)$$

VIII. *Essential Oil of Betel Leaves.*—The leaves of *Chavica Betle* yield a small quantity of a yellowish-green oil which has a burning taste, and is feebly lævorotatory; when shaken with concentrated KOH it is partly dissolved, and on addition of H_2SO_4, a phenol, *chavicol*, is precipitated. The portion insoluble in alkali can be separated into two parts, B.P. respectively 175°–190° and 255°–265°.

Chavicol, $C_9H_{10}O$, is a colourless liquid, boils at 237°, and is soluble in alcohol, ether, chloroform and light petroleum; gives with Fe_2Cl_6 a blue coloration. It is a powerful antiseptic, its action on bacteria being five times as strong as that of phenol, and about twice as strong as that of eugenol. When oxidized with potassium permanganate it yields anisic acid and an acid of lower boiling point, probably paramethoxyphenylacetic acid. Chavicol has probably the constitution—



$$C_6H_4\left\langle\begin{matrix}OH\\CH_2,CH,CH_2.\end{matrix}\right.$$

The other portions of the oil probably contain several terpenes, perhaps also cymene and cineol, but no pinene.

IX.—The bark of a bush belonging to the Cinchoneæ, *Cephalanthus occidentalis*, the "swamp dogwood." contains *Cephalanthin*, a saponin-like substance with a bitter taste and tanning properties. It is amorphous, sparingly soluble in hot or cold water, readily soluble in alcohol or ether, and has the properties of an acid. Treatment with diluted H_2SO_4 seems to split it up with formation of sugar.

X.—The root of *Scutellaria lanceolata*, one of the Labiates, is used medicinally in Japan and China. One of its constituents is *Scutellarin*; which is believed to be a phenol, possibly an isomer of juglon (also called "nucin," and obtained from the green shells of walnuts). Scutellarin forms odourless, flat, yellow needles, melts at 199 : 199·5, is insoluble in water, but readily soluble in ether, alcohol, CS_2, etc. It dissolves in HNO_3 with a red coloration. Its elementary analysis gives figures corresponding with the formula $C_{10}H_8O_3$. When administered to a dog in a dose of 5 grams it produced no effect.

XI.—Isodulcitol, a sugar isomeric with dulcite and mannite, and which has been formerly obtained by the action of dilute acids on quercitrin and from the glucoside of the berries of *Rhamnus infectoria*, has been lately found to exist in some marine plants, especially *Fucus vesiculosus*.

When dried fucus is heated with H_2SO_4, the product yields among other substances, acetone, and two bodies furfuraldehyde and methyl-furfuraldehyde. The "fucusol," said to be obtained from fucus, consisted of a mixture of these two bodies; and certain colour reactions which Stenhouse found "fucusol" to give, are due to the methyl-furfuraldehyde. This body (methyl-furfuraldehyde) yields acetic acid on oxidation. It bears the same relation to isodulcitol and rhamnose ($C_6H_{12}O_5$) as furfuraldehyde does to arabinose ($C_5H_{10}O_5$). Crystallized isodulcitol distilled with H_2SO_4, yields acetone, and pure methyl-furfuraldehyde (identical with that from *Fucus vesiculosus*).

It has been previously shown that isodulcitol is an aldehyd derived from normal hexane, it also gives acetic acid on oxidation, and thus contains a terminal methyl group.

Since furfuraldehyde is obtained from arabinose by dehydration, it follows that isodulcitol is methyl-arabinose, a relation which has often been suggested, but not established until lately.

XII.—The two bases isolated from the young shoots of *Solanum tuberosum*, one crystalline and the other amorphous, are now shown not to be chemically identical, as was at first believed.

The crystalline compound has been named "solanine;" it crystallizes from an alcoholic solution in colourless needles which melt at 244°; are almost insoluble in ether, but readily dissolved by dilute HCl. Solanine, when boiled with a 2 per cent. solution of HCl, yields the hydrochloride of another base, "solanidine," a yellow powder, and simultaneously a sugar is produced.

The amorphous substance obtained with solanine, and which is called solanëine, is a yellow, horny substance melting at 208°, more soluble in an 85 per cent. solution of alcohol than is solanine, and on treatment with HCl yields solanidine, and a sugar also.

This sugar, obtained by the hydrolysis of both solanine and solanëine, is a yellow amorphous mass with a caramel-like odour, dissolving readily in water and wood-spirit. With phenylhydrazine hydrochloride and sodium acetate in aqueous solution, it forms a body (glucosazone) resembling the compounds similarly obtained from dextrose, lævulose and other sugars. With HNO_3 it gives no recognizable trace of saccharic or mucic acids. The general behaviour of this sugar seems to point to the conclusion that it is some other sugar than dextrose, or is perhaps a mixture of sugars.

After some remarks on the report, the Chairman drew the attention of the members to a sample of chloral-amide, the new hypnotic, comparing its effects with those of chloral, sulphonal, etc.

The meeting then adjourned.

A meeting was held on Thursday, February 27, Mr. L. Ough, Vice-President, in the chair.

Mr. F. A. Hocking read a paper entitled "Suppositories," by Messrs. F. A. Hocking and E. Brooke, which will be published in an early number of the Journal.

The paper gave rise to a lengthy discussion in which the Chairman, Messrs. J. Ince, A. W. Gerrard, Fairburn, Umney, Shepheard, Brooke, and the Secretary took part.

Mr. Gerrard exhibited some improved forms of suppository, and several useful moulds, mentioning also that he found a solution of soap in water much better than soap liniment for preventing the suppositories sticking to the mould.

A paper on "Coal Gas" was then read by Mr. J. P. Barnes, who gave a description of the processes of gas-manufacture, based on personal observations, and illustrated by carrying out the operations on a small scale before the meeting.

A discussion followed in which the Chairman, Secretary, Messrs. Gerrard, Sherlock, and Shepheard took part.

The meeting then adjourned.

A meeting was held on Thursday, March 13, Mr. E. H. Cranstone in the chair.

A paper was read by Mr. A. Gunn on "Home-made Electrical Apparatus," giving practical details for the construction of telephones, induction coils, and other apparatus which a student can make for himself. The directions were rendered clear by the exhibition of instruments made by the author, which were taken to pieces to show their construction. A discussion followed in which the Chairman, Messrs. W. Wilson, Browne and the Secretary took part. In connection with the subject of electricity Mr. Gunn also showed a photograph of some curious markings produced on the chest and arms of his brother some years ago by a lightning flash. The boy with three others had got their clothes saturated with moisture in a heavy thunderstorm, and they had all been thrown some distance by a lightning-flash and rendered unconscious. When stripped they were all found to be more or less covered with peculiar branching marks, at first ascribed to a photographic effect of the lightning through surrounding trees, but afterwards thought to be due to congested capillaries.

Mr. E. J. Eastes, F.I.C., then gave a Report on Physics, in which he described, with the aid of drawings and diagrams, several novelties in apparatus, the chief of which were as follows: a new form of pyrometer, which measures the temperature by means of the alteration in the resistance of a platinum wire; a new form of apparatus for producing ozone by the electrification of air; an apparatus for signalling the presence of fire-damp in mines, by taking advantage of its powers of diffusion and causing it to elongate a metal box by diffusing into it through a porous plug faster than the contained air diffuses outwards; a new and accurate form of hydrometer; an improved gas blowpipe; a theory of hail-storms; experiments on the rate of solution of solids; the refining of sugar by electricity; and a very accurate method of determining the melting points of fats, by placing in a glass cylinder surrounded by a water-bath a layer of alcohol on a layer of water, and dropping in a thin disc of the fat which floats somewhere near the junction of the aqueous and alcoholic layers, and indicates its melting-point with great preciseness by assuming a spherical form.

The report gave rise to a discussion, in which the Chairman, Secretary, Messrs. Pears, Sherlock, Gunn, W. Wilson, and Browne took part

The meeting then adjourned.

Obituary.

Notice has been received of the death of the following:—

On the 28th of February, Mr. Foster Donald Downs, Chemist and Druggist, late of Gladstone Street, Manchester. Aged 47 years.

On the 11th of March, Mr. William Jackson, Chemist and Druggist, Mansfield, Notts. Aged 68 years.

On the 12th of March, Mr. Charles Brooke, Chemist and Druggist, Twerton-on-Avon, Bath. Aged [illegible] years.

On the 15th of March, Mr. Robert Turner, Chemist and Druggist, Oundle, Northamptonshire. Aged [illegible] years. Mr. Turner had been a member of the Pharmaceutical Society since 1853.

Review.

Proceedings of the American Pharmaceutical Association at the Thirty-Seventh Annual Meeting held at San Francisco, June, 1889.*

The annual volume of the American Pharmaceutical Association has many features in common with that issued by the British Pharmaceutical Conference, as it consists essentially of a report of the proceedings at the next preceding annual meeting and a report on the progress of pharmacy. To deal with the latter first, it may be said at once that it is very inclusive and well done, and occupies nearly 450 octavo pages. From the proceedings it appears that the American Pharmaceutical Association consisted at its last meeting of 1263 members. In the President's address it is stated that there are now Boards of Pharmacy in thirty-one states, which it is claimed are most of them doing good work in raising the standard of pharmacy and in educating the community to discriminate in favour of the educated pharmacist. The proceedings of the American Association differ from those of the Conference in this country, in that, besides having several standing committees charged with reporting annually on special subjects, the Association itself meets in sections, which are respectively occupied with Commercial Interests, Scientific papers, Pharmaceutical Education and Pharmaceutical Legislation.

BOOKS RECEIVED.

A Dictionary of Applied Chemistry. By T. E. Thorpe, B.Sc., Ph.D., F.R.S. Vol. I. London: Longmans, Green and Co. 1890. From the Publishers.

The Elements of Laboratory Work. By A. G. Earl. London: Longmans, Green and Co. 1890. From the Publishers.

A Manual of Materia Medica. By John M. Maisch, Ph.M., Ph.D., Fourth Edition. Philadelphia: Lea Brothers. 1890.

Companion to the latest Edition of the British Pharmacopœia. By Peter Squire. Fifteenth Edition. Revised by P. W. Squire, F.L.S., F.C.S., and A. H. Squire. London: J. and A. Churchill. 1890. From the Editors.

Saint Thomas's Hospital Reports. Edited by Dr. Hadden and Mr. Anderson. Vol. XVII. London: J. and A. Churchill. 1890.

Chronic Bronchitis and its Treatment. By William Murrell, M.D., F.R.C.P., etc. London: H. K. Lewis. 1889.

Food in Health and Disease. By J. Burney Yeo, M.D., F.R.C.P., etc. London: Cassell and Co. 1889.

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* Philadelphia: American Pharmaceutical Association. Large 8vo. pp. i., xxiv., 1-850.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Pharmaceutical Society.

Sir,—In common doubtless with many others, I have read with some surprise and more regret of the decision come to at the recent Council meeting to relinquish the idea of legislation during the present session of Parliament: and yet, after what fell from the President, I imagine that few will be found to question the wisdom of such a course. It seems, however, absolutely incredible that a measure, apparently calculated to promote the interests of the craft generally, should have been received, according to Mr. Carteighe, with apathy on the part of the many, and with opposition, covert or open, on the part of those whose peculiar constitution renders them unable to appreciate anything which is not entirely in accordance with their own notions, and yet who consider themselves competent to criticise and condemn, after a superficial examination, what has cost weeks of profound study to those in a far better position for judging the requirements and prospects of pharmaceutical legislation. It speaks volumes, too, for their *sancta simplicitas* who fondly imagine that, in the present condition of political affairs, such a Bill as they would frame, bristling with contested matter, could stand the slightest chance of even being considered in the House of Commons. Why, it would not attain to a place among the 'massacred innocents;' it would be stillborn.

With your permission, sir, I should like to make a few remarks upon what has been the subject of a great many letters recently, I mean the Pharmaceutical Society. And I frankly confess that I write as one of those, and I am persuaded there are many such, who do not regard the Society with its Council merely as an object for every species of attack, however unreasonable, and every manner of complaint, however childish, but who value and appreciate the work done in the present as well as in the past, and are sincerely desirous of strengthening the position and increasing the influence of the Council, and thus promoting the welfare of chemists at large.

If there is one thing more exasperating than another it is to hear the ridiculous complaints so often made against the Society and its appointed leaders. As an illustration of one class I may mention that a short time since, in conversation with a former associate, I asked him why he had discontinued his subscription, and his answer was to the effect that he "did not see why he should give his money to forward the interests of the few members who sat upon the Council." What was to be said in response to such an observation, at once irrelevant and absurd? If this idea, evidently expressed in good faith, be anything like widespread, it shows an amount of ignorance unparalleled and deplorable; ignorance of the constitution of the Society, and of its history up till now. Naturally those who have never voluntarily contributed a penny to the Pharmaceutical Society, nor ever tried by word or action to increase its influence, are the loudest in their complaints of what they term its "incompetence." Such as these lay the blame for every failure or misfortune, due to their own incapacity, at the door of the Council; such as these appeal for help and protection of every conceivable kind, without regarding the palpable fact that only by strengthening the Society itself can its power be increased. Like the man in the fable, they cry to the Council as to a kind of Hercules, for help, but never a finger do they move in order to assist the consummation of their desires. Such as these, having before them all that the Society has accomplished (notwithstanding the way it has been constantly handicapped by the worst of all obstacles, the lack of union among chemists themselves) in the way of raising the status of the pharmacist and his profession, of advancing education and science, and of consolidating the position and interests of the trade generally, petulantly ask, "What is the good of the Pharmaceutical Society?" To such a demand only one retort is possible: that of Dr. Johnson, who, in reply to an ignorant opponent, said "Sir, I have given you my reasons, but I do not feel called upon to supply you with brains to appreciate them."

I hold no brief, sir, either for the Society or its Council, but as one who has for several years endeavoured to take an intelligent interest in the progress of Pharmaceutical affairs, I feel bound to say that I think every chemist owes a debt of gratitude to those who have for years devoted themselves to the service of their fellow pharmacists, a service often enough ungrateful and trying in the extreme. It is only right that this sacrifice of time and energy on the part of members of the Council should be loyally and gratefully recognized, and to no one is this acknowledgment more conspicuously due than to the President of the Society, whose exceptional services will assuredly be even more highly valued and more justly appreciated later than now.

Perhaps I may be allowed to state that, during a residence of about four years in different parts of the Continent, I have had frequent opportunities of observing the high esteem in which our Society is held by many very competent to judge. This sentiment was expressed to me once by a well known French chemist, who further remarked that it was a matter of great regret that French pharmacists had no journal to represent them comparable in importance and interest with the official Journal of the British Pharmaceutical Society.

I must apologise, sir, for the length of this letter. So much is said and written anent the failings of the Society, that I trust you may see fit to insert this protest, however humble, on the part of one who at least recognizes its valuable services and appreciates its work.

In conclusion, may I be allowed to say that if every chemist would read the remarks made by the President in connection with the Medicine Stamp Act and Mr. Harrison's amendment, there would be less following of that will-o'-the-wisp, protection, a very different thing from State recognition in the real sense, and a truer realisation of the undoubted fact, that "the strength of the chemist's position is that he possesses personal skill and knowledge," and in this the public has confidence.

64, Via Condotti, Rome. T. Edward Barrass.

University Degrees for Pharmacists.

Sir,—I am pleased to see by Mr. Davis's last letter that he wishes well to the Society, notwithstanding his little dabble in "heresy"! I observe, however, that he is still "impenitent;" and, in the hope of preventing him and others like-minded from straying further from the "true fold," I will, if they will pardon me, submit a few more facts for their consideration.

It is his opinion that the Society would not be injured by the competition of other examining bodies, just as the College of Surgeons has not been injured by the London University. But I do not think that that is quite a parallel case, unless it is proposed to make the examinations for the pharmacy degrees unreasonably severe. I venture to assume that if the London M.B. examinations had been made of an ordinary "pass" nature, the College of Surgeons would have been out of the running long ago. If Mr. Davis is going to make his degrees as select as that, he will soon be greeted with loud cries all round to lower his requirements, as is now the case in respect to the M.B. London. Hundreds of metropolitan students, who now have to content themselves with the more sensible examinations of the conjoint Board of Physicians and Surgeons, would gladly take the London degrees if they were brought more within their reach. As it is, only a mere fraction of London medical students take them. In 1888 the University created the vast number of seventy-one M.B's., and in 1889 sixty-four; and these, presumably, from all parts of the British Empire! And if Mr. Davis says he does not want to make them so very select, but rather attainable by anyone with an average amount of cash, time and brains, then I beg to refer him to the state of things in Edinburgh. There the M.B., C.M. is of a practical, common-sense character, both as to curriculum and examinations, and as a consequence we find that the great majority of Edinburgh medical students take it in preference to the equally commonsense L.R.C.P., M.R.C.S., Edinburgh. One hundred and eighty-six is their average yearly number of M.B. passes; and at one examination, held not long since, it is stated that there were three hundred candidates. I am sorry I am not in possession of statistics respecting the Physicians' and Surgeons' examinees, but I am told the numbers are something like a tenth of the "Varsity" men. I am open to correction on that point, but, anyhow, the numbers are very considerably less, and I believe that is exactly what would happen to the Pharmaceutical Society if university licences became available. "Oh, but," Mr. Davis may say, "I would make the Society a part of the universities, and not let it remain a distinct corporation." Well, even then, there would have to be a division of the fees. Look at the scheme from whatever side you may it is very pretty and very desirable in itself, but has this (to me) fatal objection, that it would rob our Society of its monopoly and play the very mischief with its purse. Let well alone.

With regard to the sanitary degree proposal, I fear not many local boards or vestries would care to pay two men to do one man's work. When they want special chemical advice they go to the public analyst for it. Some sort of a sanitary science diploma is obtainable at South Kensington, and if I am rightly informed, one need not be on the Medical Register to get that. Would not it meet Mr. Davis's wants?

69, Loughborough Road, S.W. WILLIAM JOHNSTON.

THE TESTING OF SPIRIT OF NITROUS ETHER.

Sir,—I have read with interest the papers of Dr. Thresh and Mr. Dymond, published in the current number of the *Pharmaceutical Journal.*

I have no intention or desire to discuss at length the able papers in question, but think it necessary, as my name was repeatedly mentioned, both in the papers and the subsequent discussions, to point out that the gentleman who spoke on Mr. Dymond's paper was not the Mr. Allen previously referred to. I am bound to do this, as the views expressed by my namesake are not in accordance with my own, and might be attributed to me.

With regard to the nitrometer method of assaying nitrous ether, I must again point out that I have never claimed for it very great accuracy, especially when brine is employed; but, nevertheless, when working on pure nitrites, it gave results more nearly approaching to truth than those put forward by Messrs. Dunstan and Dymond as obtained by the vacuum-titration method. In fact, the figures quoted by Dr. Thresh abundantly prove the substantial accuracy of the nitrometer process.

I may here mention that the titration process was distinctly indicated in my "Commercial Organic Analysis" (vol. i., p. 152), the proof sheets of which were actually revised to allow of the insertion of a short description of that and the nitrometer process then just devised. On the page quoted the following passage occurs: "If the treatment with potassium iodide be effected in an open basin in presence of air, the amount of nitrite found is liable to be sensibly in error, but if air be excluded Dott's method gives fair approximate results, somewhat in excess of the truth. The process can be advantageously employed on the solution which has already been decomposed with potassium iodide in the nitrometer. The nitrite oxide is allowed to escape into the air, and the brown liquid is washed into a basin and at once titrated with decinormal thiosulphate (hyposulphite)." Then, in a footnote, I add:—"The results obtained in this manner show a difference of about 0·005 gram of nitric oxide above that corresponding to the volume of gas liberated in the nitrometer (uncorrected), the true amount doubtless lying between the two." This result is confirmed by the experience of Messrs. Dunstan and Dymond, who usually obtain by the vacuum-titration process about 2 per cent. of nitrite above the truth, and also by Dr. Thresh, operating in an atmosphere of coal-gas.

From the above quotation it appears that the novelty of Messrs. Dunstan and Dymond's process is merely in the apparatus employed. Working with the simple apparatus figured by them (*Pharm. Journ.*, vol. xix., p. 741) the vacuum-titration process will probably not give more accurate results than the nitrometer method; but for scientific purposes, and with additional precautions, it is easy to conceive that it would be superior.

But for the ordinary assay of spirit of nitrous ether by pharmacists I give a distinct preference to the nitrometer process. It is quicker than the titration methods, requires no application of heat, and has the great advantage that no standard solution is required. To those who only have to use the test occasionally this is a great object. Even the objection that a special apparatus is required may be avoided by the following makeshift:—Invert a tapped Mohr's burette, and on to the nose fit a perforated cork, to which is adapted a short piece of glass tube, such as a portion of a test-tube. This forms the cup, and a scratch on the side serves once for all to indicate the height to which it is to be filled. To the lower (open) end of the burette a cork bearing a short length of narrow glass tube is adapted. The tube is attached to a piece of india-rubber tubing, and this to another piece of narrow glass tubing, adapted by a cork to an open tube of wider bore. It can be constructed by anyone capable of making the test, and the only "special" part of the apparatus is the burette, which is also required for the titration processes. The burette can be instantly removed and applied to its ordinary use. If not graduated to the tap an obvious correction in the reading will be necessary. The process is an example of a tolerably accurate quantitative analysis performed without weights or the aid of a standard solution.

Sheffield. ALFRED H. ALLEN.

STATE OF TEETH IN PREHISTORIC SKELETONS.

Sir,—To-day, in referring back to the Journal for February 1, I noticed in your review of G. Murray Humphry's 'Old Age,' an explanation for "the remarkable preservation of the teeth" in the "skeletons of our forefathers." It was to the effect that their owners were more frequently "cut off in their prime by battle or disease" than is now the rule. This may be quite true. But recently I conducted some excavations on the site of a long barrow in this county (these ancient burial places are generally held to be not less than 3000 years old), in the course of which some seventeen or eighteen skeletons, many of them much disturbed and their bones scattered, were exhumed. These bones related to individuals of all ages, from youth upwards, several having been considerably advanced in life. Of 152 teeth (free or attached to the bone) that were found, only five or six showed any sign of caries, and of these two were doubtful. Yet many of these teeth were so much worn that in life they must have been brought down to almost the level of the gums, presenting beautiful sections, in which the dentine seems almost as hard as the enamel.

Derby. JOHN WARD.

G. Dimond.—We agree with you that the prices charged are such as to create a doubt as to the quality of the articles, but that is not sufficient to demonstrate their inferiority without further evidence.

NOTICES.

Chemists' Assistants' Association.—The next meeting of the Association will be held on Thursday, March 27, when a paper on "The Method of Growth in the Increase in Thickness of Stems," will be read by Mr. J. F. Burnett.

Dundee Chemists' Assistants' and Apprentices' Association.—The annual meeting of this Association takes place on March 27 in the rooms, 74, Commercial Street, when the Treasurer's and Secretary's reports will be submitted, and office bearers elected for the ensuing session.

Edinburgh Chemists' Assistants' and Apprentices' Association.—The next meeting of this Association will be held on Wednesday, the 26th inst., when the following papers will be read: A communication, by Mr. J. R. Hill; "The Minor," by Mr. W. Duncan: "Report on Hydrocyanic Acid," by Mr. A. Leys; and "Notes on Some New Remedies," by Mr. G. Lunan.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Balkwill, Blunt, Owen, Ball, T. B. P., Cupiditas, Inquirer, Minor.

"THE MONTH."

Chloralimide.

Attention has recently been called to the possible value as a medicinal agent of chloralimide, $CCl_3{-}C{<}^{H}_{NH}$, a substance that must not be confounded with that recently introduced as "chloralamide," which is more correctly designated chloral formamide (*Compt. Rend.*, cix., 817). Chloralimide was first described by Messrs. Pinner and Fuchs, who obtained it by the action of ammonium acetate upon chloral hydrate (*Berichte*, x., 1068), but Messrs. Behal and Choay now claim that it can be obtained in a state of greater purity as a residue from the action of heat upon chloral-ammonia. The product so obtained is described as forming long colourless and tasteless needles, slightly soluble in water, rather soluble in alcohol, and very soluble in ether. It is very stable, not being altered by air, light or moisture, or by heating in a sealed tube to 150° C. in the presence of water; but at 180° it is said to be decomposed into chloroform and formamide. In contact with a liquid acidulated with a mineral acid it is stated to be decomposed into chloral and the corresponding ammonia salt, but this reaction does not occur with organic acids (*Répertoire*, March 10, p. 109). Further it is affirmed that in doses of 0·25 to 0·50 gram chloralimide has been ascertained to possess remarkable antipyretic and analgesic properties. M. Choay also claims that it would surpass chloral ammonia or chloralformamide in activity, since an equal weight would yield more chloroform than either, whilst it presents the advantage of being stable and free from unpleasant taste and odour. Herr Ritsert, referring to this substance (*Pharm. Zeit.*, March 15, p. 166), points out that the name applied to it, chloralimide, is not free from objection, since chloral, as an aldehyde, is characterized by an hydroxyl group, which is no longer present in this compound. He thinks it would be more scientific to speak of it as trichlorethylidenimide. Further the statement that the compound is split up by heating to 180° into chloroform ($CHCl_3$) and formamide ($HCONH_2$), and by mineral acids into chloral and ammonia salts, is considered by him to be in contradiction to what is known of the decomposition of chloral, and he thinks proof is required that the compound so described corresponds to the formula attributed to it or is identical with the chloralimide prepared by Pinner.

Anthrarobin and Goa Powder.

The fact that Goa powder or some closely allied substance has been sometimes supplied in Germany when anthrarobin has been ordered has induced Dr. Mühe to put on record some characters and tests by which the two substances can be readily distinguished from one another (*Apot.-Zeit.*, March 1, p. 105). The anthrarobin prepared by Professor Liebermann, and recommended as a substitute for chrysarobin, is a yellowish-white powder, which in the dry condition is fairly permanent, especially if it be sheltered from light; after a time, however, it becomes somewhat darker through oxidation. The colour therefore differs from the brown-yellow of Goa powder. If 0·1 gram of anthrarobin be shaken with 20 grams of 2·5 per cent. borax solution it dissolves immediately to a clear yellow liquor, the froth having the same colour, while Goa powder under the same conditions only partly dissolves and forms a turbid brown liquid with brown froth. In dilute soda or ammonia liquor anthrarobin forms at once a yellow brown solution, which shaken in contact with air becomes quickly green, then blue and eventually violet; Goa powder gives a beautiful violet red solution, the colour of which is very permanent and not altered by contact with air. Another readily distinctive test is the reaction with concentrated sulphuric acid, anthrarobin forming a deep brown-yellow solution, without froth (re-formation of alizarin), and Goa powder dissolving with frothing and a red-yellow colour.

Hydroxylamine.

Dr. George Grotdeck reports the results of some experiments made to test the alleged value of hydroxylamine in dermatological practice (*Apot.-Zeit*, March 8, p. 122). He states that a solution of the strength of 1 in 1000 was practically inactive; and that solutions of 2 to 5 in 1000, while producing irritation under some conditions, were almost without other effect. A 1 per cent. solution almost always caused irritation after being used some time. Some cases did not seem to improve under the use of a solution of even this strength, but in others it acted gradually, though always more slowly than chrysarobin or pyrogallic acid. Dr. Grotdeck considers that hydroxylamine does not lend itself to private practice, because of the difficulty of carrying out the necessary watching for toxic symptoms or the commencement of inflammation.

Synthesis of Sugars.

The latest communication from Professor Emil Fischer to the German Chemical Society (*Berichte*, xxiii., 370) not only constitutes an important addition to the history of the compounds of the sugar group, but it records the completion of the synthesis of all bodies of the mannite series, with the exception of grape sugar and its derivatives. Great similarity in the characters of the lactone of arabinosecarboxylic acid, prepared by Kiliani from arabinose, and the lactone of mannonic acid, prepared by Fischer and Hirschberger from mannose obtained in the oxidation of mannite or by the action of an acid on the cellular tissue of vegetable ivory, had suggested the probability that these two bodies are optically opposed isomers, mannonic acid being dextrogyre and arabinosecarboxylic acid lævogyre. This was confirmed by experiment, the two lactones in aqueous solution combining to form an optically inactive substance of the same composition. This inactive compound, like the two lactones forming it, was found to be reducible by sodium amalgam to an inactive sugar, corresponding to mannose, and by further reduction to an inactive hexatomic alcohol, corresponding to mannite. It is therefore proposed to retain the names mannose and mannite for the respective triplets, distinguishing the individual members and other derivatives by prefixing the letters l, i, or d, according as the aldehyd (sugar) of the series is lævogyre, inactive or dextrogyre. The i.-mannite so produced was ascertained to be identical with α-acrite, the hexatomic alcohol obtained by the reduction of α-acrose, the inactive sugar first prepared by Fischer and Tafel synthetically from acrolein bromide, and subsequently found by Fischer and Passmore among the condensation products of formic aldehyd. The next step therefore was to attempt to split up the inactive synthetically prepared compounds and identify their optically active constituents with those derived from natural compounds. For this purpose α-acrose (*i.e.*, i.-lævulose) was submitted to the action of beer yeast, when the portion of the sugar belonging to the d.-series underwent fermentation, whilst l.-lævulose was left unattacked; a similar result was obtained with i.-mannose. A more complete result was obtained by reduction of i.-lævulose to i.-mannite and the oxidation of this to i.-mannonic acid. The different solubility of the strychnine and morphine salts of this acid afforded a means of splitting it up into l.-mannonic acid, identical with arabinosecarboxylic acid, derived from cherry gum, and d.-mannonic acid, identical with that derived from mannose from the cellular tissue of the ivory nut. Since, therefore, from these active acids, by reduction, the active sugars and alcohols can be prepared, the chain of synthesis is so far complete. In an interesting note appended to this communication Professor Fischer alludes to the possibility that these researches may prove the key to some problems of plant physiology. The power of the living organism to prepare optically active substances, which are never obtained by direct chemical synthesis, is a remarkable fact that may, he thinks, explain some of the assimilation processes in plants, *i.e.*, the formation of the carbohydrates in the green leaves. If plant physiologists are right in thinking that the carbohydrates constitute the only carbon structure material for the other chemical compounds formed, it seems probable that the optical activity of albumenoids and their alteration products may be produced by the same active group as is contained in dextrose and its allies. Professor Fischer considers it to be possible that in plants, as in chemical synthesis, the sugars are first formed in the inactive condition; that they are then split up and that the members of the d.-mannite series—as grape sugar, fruit sugar, and mannose—are used in the elaboration of starch and other carbohydrates, whilst the optically opposed isomers serve some other purpose, at present unknown.

Dextro-Cocaine.

The recent interesting results obtained by Messrs. Ladenburg and Hundt in splitting up an inactive tropic acid into dextro and lævo acids and the preparation therefrom of isomers of atropine (*ante*, Nov. 30, p. 422), appear to have induced Messrs. Einhorn and Marquardt to make experiments in the same direction upon the constituents of cocaine, the results of which have been reported to the German Chemical Society (*Berichte*, xxiii., 469). It was found that ecgonine is by the action of potash converted into a base, differing from ordinary ecgonine in being much less soluble in absolute alcohol and having a much higher melting point, but especially in being dextro-rotatory. From this dextro-ecgonine a synthetic dextro-cocaine was obtained as a colourless oil, which was converted into a beautifully crystalline hydrochloride, much more difficultly soluble than ordinary cocaine hydrochloride and melting at 205° instead of 181·5° C. A pharmacological examination of this dextro-cocaine showed that it exercises exactly the same influence as ordinary cocaine, except that the local anæsthetic action commences more rapidly and disappears in a shorter time.

At the same meeting of the German Chemical Society Messrs. Liebermann and Giesel made an interesting communication upon a bye-product of technical cocaine synthesis (*Berichte*, xxiii., 508).

Methyl-Cocaine.

It appears that the preparation of cocaine synthetically from the ecgonine obtained in the decomposition of the coca bases is now carried on very advantageously, as the ecgonine can in this way be obtained as a starting material in a state of great purity. From the mother liquor of this industry has been separated a small quantity of a base which is thought to be methylcocaine ($C_{18}H_{23}NO_4$), and to have had its origin in some methylecgonine occurring among the other products of the decomposition of the coca bases. The new alkaloid was obtained in beautiful hard radiating crystals, melting at 46-47° C. and much less readily decomposed when heated with water than ordinary cocaine. When treated with fuming hydrochloric acid it is split up first into methyl alcohol and benzoylmethylecgonine hydrochloride, then further into benzoic acid and methylecgonine hydrochloride. The methylecgonine set free from this salt by means of silver oxide is extremely soluble in water, insoluble in absolute ethyl alcohol, and almost insoluble in absolute methyl alcohol. The salts of methylcocaine produce upon the tongue the same numbing sensation as those of cocaine. They possess great crystallizing power and the hydrochloride is much less soluble in water than cocaine hydrochloride. The reading of the paper previously referred to, on dextro-cocaine, with which methylcocaine corresponds in many of its properties, led to an examination of the latter as to its optical activity, and the authors in a postscript state that methylcocaine also is dextrogyre. It is thought most possible that the two compounds are homologous, but the possibility of their being identical is not excluded.

Taxine the Alkaloid of Yew.

Statements have been made at different times as to the presence in the leaves and fruit of the yew (*Taxus baccata*) of an alkaloid principle. In 1876 (*Pharm. Journ.*, [3], vii., 894), Marmé described a crystalline alkaloid that he had separated from the leaves and acids, which he named "taxine" and spoke of as being poisonous. It was obtained by treating an ethereal extract of the leaves and fruit with water acidulated with sulphuric acid and precipitating this solution with ammonia. Messrs. Hilger and Brande report (*Berichte*, xxiii., 464) that, working on the leaves in the same way, they have separated an alkaloid, which they failed to crystallize. This taxine melted at 82° C., and when heated in a glass tube gave off white fumes that condensed on the colder parts of the tube to oil-like drops that solidified on cooling, at the same time a characteristic aromatic odour was evolved. It dissolved in water in traces only, freely in alcohol and ether, with more difficulty in chloroform, and was insoluble in benzol. It was coloured intense purple-red by concentrated sulphuric acid and intense red-violet by Frohde's reagent, and gave yellowish precipitates with the ordinary alkaloidal reagents, and white precipitates, insoluble in excess, with the fixed alkalies and ammonia. The salts of taxine are mostly readily soluble in water, but only the hydrochloride was obtained well crystallized, and this by passing a current of hydrochloric acid gas into a solution of the alkaloid in anhydrous ether. Analysis of taxine gave results corresponding with the formula $C_{37}H_{52}O_{10}N$, and its behaviour with ethyl iodide indicated that it is a nitrile base. The authors do not seem to have occupied themselves with the physiological action of taxine.

Aricine.

Messrs. Moissan and Landrin report that they have met with a parcel of bark yielding the rare alkaloid aricine in the extraordinarily large proportion of 3 to 3·5 per cent., the material having been sufficient for the preparation of two kilograms of the alkaloid (*Compt. Rend.*, cx., 469). The bark is described as occurring in quills, grey on the exterior and reddish in the inner side, and approximating in appearance and character to the barks described by Bouchardat and Winckler in their memoir on aricine. Hitherto aricine has only been obtained in very small proportion, Hesse having separated from a cusco bark only 0·62 per cent. Another peculiarity of the present bark is that it contained neither quinine nor cinchonine, whilst aricine has hitherto been described as occurring together with other cinchona alkaloids. The authors state that the results of an analysis corresponded with the formula $C_{23}H_{26}N_2O_4$ attributed to aricine by Gerhardt and confirmed by Hesse and that their product agreed in its characters with those recorded by previous workers, as well as with those of a sample of aricine bearing Pelletier's name preserved in the collection of the Paris École de Pharmacie.

Incompatibility of Codeine and Morphine Sulphate.

Referring to the experience that morphine sulphate and codeine are sometimes prescribed together in the United States, Mr. Claassen points out that codeine is capable of decomposing the morphine sulphate, as well as morphine salts generally, with separation of morphine, which is insoluble in water (*N. Y. Pharm. Runds.*, Feb., p. 40). So complete, indeed, is this reaction, that Mr. Claassen bases upon it a method of determining the amount of codeine present in a liquid. For this purpose an excess of morphine sulphate is added to the warmed liquid under frequent shaking, and after cooling the mixture is allowed to stand for forty-eight hours and the separated morphine is collected on a tared filter. If after addition of more morphine sulphate to the liquid no further deposition takes place in twenty-four hours, the weight of the morphine obtained, multiplied by 0·9868, gives the amount of anhydrous codeine, or multiplied by 1·0462 the amount of codeine crystallized with one molecule of water. In other words 100 parts of anhydrous codeine decomposes 126·76 parts of morphine sulphate. But in cases where codeine salts or morphine or morphine salts may be present, excess of magnesia is added and the mixture is evaporated to dryness; the residue stirred up with some water, is shaken several times with ether free from alcohol, the ether distilled off and the residue exhausted with hot water. The codeine in the resulting solution can then be determined as previously described.

Strophanthin and Ouabain as Anæsthetics.

Some experiments made to test the statement of M. Gley that strophanthin and ouabain are capable of producing anæsthetic effects without irritation, when introduced into the eyes of certain animals, have been reported upon to the Paris Academy of Medicine by M. Panas (*Nouv. Rem.*, March 8, p. 115). He found that ouabain, although manifesting anæsthetic properties when used upon the rabbit, appeared to have no action upon the human eye. Strophanthin seemed to be superior in producing some corneal anæsthesia, but it also gave rise to so much irritation and congestion as to place it far below cocaine for ophthalmic purposes.

Antipyrin in Asthma.

A case in which antipyrin was successfully administered in the treatment of asthma is reported by Mr. C. Smith (*Med. Chron.*, March, p. 465). The patient was a man thirty-six years of age, who had suffered during several years from frequent attacks of asthma which previous preventive treatment had failed to affect. Thirty grains of antipyrin administered at the commencement of a paroxysm gave complete relief in ten minutes. A slight recurrence on the following day was promptly subdued and for a period of five months the patient has been free from attacks.

Sulphonal.

A short time since Dr. R. Percy Smith reported the observation of ataxic and other disturbances following in some cases the administration of sulphonal (*ante*, Nov. 30, p. 425). A similar experience is now recorded by Dr. Marandon, of Montyel, who states that he has observed symptoms of paresis, ataxia, dulled intelligence, loss of appetite, nausea, and frequent vomiting as consecutive to treatment with sulphonal (*Brit. Med. Journ.*, Mar. 8, p. 570). The symptoms were observed in fourteen out of eighty cases of mental alienation in which this substance was employed.

Synthetic Carbolic Acid.

Some experiments have been made by Dr. Ohlmüller, assistant in the German Imperial Health Department, to test the relative disinfecting power of "synthetic" carbolic acid (*Pharm. Zeit.*, March 5 p. 142). The sample examined solidified at a moderate temperature to greasy needles that refracted light strongly, had a sp. gr. of 1·0681 and melted at 41° C. With the exception that the compound gave a faintly acid reaction with blue litmus paper it corresponded to all the requirements of the Pharmacopœa Germanica. The comparison was made with the ordinary official carbolic acid, as well as with two varieties of crude carbolic acid—oily and tarry—mixed with sulphuric acid, and the estimate of their relative power as disinfectants and antiseptics was based upon their antibacterial action. The conclusions arrived at were that there is a difference in the disinfecting power of the two kinds of carbolic acid, since the synthetic acid diminished the life activity of the bacteria experimented upon rather less than the older kind, but that the difference was so small that the two kinds might be considered to be practically of the same value. The disinfecting action of the mixture of crude carbolic acid and sulphuric acid was found, however, to be greater than that of either of the purer acids used alone.

Lithium Carbonate.

Complaints having been made recently that lithium carbonate is not now so soluble in seltzer water as it was formerly some commercial samples were examined by M. Carles (*Répertoire*, March 10, p. 104). They were found to be free from magnesium carbonate, and to contain only 1·25 per cent. of sodium carbonate, a quantity not thought to be excessive. Their relative insolubility is attributed by M. Carles to the use of too high a temperature in drying, and to the preparation being sent out in the granular form. It was found that the same samples dissolved much more easily after having been powdered, and that the salt could be rendered immediately and completely soluble in seltzer water by effecting the trituration in the presence of an equal quantity of sodium bicarbonate or sugar.

Hydrocyanic Acid and Calomel.

The grey tint which calomel assumes in the presence of traces of hydrocyanic acid was attributed by Scheele to the liberation of metallic mercury and the formation of cyanide of mercury and hydrochloric acid. Subsequent writers have, however, represented the decomposition as involving the formation of mercuric chloride. Some experiments made recently by M. Fouquet (*Journ. Pharm. Chim.*, Nov. 1; p. 400) appear to disprove this latter theory and confirm that of Scheele. M. Floquet is of opinion that the action of hydrocyanic acid upon calomel does not result in the formation of sublimate, but that mercury is set free, with the formation of mercuric cyanide and hydrochloric acid in equivalent quantities. The reaction does not generally go on to completion, as it ceases when a certain quantity of hydrochloric acid is set free, varying with the strength of the solution of hydrocyanic acid employed; but if this acid be neutralized the reaction recommences. Inversely the addition of a sufficient quantity of hydrochloric acid to the mixture prevents the reaction.

Solvents of Salol.

At a recent meeting of the Paris Society of Pharmacy (*Journ. Pharm. Chim.*, xx., 576), M. Lacroix stated that as the result of experiments he had found salol to be very soluble in olive oil, almond oil, castor oil, the oleoresins of copaiba and turpentine, and the volatile oils of sandal wood, turpentine, etc. These substances dissolve more than a third of their weight of salol at the ordinary temperature and the solution remains clear. Liquid vaseline dissolves one-third of its weight of salol at a temperature of 28° C., below which point the solution solidifies, but a 10 per cent. solution of salol in liquid vaseline does not deposit crystals even at 0°. M. Lacroix takes advantage of this solubility to prepare transparent gelatine capsules containing salol associated with oil of sandal wood, copaiba, turpentine and almond oil to the extent of one-third.

Camphor a Solvent for Iodoform.

According to Dr. Audie-Sarzeau (*Pharm. Zeit.*, March 22, p. 181) camphor exercises upon iodoform a considerable solvent power. He states that whilst 10 grams of alcohol alone will dissolve at most 0·125 gram of iodoform, the quantity that can be dissolved is increased to 1 gram if the alcohol be first saturated with camphor. A similar result is obtainable with an ethereal solution of camphor.

Lactarius piperatus.

In continuing an investigation of the fatty constituents of fungi, M. Gérard has separated from *Lactarius piperatus* oleic and stearic acids, partly free and partly as glycerides, as well as a considerable quantity of lecithine, and formic, butyric and acetic acids (*Journ. Pharm. Chim.*, March 1, p. 279). The most interesting constituent observed was a cholesterin which appeared to be identical with the ergosterin separated a short time since by M. Tanret from the fat of ergot.

Scopola japonica.

Mr. E. Collin has made an extended microscopical examination of the rhizome of *Scopola japonica*, and finds that it differs from *S. carniolica* only in the greater size of the fibro-vascular bundles, these being rather less developed in the case of *S. carniolica* (*Journ. Pharm. Chim.*, March 1, p. 240). In the radial arrangement of the vascular bundles, in the presence of starch, in the pulverulent form of the raphides of oxalate of calcium and in the absence of lignified fibres from the pericycle, these rhizomes are analogous to belladonna. He thus confirms what has already been stated in the columns of this Journal.

Phytolacca decandra.

M. Eymard states (*Journ. Pharm. Chim.*, March 1, p. 243) that in Spain and Portugal the berries of the elder and phytolacca are largely used for colouring wines and liqueurs, and that it is rare not to find a corner of the vineyard devoted to the cultivation of these plants. He has made some experiments with the juice of phytolacca, since the root of that plant is known to possess powerful medicinal properties, and the berries are stated to be a violent purgative. He finds, however, that the juice taken in the dose of 60 grams produced only one action of the bowels, and it required 80 grams to produce a cathartic action. The colour of the juice is rendered more bright by acids and turned to a bottle-green by alkalies. The extract of the berries is partly soluble only in alcohol of 60°, very slightly in alcohol of 80°, and that of 95° almost insoluble. It is almost insoluble in ether, chloroform and bisulphide of carbon.

Cannabis indica.

Dr. J. Russell Reynolds in the *Lancet* (March 22, p. 637) directs attention to the value of *Cannabis indica* as a remedy in facial neuralgia, migraine, and some forms of epileptic attacks. He states that in some individuals a grain of the extract may produce toxic symptoms, but he has never found one-fifth of a grain do so, yet by gradual increase of the dose it may be taken up to three or even four grains. Nevertheless he prefers the tincture, since pills often become hard and insoluble, and the dose cannot be so readily and gradually increased. The uncertainty of the action of this drug, so often referred to by medical men, is probably due in some measure to the great variation in strength of the drug according to the season and the place of growth, and points to the necessity for some means of standardizing the tincture. Until, however, chemical research has indicated more clearly than at present is the case what the active principle of the drug really is, such standardization is practically impossible.

Mentha Pulegium.

Mr. J. G. Marshall suggests a new subject for the list of poisons. He expresses the opinion that the indiscriminate sale of pennyroyal by druggists should be forbidden, and mentions a case in which a dose of 3 drachms of the essence produced abortion and dangerous flooding. The dose above mentioned is, however, much larger than is usually taken as an emmenagogue, and would contain, if made according to the B.P. formula for essentia menthæ piperitæ (1 in 5), thirty-six drops of the essential oil, or according to a common formula (1 in 8) about twenty-two drops, a quantity that in either case would be likely to act as a powerful irritant, as would also be the case if almost any other essential oil were used instead.

Persian Gum.

Professor E. Sickenberger remarks concerning Persian gum that quantities of it are sent from Bushire either to a small port on the west coast of the Red Sea or to Jedda, in order that it may be substituted for Khordofan gum. It is thence conveyed to Assouan and packed in old Khordofan packages and sold as genuine gum. Owing to its pale colour and the absence of any suspicion that the gum from Assouan could be other than good gum arabic, a considerable amount has been sold. The gum, however, is described as not soluble in water, but only swelling up in it, and as being less brittle than Khordofan gum. Professor Sickenberger suggests that this Persian gum may be the produce of *Prunus Bokharensis*, Royle, and *Prunus Puddum*, Roxb. The specimens of Persian gum that have appeared in the London market resemble East Indian or Senegal gum of good colour rather than the white minutely cracked opaque Khordofan gum.

New British Plant.

In the *Journal of Botany* for this month Messrs. H. and G. Groves describe and illustrate a new British species of Nitella, *N. Nordstettiana*, which is one of the smallest species of the genus, and is allied to *N. tenuissima*, from which it differs in the prominent wing-like ridges of the oospore, the surface of which is minutely warty, so that it presents a wrinkled appearance. It produces its fruits usually at the first forking of the branches, which is exceptional in *N. tenuissima*; the internodes also are shorter in proportion, and the end cells of the branchlets more sharply pointed.

THE ESTIMATION OF UREA.*

BY D. B. DOTT, F.I.C., F.R.S.E.

Of the various methods which have been proposed for the estimation of urea, that which enjoys most favour as an expeditious and sufficiently accurate process is the hypobromite method. Urea and hypobromite react according to the general equation, $COH_4N_2+3BrHO=CO_2+3HBr+2H_2O+N_2$. A strongly alkaline solution is employed whereby the carbonic anhydride is absorbed, so that it is only necessary to measure the volume of nitrogen, and after the usual corrections to calculate its equivalent of urea. The calculation shows a constant deficiency of very nearly 8 per cent. of the urea actually present. Different forms of apparatus have been suggested for conducting the operation, a useful modification being described by Mr. Gerrard. Mr. A. H. Allen advised the adoption of the nitrometer for the purpose, and that is the arrangement which I have employed. I have not, however, used hypobromite, but hypochlorite, and that is the point which I wish to bring forward. The solution of hypochlorite is easily prepared by mixing one part of chlorinated lime with three of water, and filtering. The nitrometer is now filled with this solution, and a measured quantity of the urine (say 4 c.c.) introduced by the funnel, any small amount adhering to the sides being washed in with a few drops of distilled water. The tube is now turned over twice from its perpendicular position, in order to mix the liquids, and in a few minutes the reaction is complete. It is well to introduce a little baryta solution to make sure that all the carbonic acid is absorbed, and then a few drops of methylated spirit to remove the froth and permit the reading to be accurately made. The following results were obtained. With hypochlorite solution, 2 c.c. urine gave :—

(*a*) . . . . 21·6 c.c. nitrogen.
(*b*) . . . . 21·6 c.c. „

With hypobromite solution 2 c.c. of same sample gave :—

(*a*) . . . . 21·6 c.c. nitrogen.
(*b*) . . . . 21·4 c.c. „

A solution of pure urea was prepared containing 2 grams in 100 c.c. and 4 c.c. of the solution tested with the hypochlorite solution :—

(*a*) . . . . 29·0 c.c. nitrogen.
(*b*) . . . . 28·8 c.c. „
(*c*) . . . . 29·0 c.c. „

29 c.c. nitrogen, after making the necessary corrections, are very nearly equivalent to the ·08 gram urea used. These results indicate that the hypochlorite of calcium is as trustworthy a reagent as the hypobromite of sodium. But, it may be asked, does the former possess any advantages over the latter? I decidedly think so. In the first place the hypochlorite of calcium solution keeps unimpaired for a considerable time, while the sodium hypobromite rapidly deteriorates and becomes useless. Secondly, the hypochlorite solution is easily prepared, while the hypobromite solution is rather troublesome and disagreeable to make, especially where there is not a good draught. Lastly, the hypochlorite solution is much less costly than the sodium hypobromite.

NOTE ON URALIUM OR URAL (CHLORAL-URETHAN).*

BY D. B. DOTT, F.I.C., F.R.S.E.

Uralium was the name given to chloral-urethan on its introduction into medicine. It is in some respects an unfortunate name, as it was originally applied by Guyard to a metal of the platinum group, and the termination of the word affords no indication of the nature of the compound. Uralium is not to be regarded as a loose molecular compound of chloral and urethan, but as an intimate atomic combination, differing in its physical properties both from chloral and urethan. For instance, it is almost insoluble in water, its two constituents being readily soluble, while its solution in alcohol possesses a taste which is markedly different from that of chloral or urethan. Although some excellent results have been obtained by its use as a hypnotic, its sparing solubility has militated against its employment. It is now found, however, that the substance is sufficiently soluble in proof spirit to admit of the ordinary dose (10 grains) being administered in less volume than is required for some of the other hypnotics, the dose of which is larger. Ten grains of ural dissolve readily in 1 fluid drachm of proof spirit. A solution of this strength must not be diluted with water, as such dilution very soon causes a crystallization of the dissolved substance. It is quite practicable to prepare a more dilute solution if desired, by using a larger proportion of spirit to begin with.

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* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, March 20.

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TINCTURA QUININÆ AMMONIATA.*

BY GEORGE LUNAN.

About a year ago my attention was directed to this preparation.

While giving a dose to a customer I happened to fill up the glass with aërated instead of plain water, and was greatly surprised to find that the carbonic acid gas seemed to exert a powerful solvent action on the quinine. I made various experiments then with the view of satisfactorily accounting for this, and extreme press of work has alone deterred me from finishing and bringing them forward.

My friend Mr. Hill demonstrated the solubility of the tincture in aërated water at the last evening meeting of the North British Branch, and in the discussion which followed I understand Mr. Thomson brought forward some quinine hydrate dissolved in CO_2, and Mr. Dott believed this was due to the formation of the alkaloidal carbonate.

There is a sample of carbonate of quinine in acicular crystals, stellately arranged, on the table. These crystals were obtained by passing CO_2 through freshly precipitated quinine hydrate suspended in water. The quinine rapidly combines with the CO_2 and forms a clear liquid, from which crystals of the carbonate can be obtained either by exposure of the carbonated solution to the air, or as these on the table by continuing the passage of the CO_2 gas, when they appear as a warty adhering deposit of distinctly crystalline shape on the sides and bottom of the bottle. The bottle drained from liquid and the deposit treated with a small quantity of hot alcohol and left to crystallize gave me the sample on the table.

I had intended estimating the CO_2 in these crystals, but on referring to Gmelin and Watts's 'Dictionaries' with regard to this, it was found that they both contained references to quinine carbonate founded on the work of Langlois on this subject. He prepared a combination of quinine and carbonic acid by passing the gas into freshly precipitated quinine hydrate, and by exposure to air of the solution obtained crystals having the composition $C_{20}H_{24}N_2O_2,H_2CO_3\cdot H_2O$, "in translucent needles, having an alkaline reaction, efflorescing rapidly in the air, decomposing at 110° C. with loss of carbonic acid, soluble in alcohol, insoluble in ether."

There can be no doubt that the formation of soluble carbonate of quinine explains the solubility of tinctura quininæ ammoniata in aërated water. I am sorry that the time at my disposal has not been sufficient to tabulate fully the physical and chemical properties of this salt.

But the fact has opened a wide field with regard to the use of alkaloidal carbonates in so far as they can be made, and has a special reference to the subject of this note, to which I will presently refer.

The solution of carbonate of quinine on the table, which has been kept for a considerable time, now contains, you will observe, a few delicately arranged tufts of long acicular crystals, so that it may be said to be practically a saturated one, and holds in solution about 7½ grains in the fluid ounce of the salt, approximately 1 in 60. My contention is more clearly established as to saturation when I add that it was from 10 ounces of the same solution, by further treatment with carbonic acid, that I obtained the crystals of the salt on the table. It has the slight alkaline reaction referred to by Langlois, and should be useful for ophthalmic and hypodermic purposes.

Reference to Gmelin and Watts's 'Dictionaries' shows that Langlois proved that morphine and strychnine both formed carbonates. In both cases, however, the combination was less close, quinine proving itself, as far as carbonic acid was concerned, the strongest base. Under pressure, however, strychnine and morphine formed stronger solutions with carbonic acid than quinine, but in the former cases the combinations were so loose that the solutions very readily lost their acidulous radicles.

Magnesia in its behaviour to carbonic acid greatly resembles the alkaloids, and of these quinine is perhaps the closest.

Returning to my subject, this reaction has suggested a formula for tinctura quininæ ammoniata likely to make a more convenient and soluble preparation. Admittedly, however, I am looking at it more from a pharmaceutical than a therapeutic point of view. The improvement is to substitute the carbonate for the hydrate in the official tincture. At present it contains about 1·25 per cent. of NH_3 combined with hydroxyl, and by substituting a sufficient quantity of carbonate to contain a similar percentage of NH_3, a preparation of equal efficacy, and with a number of recommendations, is obtained.

During the influenza epidemic, when it was so largely prescribed, the nauseous taste of this tincture was a continual comment, and although the substitute cannot be called palatable, it is a distinct improvement in this respect.

It forms a clear solution with 13 parts of distilled water and 15 parts of Edinburgh water, whereas the present tincture requires 26 and 30 parts respectively.

In freshly-drawn aërated waters this proposed tincture is miscible in all proportions, whereas the present tincture requires from six to seven parts to form a clear solution.

The formula used is—

Carbonate of ammonia .	(32·5 per cent. NH_3) 323 grains.
Quinine sulphate . . .	160 grains.
Distilled water	10 fluid ounces.
Rectified spirit	10 fluid ounces.

Dissolve the carbonate in the water, add the spirit and the quinine, shake until dissolved, and filter, making the product measure 1 pint with distilled water. This is done almost as expeditiously as by the present method, and gives a preparation containing rather over 2 grains of carbonate of ammonia (equal to 1·25 per cent. NH_3) and 1 grain of sulphate, equal to ·918 grain of quinine carbonate ($C_{20}H_{24}N_2O_2,H_2CO_3\cdot H_2O$) in each fluid drachm.

I may add that the formula has been in use for a considerable period, keeps well (would not suffer in this respect were the proportion of spirit reduced), acts as quickly and efficiently as the present preparation, besides having the superior qualities enumerated, rendering it a more elegant, convenient and useful solution for patient and dispenser alike.

[*The discussion on this paper is printed on p.* 796.]

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* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in Edinburgh, Thursday, March 20.

The Pharmaceutical Journal.

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SATURDAY, MARCH 29, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE SALE OF PROPRIETARY MEDICINES CONTAINING POISONS.

THE case notified in our issue of last week as having been taken up by the Treasury came on for hearing before the Lord Mayor, at the Mansion House, last Friday, and a full report of it will be found at page 805 of this week's Journal. As it is one having an important bearing upon the sale of medicinal preparations under the Government Stamp, it will be desirable to remind our readers that the article sold was a cough linctus containing morphine, and that the label contained a caution not to leave the medicine in the way of children, since its sweet character might induce them to take too much of it. This caution does not appear to have been sufficiently attended to, and the result was a young child drank the greater part of the contents of a four ounce bottle and was poisoned. At the inquest the Coroner expressed the opinion that having regard to the nature of the medicine, and the provisions of the 17th section of the Pharmacy Act, the caution given upon the label was not sufficient, and that there should also have been upon the label the word "Poison," for the purpose of enforcing more distinctly the necessity of care in the use of the article. Upon the ground of a representation to that effect by Mr. BRAXTON HICKS, the Treasury gave instructions to prosecute the seller for a breach of the provisions of the 17th section of the Pharmacy Act. It was pointed out by the counsel for the prosecution that the Act was passed in the interest of the public and with the object of establishing certain safeguards to be observed by the persons entitled to deal in poisons. As one of the most important of these safeguards was the "poison" label, which would show the danger of fatal results from an overdose of the medicine, the omission to place such a label on the bottle constituted an offence under the Act. It was however added that the prosecution had been instituted rather for the purpose of leading the sellers of proprietary medicines to understand the necessity of complying with the provisions of the Pharmacy Act than from any desire to punish the defendant in this particular case. It was admitted that what he had done was no more than a great many others are doing under a mistaken view of the matter, and that the chief object was to do away with the misapprehension that exists and to make vendors of such medicines appreciate the position in which they would be placed in respect to a violation of the statute.

We have no doubt that very general sympathy will be felt for the defendant, who was thus unfortunately compelled to answer the charge of having committed an offence against the law, even in the mitigated sense that it was brought against him. Though it was impossible for him to do otherwise than plead guilty to the charge, the fact of his having depended upon the custom of the trade was very properly taken into consideration in his favour. The result was the infliction of only a nominal penalty. At the same time it was distinctly announced as the intention of the Government that whenever the occasion may arise this matter will be pressed to the utmost, and if any instance of the sale of a proprietary medicine containing poison and not so labelled be brought to the notice of the authorities, proceedings will be taken against the vendor. Under these circumstances it will obviously be necessary for chemists to adopt means of protecting themselves against any possible risk of being held liable for infringement of the law. It may not always be easy to do this effectually and it has been said that in some instances it would be impossible for chemists to carry on their business under such conditions. We are, however, of opinion that before such an extreme view is accepted it will be well to take a calmer survey of the position. The objection that may be raised to the more frequent use of the poison label, as deterring people from the use of medicine so labelled, is one which may be removed to a great extent by explanation on the part of the chemist. Many kinds of medicine would be poisonous if taken in too large quantity, and it is to avoid such a contingency that the poison label is used. A representation to that effect would be more likely to meet with appreciation from a purchaser than otherwise, and a knowledge of the fact that there is a possibility of danger being connected with medicine would naturally induce purchasers to obtain their supply from persons properly qualified for the purpose. Moreover, if it be held that in certain instances the use of a poison label is requisite for the safety of the public it would be inconsistent with the position and interests of the chemist for him to object to the use of it. In the case of proprietary medicines made by the vendors it will be no difficult matter to decide whether the poison label is required or not. If a preparation contains a scheduled poison it would certainly be a security to the seller to put on the poison label. Where the line is to be drawn may be open to question, as in the case of morphine lozenges or paregoric lozenges, but to avoid possible inconvenience and for the protection of customers it may even be well to go to extremes in using the poison label. Then comes the question as to the preparations of a secret nature that may contain poison. Who is to be held responsible for the labelling which the law requires as a protection to the public? Whose business is it to ascertain and make known that such preparations contain poison? There can be little doubt that in the event of a casualty occurring with such an article sold without a poison label the seller would be put to some inconvenience if the expressed intention of the Government were carried out. In the first instance he would have to bear the blame, and even if he succeeded in showing that he was not aware of the composition of the medicine, the trouble of having to prove this and to show that the proprietor of the article had been the negligent party might be very undesirable. It should therefore be the business of the proprietor or manufacturer of such articles to put the poison label on preparations which require it.

In whatever light we regard the demand for the use of the poison label in connection with proprietary preparations, it seems evident that it cannot be objected to by the chemist, and in addition to the natural tendency there would be to purchase articles of that kind from properly qualified persons there is another important point to be considered. In the prosecution instituted by the Government, the view is taken that the terms of the Pharmacy Act relating to the exemption of "patent" medicines from the operation of the first part of the Act are not to be interpreted as meaning anything more than they actually express. It is held to be an error to suppose that a preparation is in any way made a patent medicine by having the Government stamp put upon it. The stamp required in the sale of a preparation made by a secret formula, and recommended for any complaint, does not bring that preparation into the category of patent medicines, and it is only those which are actually the subject of letters patent that are held by the Government to be entitled to the exemption provided in the fifteenth section of the Pharmacy Act. This is an important point in regard to the interests of legally qualified chemists, especially when taken together with the requirement, already mentioned, that the presence of a scheduled poison in any proprietary medicine must be declared, and the article must bear a poison label. As a necessary consequence the sale of such preparations by any but registered chemists would be unlawful, and any persons selling them would be liable to prosecution if they were not registered. We have on previous occasions contended that such a limitation of the sale of proprietary medicines would be consistent with the objects and intention of the Pharmacy Act, as it would be nothing more than is requisite in the interests of public safety or than the special qualification of the chemist would demand. Therefore, while sympathizing with Mr. MATTHIAS for the disagreeable experience he has had to go through, it would seem that he has involuntarily rendered a service to his brethren, and been the means of assisting in the remedy of an evil that has been a source of dissatisfaction among chemists, and a frequent ground for remonstrance on the part of the medical profession.

Among the notices given in the House of Commons last Wednesday is one by Mr. Buchanan, the member for West Edinburgh, to ask the Chancellor of the Exchequer whether his attention has been called to the varying decisions that have given by the Inland Revenue Department as to what medical preparations need the patent medicine stamp and what do not. Mr. Buchanan will also ask whether the Chancellor of the Exchequer can take steps to amend the Medicine Stamp Act or to secure its more uniform administration, or otherwise endeavour to allay the dissatisfaction felt among chemists and druggists on the subject.

* * *

It is with much regret that we have to call attention to some cases of prosecution under the Food and Drugs Act reported in this number of the Journal. Although it would perhaps be unreasonable to condemn altogether the growing practice among chemists of obtaining many of their preparations from wholesale manufacturers, it is at least desirable that the chemist should not sacrifice the advantage of his special qualification to vouch for the character of the preparations supplied by him. Though it may be fitting for the grocer to plead that he has sold medicinal preparations as he received them from a wholesale house the chemist cannot afford to do this. In his case the most implicit belief in his source of supply will not serve as a substitute for the personal guarantee that he is supposed to give, and that it is his duty to give, in regard to every article he supplies. The personal service thus rendered is the only thing by which the public can be led to appreciate the distinction between the chemist and the grocer in regard to the supply of medicine, and if that were to be disregarded by chemists, the only means by which they can expect to protect themselves against unnatural competition would be abandoned. It is therefore very important that when recourse is had to wholesale houses for articles which can perhaps be better made on a large scale than by the chemist himself, the testing of these articles so as to certify their quality should never be omitted. By that means alone will the chemist be enabled to guarantee the quality of his preparations and protect himself from the possibility of being held accountable for an offence against the law to his own inconvenience and discredit, as well to the detriment of the class to which he belongs.

* * *

We regret to have to record the death, on the 19th inst., of Richard James Chapman, aged 77, who had been an annuitant on the Benevolent Fund since December, 1888.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The third evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Thursday, March 20, at 8.30. Mr. William Gilmour, F.R.S.E., in the chair.

There was a very large attendance.

The minutes of last meeting having been read and adopted, apologies for absence were intimated from Dr. Inglis Clark and Messrs. Ewing, Heron, Laird and Thompson.

The following communications were read:—

THE ESTIMATION OF UREA.

BY D. B. DOTT, F.I.C., F.R.S.E.

The paper is printed at page 793, and gave rise to the following discussion.

Dr. Stockman said that it was well known that in estimating urea by the hypobromite or hypochlorite method there was usually an error of about 8 per cent., which could be allowed for. In testing the process it was usual to employ a solution of pure urea. It should be remembered, however, that in urine there were other substances, such as uric acid and creatine, which gave off nitrogen. They would thus considerably increase the error, which might amount to as much as 18 per cent. The presence of albumen also made it larger. These tests were only used clinically, so as to obtain an average idea of the amount of urea excreted by a patient. There were several methods, and he thought the one suggested by Mr. Dott was the cheapest and the best. Where accurate determinations of urea were required, Liebig's process was the best, but it took a long time and required some experience. Until some better process was devised he thought that Mr. Dott's would have the preference.

The Chairman asked if Dr. Stockman could say to what extent albumen influenced the result.

Dr. Stockman said when albumen was present it should be coagulated and filtered out.

Mr. Dott, in reply, said of course he had not studied this subject so fully as Dr. Stockman, but he did not think that in practice the 8 per cent. of error would be greatly exceeded.

Dr. Stockman said it would be in a case of gout where large quantities of uric acid were excreted.

The next communication was on—

LITMUS.

BY D. B. DOTT, F.I.C., F.R.S.E.

Litmus is a colouring-matter prepared from various species of lichen, by treating them with ammonia and potassium carbonate in presence of air, whereby a kind of fermentation is established. When the mass has become violet, stale urine, lime, and potashes are added and the fermentation continued until the mass has assumed a blue colour; it is then mixed with gypsum or chalk, and a little indigo, and made up into tablets. So prepared, litmus contains several colouring-matters, but the chief of them appears to be a weak acid which forms blue salts, that existing in ordinary litmus being the potassium salt.

It is as an indicator of acidity and alkalinity that litmus is principally of interest to the chemist. Although other more definite compounds have been introduced for that purpose, litmus is still by far the most universally used of these indicators and possesses its own special advantages.

It shows a well-marked change of colour when passing from the acid to the alkaline state, or *vice versâ*; it possesses great stability; paper is readily dyed with it, and retains its colour without change for a length of time; and among other advantages it is the cheapest of that class of bodies. Litmus has been so well and so long known that one might anticipate that nothing remained to be said on its properties and uses which had not been well said before. It is just, however, because I have noticed so many defective directions given in books, and met with so many specimens of badly-prepared litmus paper, that I have been led to write this note. In the first place there should be no such thing as *tincture* of litmus. Water alone extracts the colouring matters better than weak spirit, and the solution is not so liable to change colour as is the tincture. Besides, the presence of alcohol seriously interferes with the indications of litmus in certain reactions. Its introduction can serve no purpose but that of an antiseptic, which in my experience is quite unnecessary. In the next place, a liquid which is prepared direct from the crude litmus, without further treatment, contains a large excess of alkaline carbonate, and is therefore deficient in delicacy as an indicator, and not suitable for the preparation of test-papers. The proper way to proceed is as follows:—Macerate 1 part of litmus (previously pulverized) in 5 parts of water for two days; filter, and wash the residue with three parts of water. The solution so obtained is now heated to boiling, and dilute nitric acid gradually added until all the carbonate is decomposed and the solution acquires a permanent wine-red colour. The liquor must be preserved in a bottle which has a slit cut in the cork or some other device to admit air, as litmus solution deteriorates both in colour and odour in a closed vessel. When it is desired to prepare test papers from the solution, a strip of thin white filter-paper is dipped in the solution and dried. If the colour is not exactly what is required, a drop of dilute acid or potash solution is added, as the case may be. Litmus paper so prepared has a purple tint, not the strong blue colour frequently observed, which shows that the alkaline extract has been used in preparing the paper. There should be no such thing as *blue* litmus. One occasionally also meets with a kind of paper, which has apparently been prepared with a thin wash of faded tincture, so that it is difficult to detect whether any change of colour takes place in the nearly colourless paper.

In his little book on 'Urine-Testing,' Dr. Legg observes that in certain conditions urine gives an alkaline reaction to red litmus, and an acid reaction to blue litmus, and further remarks that it is not known to which constituent of the urine this abnormal action is due. The same phenomena may be observed in many pharmaceutical operations, perhaps most frequently when there is alkaline carbonate and free carbonic acid present at the same time. It is known that some ammonium salts undergo an appreciable decomposition or dissociation in solution, so that in fact we have present simultaneously a certain amount of free acid and also a certain amount of free ammonia. This is conceivably the explanation of the phenomena noticed by Dr. Legg, especially when we consider that litmus is a complex colouring matter, doubtless containing constituents which are severally differently affected by alkalies and acids.

The Chairman said his experience was that an aqueous menstruum was the best for preparing a test solution of litmus. He thought the change from blue to red which took place in the tincture on standing might be due to absorption of acid vapours from the atmosphere of the laboratory.

Mr. Hill said he was not aware that alcohol interfered with the indications of litmus, but he had observed that he got sharper reactions with an aqueous solution.

Tincture of litmus did not keep well, and he had thought that possibly Mr. Dott intended to recommend the addition of some preservative. He had found that a tincture containing spirit became acid after a time.

Mr. Gibson said he had always found water the most suitable solvent for litmus. With regard to blue litmus he thought it would be best to have a neutral litmus paper to begin with, and then it could be readily used for either alkali or acid, instead of having the blue and red, as at present. He quite agreed with Mr. Hill as to a tincture of litmus containing spirit becoming acid, a result due, probably, to formation of acetic acid. Notwithstanding all that had been said against litmus he had found it better than most of the indicators recently introduced.

Mr. Dott in reply said solution of litmus had a tendency to spontaneous decomposition and this could be prevented by exposure to air. The presence of alcohol would probably encourage such a change. An aqueous solution kept fairly well, but it might be an advantage to add a small quantity of some antiseptic.

The next communication was a—

Note on Uralium or Ural.

BY D. B. DOTT, F.I.C., F.R.S.E.

The paper is printed on page 793, and gave rise to the following discussion:—

The Chairman said he had recently had experience of antipyrin in 15 grain doses and though not a hypnotic he had found that it had a wonderful effect in allaying irritation and giving rest.

Dr. Stockman said he had not had much experience of uralium, but he had heard reports to the effect that it gave satisfactory results. There was one great objection to several of these hypnotics, and that was their insolubility. Sulphonal, for instance, sometimes did not produce its full effect till ten hours after being taken. He was afraid that uralium might be open to the same objection. The best vehicle in which to administer them was hot water. Sulphonal was used in asylums in enormous doses, 80, 90, or even 120 grains being sometimes given. If the effect produced was more than was required the sulphonal was got rid of by administering a sharp purgative. This, of course, was rather objectionable from the patient's point of view. Nothwithstanding the objections to sulphonal, it was likely to find a place in the addendum to the Pharmacopœia to be issued this year. The enormous number of these new compounds, all having analogous properties, was a source of confusion, and many of them might be set aside with advantage.

Mr. Dott, in reply, said he agreed with Dr. Stockman as to the needlessly large number of new hypnotics. It would be more satisfactory to have them carefully tested, and all but the best dismissed. It did not follow that because sulphonal had disadvantages, therefore uralium must also have them. He thought it should be fairly and carefully tried, and doubtless it would take its place among new remedies if found suitable.

The next communication was on—

Tinctura Quininæ Ammoniata.

BY GEORGE LUNAN.

The paper is printed on page 794, and gave rise to the following discussion:—

Mr. Thomson said he had prepared the tincture with proof spirit, and a little less ammonium carbonate than that in the formula, and he found that at a temperature of about 40° F. the quinine crystallized out. A menstruum containing less spirit would perhaps be more suitable. It seemed to him that the quantity of ammonium carbonate given in the formula was not accurate, but possibly he might be mistaken.

Mr. Nesbit said an advantage of the new tincture seemed to be that it was more permanent when diluted than the official preparation.

Mr. Lunan in reply said he had made allowance, in making the menstruum, for the 2½ ounces of liquor ammoniæ in the official formula. As to the figures given, he had gone into the matter carefully, and thought Mr. Thomson would find that they were correct.

The next communication was on—

The Future of Pharmacy as a Trade and as a Profession.

BY DAVID STORRAR.

In this communication I wish to advance the proposition that many of the evils we are suffering from at the present time are due, in a great measure, to the fact that pharmaceutical legislation has hitherto tended to spoil a trade without creating a profession.

We have tried to run what is essentially a trade upon professional lines, and have, naturally enough, failed. If pharmacy is a trade it should be a *free* trade; if it be a profession, that is, if special education and special training is required by the State as a condition of its practice, then, like all other professions, it should be granted reasonable protection.

I advance this proposition, not because I am entirely convinced of its truth, but because it is sincerely believed by many, and because the consideration of our subject on these lines will not only be interesting in itself, but may serve as a guide in future legislation.

As the time at our disposal is limited, and I should like to leave as much of it as possible for the discussion which I hope will follow, I think we may take two points for granted, namely first—that before the formation of the Pharmaceutical Society, pharmacy was simply a trade; and second—that in spite of all that has been done, and admitting to the full the great advance which has been made in the status and practice of pharmacy, legislation is still required alike in the interests of the public and the pharmacist to put it on a proper footing.

The latter point I am sure has been sufficiently impressed upon us all, in recent years, by the keener competition, the diminishing profits, and the increasing stringency in the interpretation of the laws affecting the trade.

We cannot intelligently consider the future of pharmacy without knowing something of its history, and although all of us here are familiar with that we shall refresh our memories by taking a glance backwards.

The history of pharmacy, so far as we are concerned, covers little more than half a century. We only commenced to make history when, in 1841, a few of the metropolitan chemists and druggists formed themselves into the Pharmaceutical Society. Before that pharmacy was simply a trade, with little or no cohesion, and upon the entrance to which the State placed no restriction.

The object of the Society, as expressed in its constitution, was "for the protection of those who carry on the business of chemists and druggists," and "to provide a fund for the relief of the distressed members and associates of the Society," as well as "for the purpose of advancing chemistry and pharmacy, and promoting an uniform system of education of those who should practise the same." Or, as it was well expressed by Jacob Bell when he wrote, "While, therefore, we concede to philosophy all that importance to which it is entitled, we must not lose sight of those substantial considerations, on which we are all dependent for subsistence. In accordance with this principle the constitution of the Society provides, in the first instance, for the protection and welfare of its members; but the prominent means by which they are to secure these privileges consist in the promotion of the requisite education and scientific knowledge which will shield them from extraneous control and interference."

In fact the formation of the Society was a measure of self-defence on the part of the chemists and druggists against "repeated attacks upon their interests" by the physicians and apothecaries of the day. They saw that "nothing short of a permanent association could secure the trade against a recurrence of the inconveniences and annoyances which it had from time to time experienced," and consequently the first resolution which was proposed and unanimously carried at the initiatory meeting of the Pharmaceutical Society was "That the permanent interests of the chemists and druggists require that they shall immediately form themselves into a Society."

As the ground upon which all attempts to interfere with the rights of chemists had been the amount of their professional qualifications, it was only politic as well as right that measures should be taken to raise the standard of the trade by an improved system of education; but none the less the motive power of the Society was trade protection, although protection which had a higher object in view when the Association had established for itself a character and position in correspondence with its aims.

Started upon these lines the Pharmaceutical Society has done excellent work in elevating the trade and providing for the efficiency of its members; "but one thing it lacked," and still lacks, to render it a thoroughly efficient conservator of trade interests, and that is the support of the trade generally. For this the Society is not to blame, as it opened its doors wide on its first formation and has all along kept them sufficiently wide open to admit all who are entitled to enter. The blame lies at the door of the trade itself, and is due to the fatal apathy which has characterized it ever since it came into existence.

If the present Council, or any previous Council, has neglected trade interests and legislated for the few instead of the many, the fault lies with the members of the Society and those who might be members but prefer to remain outside and grumble instead of to come inside and vote. The Council is as the Society likes to make it, and no member can denude himself of his share in the responsibility of the Society's policy and action.

Comprising, as it has done from the first, the more scientific and ambitious members of the craft, these members have moulded the policy of the Society and have kept the professional more than the trade element of its work in view, believing that the higher training of the pharmacist is the true road to travel in the direction of public confidence.

This drift towards professionalism can be noticed in the Royal Charter granted to the Society in 1843, and is pretty evident in the Pharmacy Act of 1852. Up to the granting of the charter the Society was only a voluntary association; it then became a corporate body and the higher aim was put more prominently forward. In the charter—the draft of which was prepared by the Society itself and accepted by Government with scarcely an alteration—not a word is said as to the conserving of trade interests, but the object is said to be "for the purpose of advancing chemistry and pharmacy and promoting an uniform system of education, etc.," and in addition to this a certain standard of education became a condition of membership.

In the original draft of the Bill of 1852 another effort was made by the Society to combine the trade into one united body, but in its passage through the House some suspicions were aroused that the Bill was against free trade in physic and would create a monopoly, so that the Select Committee to which the Bill was referred returned it to the House sadly emasculated.

Still, although much of the original intention of the Bill was altered, the title of pharmaceutical chemist was, by its action, strictly reserved to those tested by examination, and so a privileged class was created.

Again, this was not the fault of the Society who promoted the Bill. They proposed opening the door of the Society to all chemists and druggists who were then in business, but, strangely enough, more especially as no attempt was made to confine the sale of drugs to druggists, the House of Commons objected to the proposal as being against "*free trade.*"

The very modified success of 1852 was satisfactory neither to the Society nor to the outsiders, and immediately after the passing of the Act an attempt was made to bridge over the gulf separating the two by the passing of a bye-law taking powers to elect chemists and druggists as members of the Society without examination. After prolonged litigation this was declared to be within the powers of the Society, and the new bye-law received the sanction of the Secretary of State, but although many outsiders took advantage of the concession the feud between the professional and trade element in the craft was not scotched, but again and again broke out.

In 1861 a purely trade association, under the title of the "United Society of Chemists and Druggists," was formed, and for a time received large support.

This Society had a "*raison d'être*" for its existence, which entitled it to support, and not only might have done but really did good work. It occupied the ground which had been vacated by the Pharmaceutical Society, and which the Society, by its composition and growing professionalism, had become unfitted to occupy, namely, the protection of purely trade interests.

The aims of the two Societies differed entirely, but they might have gone on side by side doing good work and helping each other, instead of which they chose to become antagonistic and tilt at each other. No doubt there were faults on both sides, but it is not for us to apportion the blame. It is sufficient here to say that the feud delayed for some years a further consolidation of the trade. Each Society promoted a new Bill, and it was only after much wrangling and negotiation between them, and after much interviewing of Government officials and lobbying in the Houses of Parliament, conducted with consummate skill and patience by the then President, Mr. Sandford, that the last and greatest advance in pharmacy, namely, the passing of the Pharmacy Act of 1868, was achieved.

I am afraid that I have exhausted your patience by this rather prolix historical sketch, but it was necessary so as to establish the truth of the proposition with which I started, namely, that pharmacy is a trade as well as a profession, and that it is this dual nature which renders it so difficult to legislate for, or to predict its future.

Not that I have any doubt as to the future of pharmacy. The pharmacist of the day may suffer, and in some cases is suffering very seriously, but the pharmacist of the next generation, having adapted himself to the altered circumstances, is sure to occupy an honourable, and, I hope, a profitable position. The good seed sown and the earnest and unselfish work done by our leaders are sure to yield good fruit.

Unfortunately, however, Bills drawn upon the future at so long a date are not available for present wants, and we have to ask, therefore, what are the immediate needs of the trade? or, in other words, what are the adverse conditions which call for reform or legislation?

I think they may be summed up as follows:—

(1) That the professional and trade elements are as antagonistic as ever, and it may almost be admitted that the growth of professionalism with all its advantages has this *dis*advantage, that it has destroyed to some extent our capacity for successful trading.

(2) Not to mention the sharp tradesmen within our own body, the outside trader, always on the lookout for fresh fields of enterprise, has discovered the joint in our harness and, although he cannot open a dispensing establishment himself without infringing the law, can do so by assuming six other spirits worse than himself and becoming a limited company, which, not being a "person" in the eyes of the law, cannot therefore break the law. The fact being that, in more senses than one, it is impossible for a company to become "qualified."

(3) That the Act of 1868 from which so much was expected has failed us in another particular. It has taken over twenty years for the Society and the Law Courts to tell us what it really means. For all that time it was supposed that a qualified employer was responsible for and covered the actions of an unqualified assistant, and that what the Act says as to one section applied to the whole, namely, that "the person on whose behalf any sale is made shall be deemed to be the seller."

(4) That so-called patent medicines containing poisons are outside the scope of the Pharmacy Acts and can be sold by anyone who holds a patent medicine licence, whether he be a registered chemist or not; and

(5) That, according to the latest interpretation of the law, while chemists must be qualified themselves and employ qualified assistants, drug companies may trade without having a single qualified shareholder on the register, and the following clause of the 1868 Act stands unrepealed, "nor shall any of the provisions of this section apply to any medicine supplied by a legally qualified apothecary to his patient," so that the said apothecary can hand over his dispensing to his house-keeper or stable-boy without fear of the law.

The practical result of all this being that registered men get all the kicks while unregistered men pocket the halfpence.

Coming now to consider what might be done to remedy the evils complained of I may say, to begin with, that it is a good thing our discussion takes place this month instead of last.

Had it been held last month, when the new Pharmacy Bill was still in life, loyalty to the Society might have prevented us discussing its provisions too closely, but its premature decease has relieved us from any feeling of this kind. Last month we were practically told that any criticism of the Bill would lay us open to a charge of obstruction; this month we are invited by the Society's organ to discuss it clause by clause with a view to its adjustment and resuscitation next session. The invitation referred to is a move in the right direction and should be fully taken advantage of.

Independently altogether of its merits, it was a mistake in tactics to promote a Bill in Parliament regarding which those principally interested had not been consulted and had been given no time to consider, and regarding the provisions of which even the promoters were not entirely unanimous. Without unanimity amongst ourselves we cannot hope to influence the public.

The Bill was well intended, and contained many good points, but if my analysis of the trade is correct did not and will not give satisfaction without considerable alteration.

Taking then the Bill as a guide let us try to formulate the line of action which ought to be followed.

The main feature of the problem before us is this. Can we so weld together the two sections of the craft as to secure and increase public safety and confidence, and yet do so "without losing sight," as Jacob Bell expressed it, "of those substantial considerations on which we are all dependent for subsistence?"

It looks as if we had already reached, or were rapidly reaching, the point indicated the other day by Mr. Carteighe when he said: "The time is, no doubt, coming when we shall have to choose between being traders with no conditions or pharmacists with all the advantages of that calling."

This puts the matter very tersely and truly, and if the time referred to has come, there should be no hesitation as to our choice. In fact when we think of it, the choice is already made. We have gone too far to retreat, and the only possible course is forward; we could not lapse again into being mere traders, even supposing we wished to do so, and rightly recognizing this the Council has generously, I think, tried to carry the trade with it, and is prepared to widen the entrance to the Society to the utmost extent.

This, to me, is the crucial point of the Bill, and of the future of pharmacy, and appears so important as to warrant an effort being made, either by the passing of a byelaw or otherwise, to provide at once for the admission of associates in business as members of the Society. Until we know whom we are legislating for, the character and scope of the legislation must be indefinite, and the invitation to join the Society after the legislation of the future is fixed cannot prove so attractive as an invitation to join for the purpose of helping to decide what that legislation should be.

Let us by all means in our power, therefore, do our very utmost to induce those outside to join us now, and if the disabilities of associates are removed I cannot see how self-interest—were there no higher motive—would not induce them to do so. The Society has proved itself to be the only trade Association which can live, and to it the raising of a disunited and unorganized craft to the position of a recognized and honourable profession is due.

If the outsiders could and would join hands with us inside the Society, and by so doing make it representative of the trade and the Council representative of the Society, the future of pharmacy would be secured. If not, if the outsiders persist in remaining outside, then they cannot complain if the members of the Society judge for themselves as to what they consider necessary for the safety of the public and the wellbeing of the profession.

The necessity for union in the trade is really the burden of my song, as I believe that without it any reform must be patchwork. But although I feel that I have occupied too much of your time already, there are one or two other points I should like to refer to before closing.

Upon educational points I shall not enter at present. These are too important to be taken up at the fag end of a paper. And although a curriculum is desirable, and even necessary for our advance as a profession, it is not a necessity. To press it at the present time, in fact, suggests the idea that when the trade is calling for bread you offer it a stone.

Two very practical points, however, both of which are involved in clause 6 of the draft Bill cannot be passed over, as they are likely to form the chief points of discussion to-night.

These are: (1) the position of the unqualified assistant, and (2) the restriction of the sale of all drugs, and the sole right of dispensing prescriptions, to registered chemists.

1st. The legal meaning of the phrase "person who compounds," in the 6th clause of the draft Bill will, no doubt, be entirely governed by the interpretation put by the Law Courts and the Council upon the phrase "person who shall sell" in the Act of 1868. This being the case, and knowing that the legal interpretation, although still undeclared is practically given, and knowing also the opinion of the Council, it renders the position of the unqualified assistant an unenviable one and bears very harshly upon the smaller chemists.

I have no hesitation in saying that, in my opinion, this interpretation is against the public interest, is unjust to both employer and assistant, and was never intended by the framers of the 1868 Act.

If the actual seller or compounder is to be held personally liable for the mistakes or carelessness he may be guilty of then the employer is apt to go free, whereas if the employer is held responsible for these, as he ought to be, his motive for care and supervision is clearly increased. Anything which will minimize the personal responsibility of the principal is distinctly against public interest and public safety.

Then again the prevention of dispensing by unqualified men would be an injustice to a large class of employers who cannot afford to keep senior assistants, or in some cases assistants of any kind, and who must work on with apprentices, and, it is only justice to add, who do so at great sacrifice to themselves and with as little risk to the public as in the case of larger establishments. It would be also an injustice to junior assistants who could not, if the law were strictly enforced, gain that experience in dispensing to which they are entitled, and which is absolutely required by them to enable them to pass their examination.

I have no doubt that the Council intends that junior and unqualified men may dispense under the supervision of a qualified man, but if that be intended let it be stated so, and the Bill so framed that it cannot be otherwise construed by lawyers, who consider only the legal interpretation of the language of an Act and not its practical bearing.

It appears clear at any rate that there should be no "fencing" as to the meaning of the word "person" in the new Bill. Secondly, and lastly, as the preachers say, there is the restriction question.

In this democratic age, when anything which savours of privilege is objected to, the word "protection" has an ugly sound, and yet if the claim for protection is a just one it should be made.

The law has very evidently surrounded the trade with restrictions, and it is not unreasonable on our part to ask for a *quid pro quo*. Besides this, the Government has admitted the principle in the Act of 1868, by limiting the sale of certain poisonous drugs to registered men and imposing a penalty on those who infringe the monopoly.

The Council recognizes the admission of this principle in the draft Bill, and proposes to extend the privilege by limiting the dispensing of all prescriptions to the same class, and in this has the entire support of the trade. The only objections which have been urged are that it has not gone far enough, some members being of opinion that we should boldly claim the sole right of selling all drugs as well as the sole right of dispensing them, and should also challenge the right of limited companies to be outside of the provisions of the Pharmacy Acts.

I confess that I cannot see my way to our claiming the sole right of selling non-poisonous drugs. That would be trespassing upon the convenience of the public to an extent which could hardly be justified, and besides the definition of the term "drug" would give rise to endless dispute and litigation.

With regard, however, to limited companies, the question is entirely different and is a fair subject for discussion. So far as I am able to judge, the decision of the Law Court in favour of the companies was a purely legal interpretation of the wording of the Act and did not touch the principle involved.

It may be fairly argued that if the safety of the public demands certain qualifications on the part of the individual members of a firm it should logically require the same qualifications on the part of the members of a company. If the qualified assistant — liable to be changed every pay day—acting as manager under unqualified employers, secures public safety, then why argue that an individual employer, or a firm employing qualified assistance, should also require personal qualifications? The framers of the new Bill admit the hardship and unjust bearing of the Limited Liability Act upon the trade—a bearing which was never intended—but plead that it is not a case of not being willing to act, but a case of *non possumus*. The Limited Liability Act, they say, has put too much money into the pockets of legislators and others to allow of its action being interfered with, and that any action on our part in this direction would be useless and wreck their Bill.

If this is their only argument it is certainly a poor one. I can understand the cogency of the argument that the work of Parliament is so congested that no opposed private Bill has much chance of passing, but that the rectification of an acknowledged injustice has no chance of being carried out in the House of Commons on account of interested motives on the part of its members says little for the House and values too cheaply the influence of the trade.

Why, sir, I read that in 1858 a poison Bill injuriously affecting the trade was unexpectedly read a third time one afternoon in the House of Lords, and what happened? Within two hours circulars were framed and in the printer's hands, and within twenty-four hours the symptoms of a storm were manifest. Petitions began to come in, and in the course of a few days the House of Commons was so influenced that the Bill was withdrawn.

Are we prepared to admit that our influence is lessening—that what was done in 1858 could not be repeated in 1890? This would be a curious commentary upon the work of the Society. Surely the undoubted advance which we have made in public confidence, and in our own organization, entitle us to believe that our influence has strengthened instead of weakened, and that we need have no hesitation in putting forward our claims so long as these can be proved to be just and right.

The Chairman said there had been two papers read at their meetings this session which he felt sure would have a lasting effect on the progress of pharmacy. He referred to the inaugural address by Professor Fraser and the admirable address of the Vice-Chairman to which they had just listened.

Mr. Stephenson said, though not committing himself to all that Mr. Storrar said, his address was on the whole so sensible, moderate and judicious that he had seldom listened to anything on the subject with such high satisfaction as he felt to-night. He had great hopes that something would yet come of the statement so ably put before them by their Vice-Chairman.

Mr. Mackenzie suggested that the discussion of the points raised in Mr. Storrar's paper should be postponed till next evening meeting, and after a short discussion this was unanimously agreed to.

The Assistant Secretary reported that Mr. Maben had kindly presented to the Museum the twenty-one samples of commercial gums shown at last meeting in illustration of his paper. These would form a most useful series for reference, and as several gentlemen who were unable to attend last meeting had expressed a desire to see the samples, he had placed them again on the table.

Attention was also directed to the following donations to the Museum:—

Specimens of jalap and two varieties of Chinese galls. From Messrs. T. and H. SMITH and Co., Edinburgh.

Specimen of Dyak arrow poison from Borneo. From Mr. ROBERT JAMIE, Edinburgh.

The following donation to the Library was also intimated:—

'Extra Pharmacopœia,' 6th edition.
From Mr. WILLIAM MARTINDALE, London.

Cordial votes of thanks were awarded to the authors of papers and donors to the Library and Museum. The meeting then closed.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

THE BOROUGH ANALYST OF SHEFFIELD ON LEAD POISONING.

On Friday evening, March 21, Mr. A. H. Allen, F.C.S., F.I.C., borough analyst of Sheffield, lectured before the members of the Sheffield Pharmaceutical and Chemical Society on "A Chemist's View of the Sheffield Water Supply, with special reference to its Action on Lead." In view of the fact that Mr. Allen has for several years past paid a great deal of attention to the subject, which has excited much controversy in Sheffield, the lecture was looked forward to as of special interest. There was a good attendance. Mr. G. Ellinor presided.

The Lecturer commenced by explaining the character of the Sheffield water supply, which he said was a pure soft moorland water, to which no exception could be taken, save that it contained more or less peaty matter, which often gave it a brownish colour. On that account it would certainly be all the better for filtration. The Sheffield water supply might be divided into two main branches. One was derived from the moors in the neighbourhood of Redmires, and, after passing through an open conduit five and a half miles long was distributed by means of the Hadfield reservoir to the upper portions of the town. This constituted the high level supply. The other main source was from the moors in the neighbourhood of Bradfield. This water passed through a tunnel two miles in length and was distributed to the lower portions of the town through the Godfrey reservoir. It was a curious fact, but one that was now thoroughly established, and admitted by the recent committee of inquiry appointed to investigate the subject, that the high level water had of late, and in former times, occasionally had a marked action on leaden service pipes and cisterns, whereas the lower level supply was practically free from that tendency, though at certain times it had developed it to a limited extent. On one of those occasions the activity was contemporaneous with the admixture of a certain amount of water from the Redmires district. Speaking generally, the composition of the two waters was very similar. The hardness of the high level supply was between 2° and 3°, and the low level supply was perhaps one degree harder. The proportion of silica was approximately the same in the two waters, and it was a singular fact that in January, 1888, when the tendency to corrode lead was at its maximum, an amount of silica was found in excess of the half grain per gallon which had been held to ensure complete immunity to leaden pipes. The most tangible difference in the two waters lay in the fact that the high-level supply contained a sensible quantity of free acid, which was wholly absent from the low-level supply, or rather existed in the low-level supply, only in a state of combination. That the acid was of a fixed nature was evident from the fact that it was not lost on concentrating the water to a small bulk, but could then be determined with accuracy and facility by titration with standard alkali and phenolphthalein. On evaporating the water thus neutralized to dryness and igniting the residue, a carbonate was formed, which proved that the acid previously free was an organic nature. In fact it was evidently derived from the peat of the moors. Several bodies of the kind had been described under the names of crenic acid, apo-crenic acid, and humic acid, but there was some doubt whether they had ever been obtained in a state of actual purity. Hence it was preferable to express the acidity of the water in terms of sulphuric acid. Thus expressed it was found that the water had occasionally had an acidity equivalent to ¾ grain of sulphuric acid per gallon, and that for many months the Redmires water had an acidity equal to ½ grain of sulphuric acid per gallon. There was no doubt that this quantity of acid, although small, was quite competent to produce lead corrosion. In fact, experiments by adding such a proportion of sulphuric acid to water had shown that a previously inactive water became strongly corrosive. The logical cure for corrosion from such a cause was to neutralise the acid, and this had been recognized by the recent committee of inquiry. Neutralization might be effected by adding a suitable amount of carbonate of sodium, and experiments made by the engineer to the waterworks convinced him that the method was practicable. Another plan which had been advocated was to treat the water with limestone or some other form of carbonate of lime. It was evident that this might be done either in an efficient or in a perfunctory way. The proper way was to employ the limestone in such a form as would permit the water to be readily brought into contact with it and a fresh surface to be constantly maintained. Blocks of limestone, when introduced into the water, became covered in a short time with a brown peaty deposit, consisting, no doubt, of a combination of the peaty matter with lime. The limestone was thus rendered inactive, and this was fatal to any proposal involving the filtration of the water through beds of limestone or similar material. The limestone would speedily become inoperative. One method of employing limestone to advantage was that already adopted with success at Dessau, where exactly the same difficulty had arisen. There the limestone in a granulated state was intimately mixed with a portion of the water, and the water thus treated was then allowed to flow into the main bulk. Another way of employing limestone was to use it in a horizontal cylinder kept in constant revolution by the water itself, the cylinder being furnished with internal projections which caused the fragments of limestone to fall over each other, and by their attrition to always keep a clear surface and produce a finely-divided powder which acted with facility on the water. With the aim of obtaining a form of carbonate of lime which would be very active, the Water Committee were now making a trial of chalk, but he was not aware whether it was intended to use the chalk in lumps, or, as he thought would be preferable, in the form of a cream, such as would be produced by grinding it with water and subsequently adding the cream to the main bulk of the water in the proper amount. There was some danger, in his opinion, that mechanical difficulties might arise from the slow subsidence of the excess of chalk, but there was no doubt that chemically a treatment of the water with carbonate of lime in the form of either chalk or limestone offered the great advantage that an excess of the chalk or limestone would do no harm. The only doubt which he had was whether during the limited time that the water would be in contact with the limestone or chalk, complete neutralization of the acid would occur. It must be remembered that the peaty acids in question were very weak, and if weaker than carbonic acid they could not be expected to decompose the carbonate of lime. At any rate there was a danger that the action would be but partial. On that account he rather favoured a treatment of the water with actual lime, employed in proper amount.

The lime might be thrown into the water as it left the storage reservoir, before its passage down the five and a half mile conduit, but it would be preferable to make it into a cream with a small quantity of water, and to add that cream in a definite amount to the main quantity. Experiments in this direction appeared to indicate that a reddish or brownish precipitate was formed, which settled with difficulty, and it was stated by the engineer to the water-works that the colour of this precipitate was due to iron in the water. Undoubtedly there were traces of iron in the Sheffield water, and this would be precipitated by lime, which so far would be an advantage, but it was highly probable that the greater part of the brown colour was due to the precipitation of the peaty matter by the lime, in which case the fact was very encouraging. It would, however, be necessary probably to subject the treated water to filtration through a simple bed of sand in the manner practised at the majority of water works. Such filtration would also be necessary, probably, if limestone or chalk were employed. But that was a simple matter, and very different from the complex filter beds which had been suggested, the estimated cost of which varied from £10,000 to £100,000. Those expensive filter beds it was proposed to construct of mixed flints and limestone, with the object of silicating the water to the extent of at least half a grain per gallon. As a matter of fact the water which acted upon lead frequently contained that amount of silica already, and it was a curious circumstance that the advocates of silication as a remedy did not rely on silica alone, but always used it in combination with a neutralizing agent, limestone, though they attributed no efficacy to the limestone. But flints did not really consist of pure silica, as might be proved by taking the black interior portion of a flint and treating it with hydrochloric acid. A distinct jelly would be formed on the surface, and on washing it would be found that lime has passed into solution. He had himself made numerous experiments on flints in their natural state and decalcified by hydrochloric acid, and while the natural flints had a sensible action in reducing the activity of the water by neutralizing the acid the decalcified flints were found to be wholly ineffective. This conclusion had received confirmation from the experiments of Professor Carleton Williams, who had prepared water containing a considerable amount of soluble silica obtained by dialysis, and had found that the silica had no appreciable effect in reducing the action of water upon lead. The suggestion was made that the silica acted by forming an insoluble coating of silicate of lead on the interior of the leaden service pipes, and the composition of this deposit had been pointed to as evidence of this fact, but as the amount of silica shown by analysis of the deposit in these so-called protected pipes was only some 3 or 4 per cent., and there was much more sulphate, it was evident that the conclusion was open to grave exception. He did not think that sulphates exerted the protective action which had been attributed to them. Sulphate of lead was often regarded as an insoluble salt, but as a matter of fact it was soluble in water to the extent of about 3 grains per gallon, which was equal to about 2 grains per gallon of metallic lead. Hence for the purpose in question it was really a soluble salt, and medical men were agreed that any proportion of lead exceeding 1 gr. per gallon was liable to cause serious injury to health. His own opinion was that this was too low a limit, except in special cases, but seeing that there was so much variation in individual susceptibility to lead it was not safe to allow even that proportion. He knew of a case of death by lead poisoning where the water contained ½ gr. of lead per gallon. He had drawn from taps in Sheffield, day by day for months, water which contained from ·6 gr. to 1 gr. of lead per gallon; and even after running the water off he had found fully ½ gr. per gallon. Hence it had become a very important matter in Sheffield to purify the water from the lead which it had taken up from the pipes. This was found to be done very effectually by animal charcoal filters. Wood charcoal was practically useless for the purpose. The cause for the efficiency of the animal charcoal evidently lay in the presence of phosphates, which existed in animal charcoal to the extent of 80 per cent. of its weight. In fact he had proved that bone ash itself, instead of animal charcoal, was equally efficient in removing lead from water. Phosphate of lead was an extremely insoluble salt. If with a solution of acetate of lead an excess of sodium phosphate was added, and the liquid then filtered, the filtrate was found to give no trace of colour with sulphuretted hydrogen, thus showing that the precipitation of the lead was absolutely complete. In conclusion the lecturer pointed out that there was no ground for the fears of some people that the treatment of the water by lime, limestone, or chalk, would seriously increase its hardness, though there was no doubt that in some respects such hardening would be an advantage. As a matter of fact an acidity equal to ½ grain of sulphuric acid per gallon—or more correctly ·49 grain—would be neutralized by ·28 gr. of quicklime or ·50 gr. of limestone or chalk. Hence it appeared that the treatment would only raise the hardness of the water by half a degree; that is, it would increase the hardness from about 2½° to 3°, making the high level water in fact as hard as the low level water was at present. London water, it might be added, had a hardness of about 15°.

The lecture was illustrated by several experiments, as well as by maps of the districts and diagrams thrown upon a screen by the oxy-hydrogen lantern.

The Chairman moved a vote of thanks to Mr. Allen for his interesting and valuable lecture, and Mr. E. R. Learoyd seconded the motion, which was cordially adopted.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

This Association held its last ordinary meeting on the evening of Wednesday, 19th inst. Mr. John McMillan, one of the Hon. Vice-Presidents, delivered the closing address. After some preliminary remarks,

Mr. McMillan said: It has occurred to me to say a few words to you on the benefit and satisfaction which I think would result to you in your business relations and every day duties by a careful and minute attention to the details connected therewith. In every business, I believe, it is most essential that details be attended to; indeed it has become a maxim that if we look after the smaller things, the larger items will look after themselves. "Small sands make the mountains, moments the year, and trifles life," but I believe there is no business where details and small attentions are so requisite as in our anxious, every-day duties. A banker's clerk makes a slip of the pen in his entries, but the non-agreement of some cross entry quickly draws his attention to the mistake, and at the close of the day it is more than likely that his error will be discovered and rectified. He makes an error in his cash, but the worst that can happen to him is some pecuniary loss. A grocer's assistant gives away salt for sugar and the matter ends with some strong language at the tea-table and eventually a laugh. But chemists are on a very different plane of responsibility. A serious error caused by a moment's abstract of thought might cause us a lifelong regret; while one smallest *lapsus pennæ*, even, might not only be a most annoying and distressing circumstance to ourselves, but might be attended with most disastrous consequences to our customer. The confidence which customers ought to have towards us, and which each one of us ought to cultivate and encourage to its utmost extent is shaken, and the circumstance, perhaps very trifling in itself, is not forgot for a long time. Many instances will occur to each of you proving that I am not exaggerating when making these statements.

I had some thoughts of collecting a number of instances where the exercise of a little care might have averted considerable annoyance, but on further consideration thought it better not. I may, however, give one or two, and to show that I am no respecter of persons, the first happened to myself. While spreading a blister a messenger came in, and putting down a shape said, "I want one, too." Putting aside the first (which was to be sent) I served him with one as desired. Next morning the doctor called to see the cause of his patient's misfortune, and on finding the shape, the other side was seen to bear "emp. bellad. this size." Moral: "Look at both sides of your paper." The next resulted in aq. ammon. being used to fill up a pick-me-up instead of *aqua pura*, through the bottles having being shifted on the shelf, and neglect to read the label. The third was due to prussic acid being used, which had become partially inert, and when the dose was increased a fresh sample employed: "Keep your hydrocyanic acid in 1 ounce bottles."

I was exceedingly pleased with the paper read by Mr. Fisher and the many valuable hints he threw out regarding our business and the working out of its details. He very properly put in the forefront, as did Mr. Kinninmont in his opening address, the absolute necessity of education—general and technical—and with all this I heartily agree; but I would very strongly urge that the highest scientific attainments, the most accurate chemical knowledge, would be lost in the furtherance of our business success, if they were not accompanied by a pleasing address, a suave manner, neatness, tact, and what Scotch people call "gumption."

In looking back over my circle of friends and acquaintances, not only in our own business, but among my schoolfellows, I cannot shut my eyes to the fact that the unsuccessful ones have been those who lacked patience, who could not wait, who despised the little trifles; while the successful ones are those, who while not adverse to advance with advancing times and conform to altered circumstances were still found watching and attending to the little matters which after all make up the bulk of our life here. A now somewhat extended experience in our trade teaches me that a moderate scientific and chemical knowledge, coupled with carefulness and neatness, will be more likely to lead to satisfaction to ourselves and customers than the most correct learning apart from these. If we take the matter home to ourselves, I am sure any one of us who had to swallow the contents of a bottle of medicine, would be more impressed with confidence if we saw the bottle carefully corked, a neatly written and clean label attached, the contents carefully mixed and free from specks, with a general air of care and attention about the whole matter, although we knew it had not been dispensed by a Major man; I say we should have more confidence than if, when the medicine was delivered, it was devoid of all these little attentions, and we knew it had been dispensed by Sir Humphrey Davy himself.

Method and perseverance with very moderate accomplishments will effect much. Remember, I do not cry down scientific research—knowledge, like charity, "never faileth"—nor do I put business success and money-making as the sole object or aim of a man's existence; but if a man has set his heart on making a comfortable income to provide for himself and those dependent upon him, I say that he is far more likely to attain his object by attending to the details and minutiæ of the trade than otherwise. As Mr. Ince in a recent article said, "What can the shop teach? It teaches something that is indispensable and of incalculable advantage. There only can an apprentice learn business habits, neatness, despatch, the love of order, trade values and an infinity of minor details which are essential to his subsequent success." There is no detail too trivial to be slurred over. Every little fact gained and made part of our thoughts becomes our own nature and requires no effort for its utilisation. Our business, perhaps more than any other, requires the best scientific attainments, but it requires these coupled with the most careful attention to detail, and a due cultivation of each is much to be desired and is imperatively necessary.

Success in life's battle is not gained, cannot be gained, by jerky, inconstant efforts. The strong, steady pull is what forces the boat through the water. Tact and caution are what direct and aid us to avoid rocks and shallows, and the great secret of success and happiness is to make the most of the circumstances which naturally surround us and which form part and parcel of our daily duties.

Much has been spoken, much has been written, about the irksomeness, the wearing-out labour, and the long hours connected with our trade. Unfortunately all this is too true. Many remedies have been suggested for our improvement, but I fear the panacea will not easily be found. I doubt we must accept the inevitable. If fate or circumstance has decided our course of life, it is our duty to make the most of it and to extract as much satisfaction and pleasure as possible out of our surroundings. The past certainly often looks smooth, easy, pleasant; the present too often appears hard, full of trouble, of broken and rugged pathways; and the future seems uncertain, dim and unstable. Yet to spend our time looking backwards, regretting that we had not done such and such a thing, dreaming away our existence over the present that is not so pleasant as it might have been if we had pursued some other calling, all this is too lose ground, and is distinctly detrimental to all the higher objects of life. Nothing will be gained without work, hard, energetic every-day work. This may appear, especially to young minds, a gloomy, undesirable prospect, but there is a compensation in everything, and when the habit of work has once been acquired, a love of it for its own sake is engendered, habit becomes a second nature, and what to others may appear monotonous and burdensome, and what at one time even to ourselves seemed a great task, gradually induces happiness and eventually carries with it great satisfaction and pleasure.

If the simplest duty, the most irksome task were approached with conscientious motive, there would be no labour in the work, custom would in a short time make easy the details, and personal comfort and increased influence would soon follow.

Burke says, and I think says truly, "that labour is not only requisite to preserve the coarser organs in a state fit for their functions, but it is equally necessary to those finer and more delicate organs on which and by which the imagination and perhaps the other mental powers act."

Not only then is it necessary for our happiness, mental and physical, to acquire the habit of industry and to abjure its opposite—idleness; but in all businesses, and in none more so than in our own, is it of the utmost importance and moment to acquire a habit of carefully attending to every trivial matter. Perfection in anything is only attained by the most watchful attention, not only to the matters of great moment, but more particularly to the little items which cause friction, and which eventually render the machine unsatisfactory, if not absolutely useless.

Mr. McMillan here read the standing orders in force in his own establishments as to compounding and checking prescriptions. These orders inculcate the careful reading and copying of the prescription, cleanliness in vessels used, checking weight or measure of potent drugs, removal of any doubt before dispensing, and the exercise of an intelligent watchfulness in every detail. The checker is instructed to smell, taste, count or otherwise examine everything in the most critical manner before passing it to the delivery counter and particular care is required of assistants on night duty. Mr. McMillan also urged the necessity of work being done in such a way as to create as little trouble as possible to other assistants or whoever might succeed at the dispensing counter, and recommended assistants also to make themselves acquainted with the names of customers and with styles of prescribing and initials of medical men.

Mr. Gilmour proposed a vote of thanks, which was seconded by Mr. Robinson and cordially awarded.

Parliamentary and Law Proceedings.

IMPORTANT PROSECUTION UNDER THE PHARMACY ACT, 1868.

THE LABELLING OF PROPRIETARY PREPARATIONS CONTAINING POISON.

On Friday, the 21st inst., Mr. John Jackson Matthias appeared at the Mansion House Police Court, before the Right Hon. the Lord Mayor, charged with having sold on January 15 last three bottles of cough mixture, containing in each bottle 2 grains of acetate of morphine, the bottles not being labelled with a poison label in compliance with the 17th section of the Pharmacy Act, 1868.

Mr. Gill (instructed by the Treasury) appeared on behalf of the Public Prosecutor.

Mr. Matthias pleaded guilty to the charge, saying that he depended on the custom in the trade.

Mr. Gill said: I think the defendant has acted rightly in pleading guilty to this summons, because as a matter of fact, legally, there is no answer to it, though I quite understand what it is he says as to his having relied upon what he supposes to be the custom with regard to the sale of these articles. This, my Lord, is a summons under the 17th section of the Pharmacy Act, 31 and 32 Vict., Cap 121. That Act was passed in the interest of the public in order that certain safeguards should surround the dealing with poisons, and that there should be certain provisions with regard to the persons who were entitled to deal with them. The offence dealt with in this particular section under which the defendant has been summoned is the offence of selling a poison without having on the label printed the word "poison," which, as you can well understand, is a very great safeguard to those who are purchasing medicines, and especially a great safeguard where bottles are left about, and where great risks are run by persons purchasing medicines, their attention not being directed to what it is they buy. Steps were taken in this particular case, in consequence of an inquest which was held on a child who had drunk a bottleful of what is sold as "Matthias's Compound Syrup of Camphor, or Cough Linctus." A bottle of this compound had been purchased at the shop of the defendant, and the purchaser, thinking that it was an ordinary cough medicine, and could be in no way dangerous, treated it as he would an ordinary medicine bottle, and left it about, with the result that this child drank it with fatal results. The matter was inquired into, and the contents of the stomach of the child were submitted to that great authority, Dr. Stevenson, and he found evidences of one of the poisons contained in the schedule to this Act. I think the bottle contains as much as 2 grains of acetate of morphine, which is a preparation of opium, part of a grain of which might be fatal to a child. The gentleman who was conducting the inquiry at this inquest, Mr. Braxton-Hicks, thought it desirable that some bottles of this cough linctus should be purchased at the shop of the defendant. Accordingly he instructed an officer to purchase three bottles, one of which was submitted to Dr. Stevenson, in order that an opinion might be formed what quantity of this poison was contained in the bottle; as the result it was ascertained that there were 2 grains of acetate of morphine. It is sold, as you see, my Lord, with a caution in this form: "To be kept out of the reach of children, as it is sweet, and they may take too much." That is not at all the kind of caution which would suggest to anybody that the consequence of taking too much of it might prove fatal, and would not be acted upon in anything like the same way as the caution which would be conveyed by the bottle or the cover being labelled "poison." There is no suggestion anywhere on any part of the label that this mixture contains poison. The defendant seemed to be under the impression that the fact of its having upon it the Government stamp in some way made it a patent medicine. That is an error under which a great many people labour, that the fact of the revenue stamp being upon it constitutes it a patent medicine. That is not so. It merely becomes a proprietary medicine, and any person who sells an article such as this, which he suggests is good for any particular complaint, and desires to get a special sale for it, must have upon it a stamp according to the value of the medicine. There have been a number of different Stamp Acts passed from time to time dealing with the sale of nostrums of this kind. There are, I believe, very few patent medicines, because the result of a person taking out a patent for a medicine would be that he would have to describe the contents of it, which he would be undesirous of doing, because he would rather keep the secret to himself. Having regard to the statement made by the defendant as to the circumstances under which he sold this medicine, it was thought that these proceedings should be taken by the Public Prosecutor, upon representations made to him by the Coroner who had conducted the inquiry, in order that all persons who are selling proprietary medicines might understand that they are obliged to comply with the 17th section of this Pharmacy Act, that if the mixture contains any poison scheduled to this Act there must be printed distinctly upon the label the word "poison," so that that protection might be afforded to the public. I should say at once that this prosecution is rather instituted from that point of view than from any desire to punish the defendant for what he did, because no doubt he was doing what a great many other persons are doing under a mistaken view of the matter.

The Lord Mayor: Which section of the Act do you rely upon? You say "if the mixture contains any poison."

Mr. Gill: The 17th section, my Lord. "It shall be unlawful to sell any poison, either by wholesale or retail, unless the box, bottle, vessel, wrapper, or cover in which such poison is contained, be distinctly labelled with the name of the article and the word poison, and with the name and address of the seller of the poison."

The Lord Mayor: You will pardon me for saying so, but I fail to see that what you have read carries out what you have said. Your statement is "if the mixture contains any poison." It seems to me that there is a very great defect in the statute in that respect. I do not see any such words as those in the statute. The words you have read are, "It shall be unlawful to sell any poison, either by wholesale or retail, unless the box, bottle, vessel, wrapper, or cover in which such poison is contained, be distinctly labelled with the name of the article"—that is the poison. I do not see anything in that section which says if the mixture contains poison.

Mr. Gill: That, my Lord, I would suggest could not be arguable. If a person sells a bottle of mixture of any kind, any ingredient of which is a poison, he in fact sells poison, because he sells every ingredient in the mixture. The section would be perfectly useless if a person could sell a poison by mixing it with some other article or a number of other articles. In selling a mixture of this kind he sells everything that the bottle contains, and he sells amongst the things that make up this mixture a poison which is one of the poisons scheduled to the Act. In this particular instance it is the provision as to "opium and all preparations of opium or of poppies," that applies.

The Lord Mayor: As you represent the Treasury, and this is a matter of great public importance, I suggest whether it would not be better if after the words, "it shall be unlawful to sell any poison" to put the words, "or any mixture containing poison."

Mr. Gill: I think, if I may say so, my Lord, that those words would be construed as covering any poison contained in any mixture, because no one would suppose that the poison itself could be sold in any quantity.

The Lord Mayor: I quite agree with you that it might be so construed by a lawyer, but I think a criminal statute, such as this is, should be so clearly drafted that any person could understand it. I must say, when my attention was called to this, I was much struck by the omission of such words from this statute. You have got the word "article" thereon. "It shall be unlawful to sell any poison, either by wholesale or retail, unless the box, bottle, vessel, wrapper or cover in which such poison is contained, be distinctly labelled with the name of the article." A man of business would read that as meaning that the box contained the poison, and nothing but the poison. Of course it is open to the legal construction you put upon it, but I really think the statute ought to be clear.

Mr. Gill: The latter part of the section explains what is meant by any person selling poison, because there is a protection for any chemist dispensing a medicine which contains amongst the ingredients a poison, when he is making up the prescription of a physician.

The Lord Mayor: That does not alter the fact I am referring to, Mr. Gill. I quite see that. That is when he is dispensing for a patient.

Mr. Gill: It would be impossible to put on a bottle of this kind the different quantities of the different articles that go to make up the mixture.

The Lord Mayor: But if the statute contained the words "or any mixture or compound containing poison," then it would be compulsory on the seller to call the attention of the buyer to the fact that the bottle contained poison.

Mr. Gill: That distinction, if I may say so, has not arisen in the minds of those who have made the mistake with regard to this mixture. I think they were under the impression that they were protected by the fact of there being a stamp upon it.

The Lord Mayor: The Treasury has taken up this case, not for its own intrinsic merits or demerits, but upon public grounds, and in order that vendors of medicines should appreciate the position in which they are placed in respect to a violation of the statute. I again say that the statute ought to be amended by the insertion of such words as I have mentioned, so that those who are dealing with these compounds should know what they are doing, and what their obligations are.

Mr. Gill: I am quite sure any observation of that kind falling from your Lordship will get publicity, and probably there may be some further legislation with regard to this matter, and then it could be provided for. In this case the facts are not in dispute, therefore the only witness I propose to call before your Lordship is the witness who proved the purchase of the three bottles. I say at once that the object of this prosecution is to clear up the misapprehension in the minds of the public and those who are owners of proprietary and patent medicines, that neither the fact of the stamp being upon the bottle, nor the fact of there having a patent, would protect them if they sell an article which contains a poison, unless they comply with the provisions of the seventeenth section.

Mr. Matthias: I have been in the habit of preparing that preparation for over thirty years, and was never aware that it required to have the word "poison" on the bottle. There are many similar preparations that are not so labelled.

Mr. Gill: The difficulty is that the occasion does not arise with respect to these other articles. No one has a roving commission to go about and test these mixtures. Through the carelessness of leaving these articles about accidents happen. Whenever the occasion does arise, certainly after this prosecution, the matter will always be pressed to the uttermost, and if any instance of a proprietary medicine containing poison, and not so labelled, is brought to the notice of the authorities, proceedings will be taken against the person selling.

The Lord Mayor: No doubt there are many who would plead that they are not bound to mark this "poison."

Mr. Matthias: I was speaking to a chemist in a large way of business recently and he told me that it would be impossible for him to carry on his business under such circumstances. He would not be able to make up a bottle of diarrhœa mixture, which is not complete without opium. It is a very serious question indeed.

The Lord Mayor: There is a distinction between labelling "poison," and labelling "this mixture contains a poison."

Mr. Gill: Apart from any label saying "this mixture contains poison," what we say is that this bottle should have a label with the word "poison" distinctly upon it—apart from any label giving the contents of the bottle. The word "poison" should stand out in relief.

Mr. Matthias: I maintain that that bottle being so labelled would not prevent a child taking it.

Mr. Gill: We say that a person buying it with the label "poison" on, would put it away somewhere.

The Lord Mayor: Have you anything more to say, Mr. Matthias?

Mr. Matthias: May I call a witness to prove that the custom has not been to so label it?

Mr. Gill: There is no custom that can affect the statute.

The Lord Mayor: No. Having regard to the fact that this is a test case I purpose fining the defendant 10*s*. and 2*s*. costs of the summons. My mind is somewhat affected by what I cannot help regarding as a great defect in the Act, a defect which I hope those in authority will take cognizance of.

Mr. Gill: It is strongly in the interests of the chemists' trade that this section should be enforced.

The Lord Mayor: Very much indeed, after what has occurred to-day. I think we are agreed, Mr. Gill, as to the necessity for making this section more explicit.

Mr. Gill: Subject to my saying that I have no doubt it will be construed as having any ingredient.

The Lord Mayor: If it is so legally construed it does not alter the fact.

Mr. Gill: So far as the public are concerned any suggestion of that kind which makes it more clear it is desirable should be adopted.

The Lord Mayor: It must be so. As a rule even chemists are not lawyers.

PROSECUTIONS OF CHEMISTS UNDER THE SALE OF FOOD AND DRUGS ACT.

At the Sheffield Town Hall on Friday, the 21st inst., before the Stipendiary Magistrate, Joseph John Riding, chemist, 19, London Road South, was charged with selling to Mr. John Poole, an inspector of nuisances for the borough, a quantity of sal volatile which was not of the description and quality required by law. There was a second charge against Mr. Riding in reference to a bottle of medicine.

Mr. Sayer, who appeared to support the prosecution on behalf of the Health Committee of the Corporation, said that these summonses had been taken out under the Food and Drugs Act, 1875. On the 24th of January Inspector Poole went and purchased a quantity of sal volatile from Mr. Riding, and this had been sent to Mr. Allen, the borough analyst. His report was:—"Sal volatile is a popular name, and official synonym for the preparation described in the British Pharmacopœia as aromatic spirit of ammonia. The neutralizing power of the sample indicated a strength about 9-16ths of that of the British Pharmacopœia preparation, and the amount of carbonate of ammonia contained in it was less than half of the proper amount. The sample was also deficient in alcohol." This case involved the very important point, which had been before his worship before, as to whether the British Pharmacopœia should not by law be the recognized standard for medicines and drugs. He would remind his worship of the case of White *v.* Byewater, in which it was decided that the British Pharmacopœia was the only standard which should be acted up to. In their decision the Lord Chief Justice and Justice A. L. Smith, both upheld this standard.

The Stipendiary: Then you hold that the London Pharmacopœia cannot be taken as a standard.

Mr. Sayer: I say so. The British Pharmacopœia was made so by certain Acts of Parliament, and therefore I contend that the London Pharmacopœia has no standing.

John Poole, inspector of nuisances for the borough, said on the 24th of January last he called at the defendant's shop and saw Mr. Riding. Witness asked for a prescription to be dispensed. He was told to come again, and later on in the day he did go, and then asked for 2 ozs. of sal volatile, for which he paid 9*d.* He told Mr. Riding he had purchased both articles for purpose of analysis, and offered to divide them with him. He did divide the article with the defendant, who told him that he sold all his drugs as genuine articles, and showed him an invoice with the initial "P. L." on it, and which meant London Pharmacopœia.

Mr. Alfred Henry Allen, borough analyst, said the certificate which Mr. Sayer had read was the result of his analysis.

Mr. Sayer: Do you think it desirable that there should be one standard?

His Worship: I am afraid we cannot take that here. We must administer the law.

Mr. Sayer: Well, you know the standard of the British Pharmacopœia?—Yes.

Do you know that it is different from the old London Pharmacopœia?—It is somewhat different, but the last edition of the London Pharmacopœia was issued in 1853. The sample I analysed was not in accordance with the British Pharmacopœia, nor was it strictly or approximately in accordance with the London Pharmacopœia.

Defendant contended that the article he had sold to Poole was genuine. He would admit that it was rather stronger in ammonia and spirit than the B.P.

Mr. Sayer: Rather weaker.

Mr. Riding: Well, I say now as I said then, that it is a true, genuine, and unadulterated article. He told Mr. Poole before he went out of the shop that if he wanted sal volatile of the British Pharmacopœia he had not got it. He put on the label "P. L." to show it was the London Pharmacopœia. Mr. Riding handed up a letter he had received from the wholesale house from which he purchased his drugs, and afterwards he submitted that Poole had got what he asked for.

A question arising as to the label marked "P. L.," it was stated by Poole that Mr. Riding marked the label at the time of sale.

The Stipendiary held that a conviction must follow, and he must decide that defendant was bound to sell by the British Pharmacopœia.

Mr. Sayer said the second summons was under section 7 of the Act, and the section read:—"No person shall sell any compound article of food or compound drug which is not composed of ingredients in accordance with the demand of the purchaser, under a penalty not exceeding £20." A few days before the 24th January the medical officer of health wrote certain prescriptions, which the inspectors of nuisances were instructed to get made up, and he was happy to say that in most cases the compositions were fairly good. In this case, however, the analyst's report stated: "I am of opinion that the said sample contains only 7½ grains of citrate of iron and quinine in each fluid ounce, equal to 60 grains in the eight fluid ounces directed to be dispensed, whereas the weight ordered in the prescription was 1½ drachms or 90 grains in eight ounces; hence the quantity of the acting ingredients of the medicine dispensed would only be two-thirds of that ordered. The citrate of iron and quinine employed was not only deficient in weight, but somewhat defective in quality, for it contained only 13½ per cent. of its weight in quinine, instead of 15 per cent., which is the proportion directed in the British Pharmacopœia. The sample was analysed before it had undergone any change in its constitution that would interfere with the result of the analysis." He need not dwell on the importance of this case. Often life and death depended on the dispensing of a prescription, and it was therefore absolutely necessary that it should be compounded in strict accordance with the prescription.

Dr. Thomson, medical officer of health for the borough, said he wrote the prescription and made several copies of it, and one of them was handed to Inspector Poole to get compounded at the shops of certain chemists. The prescription was: "90 grains of citrate of iron and quinine, and 8 ozs. of chloroform water." That would be prescribed in actual practice, and was a reasonable dose.

Mr. Allen, the borough analyst, and Mr. Poole having given formal evidence,

Mr. Riding said the medicine was compounded according to the British Pharmacopœia, and was supplied in bulk by the same wholesale house as supplied the sal volatile. Whatever was written on that prescription he put into the bottle, and made it up properly.

The Stipendiary, in giving judgment, said there were two cases. First as to the sal volatile. It was certainly clear that Mr. Riding put the letters "P.L." on the label, meaning Pharmacopœia Londinensis, and it also appeared there was no recipe as to sal volatile in the British Pharmacopœia until the year 1888, the previous edition being issued in 1885. But there was the case which had been decided in the Queen's Bench, and it seemed to point to the opinion that when there was a recipe in the British Pharmacopœia, that recipe had the monopoly over all other recipes, and though in accordance with other pharmacopœias, the British Pharmacopœia must overrule them and supersede them, and the chemist must sell by that. That was the view he felt bound to take against his own ideas. The costs would be 8*s.* He thought a small sum would do for a fine. Therefore Mr. Riding must pay 5*s.* and the costs. Then they came to the second case, in which there was a bottle of medicine which came under the description "compounded drug." Against that there were two complaints, one of which was that where there ought to have been 90 grains there were only 60 grains. That was two-thirds of the whole. That he must view as carelessness on the part of Mr. Riding. In the second part there was some deficiency in the quality, it being only 13½ instead of 15 per cent. How that came about was not clearly explained. They might consider that it was due to the wholesale supplier of Mr. Riding. The latter believed it to be according to the "B.P." It was ordered to be so, and he saw no reason to doubt him. The costs in this case were 18*s*. 6*d*. He took it that the case had been brought more with the intention of making Mr. Riding more careful.

Mr. Sayer: That is so.

The Stipendiary: Well, I will make the fine 20*s*. and the costs.—*Sheffield Daily Telegraph.*

At the Sheffield Town Hall on March 25, before the Stipendiary Magistrate, Mr. John Parkin Hewitt, chemist and druggist, carrying on business at 66 and 68, Division Street, and 71, London Road South, and Mr. John Turner, Chemist, 118, South Street, Moor, were both summoned for on the 24th January selling to Mr. John Poole, inspector of nuisances, a certain drug—to wit, sal volatile—which was not of the nature, substance, and quality demanded by the purchaser. Mr. Sayer appeared on behalf of the Corporation to support the summonses, while Mr. A. M. Wilson represented Mr. Hewitt, and Mr. R. Fairburn appeared for Mr. Turner. The case against Mr. Hewitt was taken first.

Mr. Sayer said that on the date named the inspector called at the defendant's shop and purchased 2ozs. of sal volatile, for which he paid 9*d*. This was sent to Mr. A. H. Allen, the borough analyst, for examination, and the result of his analysis showed that the sample was almost wholly destitute of carbonate of ammonia, which was the leading constituent of sal volatile. Its strength as indicated by its neutralizing power was only about two-thirds of that of the British Pharmacopœia preparation. It was also deficient in alcohol. Sal volatile was not liable to undergo material alteration by keeping. Mr. Sayer said he believed the defence was that the sal volatile was in the same condition as when defendant received it from the wholesale house, but in that case Mr. Hewitt could have protected himself if he had obtained the warranty which was provided for by the 25th section of the Act of 1875.

Mr. Muir Wilson said he admitted all the facts, but he submitted that the article as sold by the defendant was as it was when he received it from Messrs. Hodgkinson, Prestons and King, of London. That was a well-known firm, and when the defendant ordered his drugs he had faith that they would be fully up to the B.P. standard. He had not thought it necessary to obtain the warranty spoken of—in fact, that process was a very long and troublesome one. Directly Mr. Hewitt was informed that the inspector had been to his shop he wrote to the firm with which he dealt, telling them of the fact, and also informing them that as a result of Mr. Allen's analysis he had received a summons to attend at the Sheffield Town Hall. He also forwarded them the part of the sal volatile left him by the inspector, and asked them to examine it and state what there was that was deficient and why. He also added—"I should have thought that for the credit of your house all drugs that left it would have been genuine, but according to his analysis such is not the case. The article in question was sold in exactly the same condition in which it was received, and has been kept in a well-stoppered bottle during our ownership of it." In reply to this letter Messrs. Hodgkinson, Prestons and King wrote: "We regret to find that you, in common with other chemists, are having trouble with the spt. am. arom. As you are no doubt aware, our laboratory was burned down on July 14, and during the time of rebuilding we had to depend for most of our preparations upon other houses. The spt. am. arom. B.P. in question was obtained from a respectable firm, and was ordered, bought, and paid for by us as B.P. We cannot hold ourselves responsible for any loss of strength in a volatile preparation six weeks after it has left our premises." He (Mr. Wilson) read these letters to show that Mr. Hewitt had not had any intention to defraud the public, but that as the article he purchased was warranted to be B.P. he expected that it was such when it was sold.

Mr. Sayer next proceeded with the charge against Mr. Turner and produced the analyst's report, which showed that the sample of sal volatile purchased was almost wholly destitute of carbonate of ammonia, the strength being only about two-fifths of the B.P. preparation. The sample was also deficient in alcohol.

Mr. Fairburn, on behalf of the defendant, said he got this sal volatile from Messrs. Raimes and Co., of York, with whom he had dealt for many years. The article was only received on January 11, and the sale took place on January 25. As soon as Mr. Turner was informed that a summons had been issued against him he wrote to Messrs. Raimes and Co., telling them of the fact. They replied, "We are surprised to learn that you have had a summons for the sal volatile we sent you last January. It is entered in our books as B.P., and we feel certain that it was sent B.P., and you should send the sample left by the inspector to Somerset House or Professor Attfield. We should like a sample from the bulk also to try ourselves." A portion of the part left by the inspector was sent to Professor Attfield, and his analysis subsequently agreed with that of Mr. Allen. Messrs. Raimes and Co. had also written, admitting that the qualities mentioned were deficient, and they had taken all the responsibility in the matter. The fact that his client had gone to so much trouble and expense he thought proved that he had no desire to defraud the public, but that he was selling what he believed to be that which was asked for.

Mr. J. W. Turner said he supplied the sal volatile to the inspector. It was taken from a new bottle that he opened to get this 2 ounces from. The bottle was just as it had arrived from Messrs. Raimes and Co.

Mr. George Watt, who is in the service of Messrs. Raimes and Co., said he made this drug up and sent it to Mr. Turner. His employers took the whole of the responsibility for the deficiency of the ingredients named, but could not account for it. The absence of a little of the ammonia might be accounted for by evaporation.

The Stipendiary said, though he thought it would have been wise for the defendants to have obtained a warranty in respect to the goods, yet he did not think they had had any intention to defraud the public. It was, he thought, necessary in the interests of the public and for their safety that the utmost care should be used, and he took it that it was for that object that these cases were brought. He thought the justice of the case would be met by each defendant paying a fine of 5*s*., and 8*s*. costs.

R. S. Farrer.—We fear that your scheme is based upon too enthusiastic a view of the possibility of obtaining unity of action.

We have been compelled by the length of the official report and the reports of legal proceedings to defer the publication of several communications.

Dundee Chemists' Assistants and Apprentices' Association.—A Conversazione will be held on Thursday evening, April 3, in Speed's Hall, Commercial Street, to which all members of the craft are specially invited. It is proposed to hand over any surplus which may accrue to the Benevolent Fund of the Pharmaceutical Society.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Bancroft, Long, Curtis, Blunt, Oxen, Davis, Smith, Brooke, Adams, Walker, Powell, Smith, Stark, Stewart, Inquirer.

AN ATTEMPT TO DETERMINE "EMETINE" BY ALKALIMETRIC TITRATION.

BY THOS. P BLUNT, M.A., F.C.S., F.I.C.

The following observations were made with the object of ascertaining whether any modification of the ordinary alkalimetric methods could be applied to the determination of small quantities of the body or group of bodies passing under the name of "emetine."

A sample of the commercial alkaloid was obtained, and weighed quantities examined as follows:—

5 c.c. of decinormal solution of sulphuric acid was carefully measured into a porcelain dish, and the alkaloid, of which from 0·03 to 0·065 grain was taken, was added.

Solution took some little time, and demanded frequent stirring; when it was complete two drops of ordinary methyl orange solution (1 gram to the litre) were added, and a $\frac{1}{10}$ normal solution of soda, which had been carefully adjusted to the acid, dropped in from a burette graduated in $\frac{1}{10}$ c.c. As saturation was approached a very gradual change of colour took place, and it was not easy to determine the exact point of neutrality nearer than one or two-tenths of a c.c. Six determinations had been made, when the material (which had been used for some preliminary experiments) was exhausted. It would be tedious to give all the details, the highest and lowest results have therefore been selected.

Emetine I.

Weight taken.		Saturating power in terms of 1-50 normal soda.	Dyad emetine indicated.
(*c*)	. . 0·052	9·7 c.c.	0·049
(*e*)	. . 0·065	12·6 c.c.	0·064

On examining these data a curious result comes out; if Kuntz's formula be taken as the basis of calculation ($C_{30}H_{40}N_2O_5$, = 508), and if this be regarded as a molecule of monad functions, each c.c. of the 1-50 normal soda should be equal to 0·01016 gram of alkaloid, and the saturating power of the weights taken, if the sample of emetine were pure, should be (*c*) 5·3, (*e*) 6·6, respectively. The amount actually found approaches twice this quantity, and as examination demonstrated the absence of free alkali, the inference seems inevitable that Kuntz's molecule acts as a dyad. In the third column will be found the amount of emetine indicated on this supposition. A second sample of emetine (II.) was now procured from a different source; it had not nearly so good an appearance as (I.); this was a light cream colour, approaching white, and had a pulverulent fracture; (II.) was orange coloured, had a resinous fracture, and gave a highly coloured solution. Six determinations were made in this case. As in the last the highest and the lowest results are given:—

Emetine II.

Weight taken.		Saturating power in terms of 1-50 normal soda.	Dyad emetine indicated.
(*b*)	. . 0·05 gram	8·9	0·045
(*c*)	. . 0·062 „	10·2	0·052

The error in this and in the last series is large, being about 7 per cent., but experience had been gradually gained, and the difference in the last three results of the second series was only 2 per cent. It had been found desirable to use "zig-zag" titration with 1-50 normal acid, several times repeated, and to work against distilled water coloured with the indicator to about the same tint as the assay in its final stages.

A third sample of emetine (III.) was now procured from the same source as the first; it resembled it in appearance and fracture, and was probably from the same batch. Two careful determinations were made with the precautions given above; the results were as follows:—

Weight taken.		Saturating power in terms of 1-50 normal soda.	Dyad emetine indicated.
(*a*)	. . 0·065 gram	12·7	0·0645
(*b*)	. . 0·059 „	11·4	0·058

The percentages here indicated are 99·2 and 98·3 respectively, representing an alkaloid closely approaching theoretical purity if the formula is to be trusted.

An attempt was made to prepare a crystalline hydrochlorate of emetine. It was not successful. The following indicates a method by which the process here described may be applied to the estimation of solutions of emetine.

A solution of emetine (III.) was prepared containing 0·7 per cent., calculated as 0·69 per cent. of the pure alkaloid. Measured portions of this solution were treated with 10 per cent. carbonate of soda solution until a faint permanent precipitate appeared, then ten more drops of the solution were added and about 10 c.c. of chloroform. The whole was well and repeatedly agitated in a separator, and the chloroform drawn off when quite clear; 10 c.c. more chloroform were then poured into the separator, agitated, and separated as before. The whole of the chloroform was now transferred to a clean separator and well shaken with 5 c.c. decinormal sulphuric acid and 15 c.c. of distilled water; it was drawn off, and the acid liquid decanted into a dish. The chloroform was then returned to the separator, shaken with a little distilled water, drawn off, and the water poured into the dish with the rest of the acid; finally the acid was titrated as usual with 1-50 normal soda.

Quantity of solution taken.	Saturating power of alkaloid as before.	Alkaloid found.	Alkaloid calculated.
10 c.c. . .	13·3 c.c.	0·068	0·069
8 c.c. . .	11·2 c.c.	0·057	0·055

It was found that the process did not work satisfactorily with the wine merely concentrated; it might probably do better if resort were had to a preliminary purification, such as that described by Braithwaite and Umney ('Year-Book of Pharmacy,' 1889, p. 395). Chloroform was selected as the solvent, and carbonate of soda as the precipitant after a considerable number of trials. Ether seemed preferable from the point of view of manipulation, as it is better for the solvent to remain in the separator, the risk of loss being thus avoided and rinsing being more conveniently carried out; its solvent action on the emetine is however much too slow, a large number of shakings being required for complete extraction.

Both ether and chloroform were found by blank experiments to dissolve the caustic alkalies in quantities sufficient to vitiate the subsequent titration, but carbonate of soda seems to be quite insoluble in chloroform.

THE MANDRAKE.*

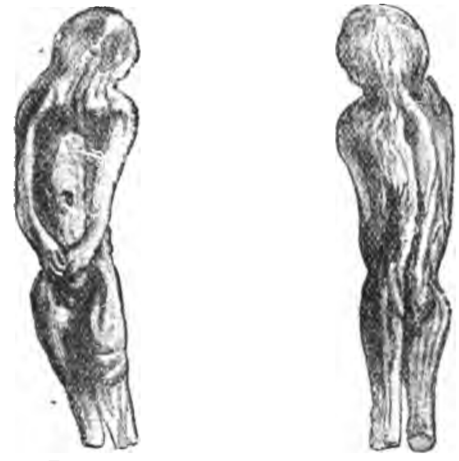
BY WILLIAM WYNN WESTCOTT, M.B.LOND.

The true mandrake plant, *Mandragora officinalis* or *Atropa mandragora*, was used to prepare a medicine by many of the peoples of the ancient world; notably by the various races dwelling in Asia Minor, by the Greeks and Egyptians. In mediæval times the nations of Europe recognized its medicinal properties. The plant is indigenous to Palestine and Syria, and is occasionally found in Eastern Turkey and Asia Minor.

The root represented in the accompanying drawing is several years old, and is quite dry. It exhibits very well the curious resemblance to the human form, which has made a further interest in the plant, and which gave rise in remote ages to the assertions of magical power and virtues in sorcery. The ancients laid much stress on the doctrine of correspondences, and they argued that this human-like root must have special attributes as regards man, and hence this root became used as an amulet or talisman, and ladies valued it as a love philtre.

The Hebrew name is *dudaim*, or "love fruit," and the reference to Genesis, cap. xxx., where Reuben, the son of Leah, finds mandrakes in a field at the time of harvest (April) is known to all. Rachel consents to resign Jacob in exchange for the mandrakes, and Leah said to Jacob: "I have hired thee with my son's mandrakes." The birth of Issachar follows, a name which means in Hebrew hire or wages.

This root comes from Damascus, and is a very striking example of how much the plant may represent a man's form. Of course all roots are not like this one, but there is a curious tendency to send off two lateral branches above and to end in two limbs below. There are often, also, the constrictions suggesting the neck and waist. The root of the white bryony of England, a cucurbitaceous plant, is sometimes fudged up by dealers to imitate the mandrake root; but I guarantee the genuineness of this sample, which is not carved out, but when green it may have been pressed a little into shape before being allowed to dry.



From a specimen lent by Mr. Martindale.

The plant belongs to Solanaceæ, and is a near connection of the potato; the root is perennial; there is no stem; from the crown springs a cluster of radical leaves which are entire, wavy, ovate; among them there springs up a flower-stalk, or several, each with one bell-shaped five-lobed corolla. The fruit is a berry, nutmeg-sized and of orange colour. The flowers are mostly white, and have a full scent, but there are varieties with dusky flowers and unpleasant smell.

The plant is mentioned by several of the classical authors; by Pliny, A.D. 100; Theophrastus, *History of Plants*, B.C. 350; by Ælian, Columella, Isidorus and Serapion, and by Dioscorides. The celebrated Sir Thomas Browne, M.D., 1650, the author of *Religio Medici*, wrote a long essay upon the mandrake, and repeats all the old traditions concerning it, such as the danger of pulling it up, the use of a dog for the purpose, the shriek which it gives when uprooted, and its aphrodisiac virtues. Shakespeare mentions it in *Romeo and Juliet*, *Cleopatra*, *Macbeth* and *Othello*, Gerard, in his well-known *Herbal*, 1597, refers to the use of the plant in olden times. The ancients used the leaves as a poultice to relieve pain and swelling; they boiled them with milk; they made a wine of mandragora, and also administered the powdered root as a narcotic to relieve pain, and to produce a stupor for the performance of surgical operations.

Dr. B. W. Richardson, in his *Asclepiad* for the second quarter of 1888, claims to have recently made some wine of mandragora, and that for the first time since the thirteenth century. The old wine was prepared from half a pound of root bark digested in nine gallons of wine, and is reputed to have a very a similar effect to that of chloral hydrate. Dr. Richardson made some experiments on animals, and obtained anodyne effects, and some local anæsthesia; when tasted, a numbing effect is produced on the tongue. He noticed the peculiar fact that alcohol takes up less virtue from the root than water does.

Some years since, a crystallized alkaloid was separated, and named "mandragorina." The sulphate is a mydriatic, and has narcotic action; it has a close relation to atropine and hyoscyamine.

MEDICINAL GELATINES.*

These preparations are indicated in superficial inflammatory affections when the skin is swollen, wet, and itchy. Very high temperatures and profuse sweating forbid their use. For a general basis the following formula is given—the figures within parentheses being taken when a hard zinc gelatine is wanted.

℞—Zinc oxide	15	(10)
Gelatine	15	(30)
Glycerine	25	(30)
Water	45	(30)

(1.) Cerussa, iodide of lead, white precipitate, sulphur, iodoform, chrysarobin in fine powder may be mixed in any proportion required. From 5 to 10 per cent. added to soft zinc gelatine is recommended.

(2.) Carbolic and salicylic acid, resorcin, naphthol, creasote, and sulphide of potassium may be added to the hard gelatine basis in any proportion up to 10 p.c.

(3.) Fats, balsams, tars, and ichthyol all make the basis softer. The proportion added is usually from 10 to 20 per cent.

(4.) If we wish to combine drugs in rules two and three, then the sum of the proportions must be attended to. For example, if resorcin and salicylic acid were both ordered we should not prescribe more than 5 per cent. of each if we wish the gelatine to form a good covering.

(5.) Powders may be combined in any proportions.

(6.) Tannin, pyrogallol, and oxide of mercury cannot be added to the basis.

(7.) Corrosive sublimate up to 3 per cent., camphor, chloral, and camphor chloral all to 2 per cent., ext. cannab. indic. from 2 to 5 per cent., may be used with soft zinc gelatine.

The different glues should be dispensed in pots, which are to be put in boiling water when the preparation is to be used. It is to be painted on the skin with a long-haired brush.

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* From the *British Medical Journal*, March 15.

* From the *Deutsch. Med. Zeit.*, November 4, 1889. Reprinted from the *Medical Chronicle*, March.

The Pharmaceutical Journal.

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SATURDAY, APRIL 5, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

The Council meeting last Wednesday was attended by twenty members, and after the minutes of the previous meeting had been read and confirmed four pharmaceutical chemists and five chemists and druggists were elected members of the Society. Twenty-nine persons were elected associates of the Society, and twenty-three were elected apprentices or students of the Society. The nominations to fill the fourteen vacant seats on the Council were then announced, as well as the names of those who had declared their willingness to accept office if elected. The nominations are less numerous than they were last year, but there have been more acceptances, the number of candidates being twenty-three. Among the number of those who have declined to stand for election many of our readers will regret to find the name of Mr. Robbins, who has now been a member of Council for sixteen years, during ten years of which period he held the office of Treasurer. Mr. Robbins has always taken a special interest in the promotion of the Benevolent Fund, and his services to the Society in that respect, as well as in the general management of the finances, have been considerable. The present auditors have again been nominated for election, and have expressed their willingness to accept office.

The report of the Finance Committee recommended the payment of a further sum during the current month to the contractor for the new buildings, and attention was called by the President to the receipt of the accounts of the North British Branch of the Society, which had been found satisfactory by the Finance Committee, and showed that great care had been taken by the Executive in Scotland to husband the resources of the Society. Reference was also made to the zealous work of the officers of the Scotch Executive in carrying on the business of examinations, evening meetings, etc., with due regard to efficiency and economy. In acknowledging the compliment Mr. Watt said he was sure it would be received with satisfaction, and he assured the Council that there is in Scotland every desire to be loyal to the Society, however freely opinion may be expressed there on pharmaceutical matters.

During the past month a fair number of subscriptions to the Benevolent Fund have been received. Two grants of ten pounds and four of five pounds each were recommended by the Committee, and the death of two annuitants was reported. There has been a considerable increase in the number of applications for relief from the Fund, and regret was expressed that so few of those who have applied have been subscribers to the Fund. Some members of the Council suggested that those who have been subscribers should have a preferential claim in the distribution of the Fund, this view being especially urged by Mr. Robbins. However, the prevalent opinion was that the principle hitherto acted upon, of making no distinction in this respect, should still be adhered to, although it could not be overlooked that the trade does not support the Fund as it should do. In connection with this matter the most important point is, as pointed out by the President, that the Act of 1868 constituted the Society a trustee of the Benevolent Fund for the benefit of all registered persons. Many of the contributions to it are made for the benefit of the whole trade, and it is on the ground of the general applicability of the Fund that the Council constantly appeals to everyone connected with the drug trade for subscriptions and support. The sole qualification for relief is the fact of being registered as a chemist and druggist, and the advantage of having been a subscriber lies in the fact that in the event of an application being made for an annuity, a subscriber, or his widow, is credited with a corresponding number of votes, in addition to the fact that the candidate might expect to receive a larger number of votes. If anything further were done for the relief of necessitous members of the Society, it would have to take the form of an insurance fund. The President also announced that he had received from the Secretary of the Chemist's Ball a cheque for twenty guineas as a donation to the Benevolent Fund, and that as the result of a similar gathering at Brighton, initiated by Mr. Marshall Leigh, a further donation of five pounds had been received. There is also a prospect that a similar contribution will be received from the Committee of the Junior Pharmacy Ball, so that with the proceedings of these three meetings, if continued, it might be possible in future to maintain an additional annuitant.

The report of the Library, Museum, etc., Committee contained a recommendation that a Conversazione should be held in the Society's premises on the occasion of the annual meeting next May, and that a committee should be appointed by the Council to arrange and carry out the details. By that time the Society's new buildings will be sufficiently far advanced towards completion to admit of being made use of for the purpose. It is proposed that the Conversazione shall take place on the evening before the annual meeting, and that ladies shall be invited to be present. The recommendation was approved by the Council and a Committee was appointed to carry out the necessary arrangements. There can be no doubt that it is desirable to have such an opportunity for an annual meeting of the members of the Society, and that it would really be more useful than a meeting in a large building like the South Kensington Museum, inasmuch as it would offer greater facilities to members of the Society to become acquainted with the President and members of the Council and for the interchange of views on pharmaceutical affairs.

Mention was made of a letter that has been received from the Privy Council office, enclosing one addressed to the Home Secretary by the Battersea Ratepayers Protection Association, calling attention to the apparent heedlessness with which poisonous drugs are being sold in that parish as well as the ease with which they can be obtained by the public. No particulars were furnished beyond this general statement, and it was suggested that an answer should be sent to the effect that the Council takes cognizance of whatever infringements of the law are brought under its notice. The complaint has probably reference to the manner of labelling, which is purely a matter for the police authorities to deal with under the seventeenth section of the Pharmacy Act. Eventually the communication was referred to the General Purposes Committee.

Copies of the reports of Dr. STEVENSON and Sir DOUGLAS MACLAGAN on the Society's examinations in London and Edinburgh have been received from the Privy Council, with a letter requesting the President to call the attention of the Society to certain remarks in Dr. STEVENSON'S report. These two reports will be found at page 817. They gave rise to some discussion, and it was eventually decided that they should be referred to the Boards of Examiners.

The reply of the Chancellor of the Exchequer to the question put to him concerning the Medicine Stamp Act last Friday week was not of a nature to satisfy those who consider that there is need for an amendment of the law, or for an alteration in the administration of it by the Commissioners of Inland Revenue. Mr. Goschen does not appear to have been unaware that there have been complaints of varying decisions given by the Inland Revenue Department in regard to the liability to medicine stamp duty, but it would seem from his remarks that he has been more impressed by the fact that there is no general dissatisfaction, and that the trade has not manifested any general desire for the amendment of the law. In reference to the alleged want of uniformity in the administration of the Act he stated that every attempt had been made to secure uniformity, and he attributed any failure in this direction to the many relaxations which have been allowed from the comprehensive charge imposed by law. This does not offer any ground for expecting that further exemptions are likely to be recognized by the authorities, unless a much stronger case can be made out for such a course being adopted. So far as chemists are concerned in the sale of articles liable to medicine stamp duty, Mr. Goschen appears to think that the action of the Inland Revenue Department has been of a nature that ought to have removed all dissatisfaction on their part. He speaks of the acquiescence of the Department in the request of the trade that it should advise as to the liability involved by the use of labels as a concession that should do away with any uncertainty whether a preparation requires the stamp or not, and as he regards occasional varying decisions on this point as being unavoidable consequences of the work the Department has undertaken for the guidance of chemists, there seems to be little ground for expecting that he will recognize the contention that variations thus caused constitute an argument for the amendment of the Act.

* * *

From the Calendar of the Pharmaceutical Society of Ireland, just issued, it appears that on the 29th of January the number of persons registered under the Irish Pharmacy Act was 335. Of these 127 were members of the Society, 16 being original members mentioned in the Act.

* * *

In addition to Sir John Lubbock's Shops (Weekly Half-Holiday) Bill, to which reference was made a few weeks since, and which would provide for the closing of shops on one afternoon in each week, Mr. Blundell Maple has introduced into the House of Commons a Bill having for its object to give salaried assistants one half-holiday in each week without closing the shop. It provides that, under a penalty of five pounds, every keeper of a shop that is not already closed on one working day in each week before 4 p.m. should in each week, on a working day to be selected by himself, grant to every shop assistant who has been in his employment for not less than three months a half-holiday, to commence not later than 4 p.m. on the day selected. At least three days' notice would have to be given to the assistant as to the day selected, and in each establishment a register would have to be kept containing the names of all the assistants, the dates on which they were respectively engaged, and the day on which each was entitled to the half-holiday, and the initialling of this register once a week by the assistant would be evidence that the half-holiday had been given. The Bill contains an exemption in favour of refreshment houses, public houses and tobacconists' shops, and the members of the family of the keeper of the shop would not come within the definition of "shop assistant."

* * *

A Bill to amend the Acts for abating the nuisance arising from the smoke of furnaces and fire-places within the metropolis, brought into the House of Lords by Lord Stratheden and Campbell, would make the issue of "opaque smoke" from the chimney of any private dwelling house, hotel, club, or eating house, an offence punishable by a penalty of not less than one pound or exceeding five pounds. The expression "opaque smoke" is defined as "smoke of such volume or density as unnecessarily to impair the atmosphere," but there is no indication as to what is to constitute the limit of the unnecessary.

* * *

Once more Sir Albert Rollit has introduced a Registration of Firms Bill into the House of Commons. It provides for the registration of the true names and addresses of the members of all firms carrying on business under firm names which do not consist of the full or usual names of all the partners without any addition, and of individuals who carry on business under a firm name containing any name other than their own. As has been before pointed out the existence of such a register would sometimes facilitate the carrying out of the provisions of the Pharmacy Acts.

* * *

There is also a Bill for better securing the purity of beer, which would impose a penalty of five pounds upon any person who sells or exposes for sale "any beer brewed from or containing any ingredients other than hops *or* malt from barley," unless he keeps conspicuously posted a "notice stating *what* other ingredients are contained in such beer." This, if read strictly, would involve the necessity of every publican solemnly announcing that the beer he sells contains water. Probably this partly explains the appearance of a Beer Adulteration No. 2 Bill, differing only in two words, though bearing the names of different backers. This Bill would require a "notice stating *that* other ingredients are contained in such beer," if it contains "any ingredients other than hops *and* malt from barley," which is certainly suggestive of a new source of hops.

* * *

The death of Dr. Karl Jacob Löwig, at the age of 87, is announced in the *Chemiker-Zeitung* as having occurred on the 27th of last month at Breslau. Originally Professor Löwig was engaged in pharmacy, and when studying chemistry at Heidelberg was for some time assistant to Gmelin. Subsequently he became the manager of a pharmacy at Kreuznach, but continuing his scientific studies took a degree at Heidelberg and then studied under Mitscherlich at Berlin. In 1833 he was appointed professor of chemistry at the University of Zurich, and from there he was called to succeed Bunsen in the chair of chemistry at Breslau in 1853, a position which he continued to occupy until recently, when compelled to resign in consequence of an accident.

* * *

A series of lectures, commencing on Friday, the 9th of May and continued on the five following Fridays will be delivered at the Gardens of the Royal Botanical Society of London, Regents Park. The first and fourth lectures will be delivered by Mr. E. M. Holmes on British Sea Weeds and British Mosses. The second and third by Mr. G. R. M. Murray on Insectivorous Plants and Flowering Parasites. The last two lectures, on Vegetable Oils and Fats and on India-rubber and Gutta Percha, will be delivered by Mr. J. R. Jackson. The lectures will be delivered in the Museum in the gardens at 4 o'clock in the afternoon, and they will be free to fellows and members of the Society as well as all visitors in the gardens at the time.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, April 2, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Evans, Gostling, Greenish, Hampson, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Robbins, Schacht, Southall and Watt.

The minutes of the previous meeting were read and confirmed.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Allen, Willie	Basingstoke.
Duffin, Charles William	Huddersfield.
Foster, Murray Toogood	Collumpton.
Young, Edward Francis	Southport.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Coke, Charles Edwin	London.
Fawcett, John	Bebington.
Scanlan, Charles	Droylsden.
Smith, Sidney	Urmston.
Stevenson, John Crabtree	Todmorden.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Biggs, Frederick William	Stourbridge.
Burnet, George Maxwell	Blundell Sands.
Calkin, John Ernest	Southampton.
Fawcitt, Thomas Christopher	Manchester.
Fraser, Alexander	Edinburgh.
Gardner, William	Edinburgh.
Hudson, Walter Jowett	London.
Longstaff, William Luther	London.
Mathews, John Hitchcock	London.
Nethercott, Walter John	Bristol.
Parker, Robert	Rishton.
Rowsell, Philip Foale	Exeter.
Sharp, Stephen	Ashton-under-Lyne.
Smith, Charles Albert	Derby.
Stedman, Walter	Teynham.
Stott, Ernest Lucius	Sowerby Bridge.
Wilcock, Fred Anderton	Bradford.

Modified.

Roper, Henry Edward	Oundle.

ASSOCIATES.

The following, having passed the Minor examination and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Arnison, Williamson Shoolbred	Sunderland.
Clutterbuck, Charles	Nottingham.
Dawson, Alexander Fraser	Aberdeen.
Fisher, William	Dundee.
Freeman, Arthur Alexander	London.

Leadbeter, Sidney Herbert	London.
Matthews, Edwin James	Cowbridge.
Naylor, John	Burley-in-Wharfedale.
Palmer, John George	Durham.
Pearson, George Edward	Northallerton.
Young, James Robertson, junr.	Edinburgh.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Benton, William	Loughborough.
Cowles, Hector Charles	London.
Davidson, Samuel Riddel	Cullen.
Forbes, Charles	Aberdeen.
Geddes, James	Leith.
Handley, Hugh	Wisbech.
Howling, Abram Edward	Leith.
Irwin, Hubert Aloysius	Watford.
Johnson, Thomas	Bilston.
Johnson, William Arthur	London.
Jones, John Harrison	Ruthin.
Kington, John Frank	Edinburgh.
Leslie, Robt. Alex. Partridge	Chelmsford.
Long, Herbert Samuel A.	Lowestoft.
Mallaband, William Henry	Sheffield.
Owen, William Edward	London.
Patrick, Herbert Waring	Kettering.
Peck, William Hy. Wesley	Teignmouth.
Robertson, James	Leith.
Southall, Alfred William	Birmingham.
Thomas, William John	Dorrington.
Thomson, Charles	Cullen.
Truscott, William Hearle	Southampton.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Brooksbank Armstrong, 166, North End Road, West Kensington, London, W.
Thomas Goodwin Field, 193, High Street, Borough, London, S.E.
John Iberson, 73, Cavendish Street, Barrow-in-Furness.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

NOMINATIONS FOR THE COUNCIL.

The Secretary reported that he had received *thirty-three* nominations to fill the fourteen vacant seats on the Council, and the following *twenty-three* had declared their willingness to accept office if elected:—

Abraham, Alfred Clay, 87, Bold Street, Liverpool.
Atkins, Samuel Ralph, Market Place, Salisbury.
Broad, John Morris, 510, Hornsey Road, London, N.
Carteighe, Michael, 180, New Bond St., London, W.
Coleman, Alfred, 87, St. Mary Street, Cardiff.
Evans, Gwilym, 7, Stepney Street, Llanelly.
Gostling, Thomas Preston, Market Hill, Diss.
Greenish, Thomas, 20, New Street, Dorset Square, London, N.W.
Grose, Nicholas Male, 5, Castle Street, Swansea.
Hampson, Robert, 31, Baalbec Road, Highbury, London, N.
Harrison, John, 33, Bridge Street, Sunderland.
Hills, Walter, 225, Oxford Street, London, W.
Hopkin, William King, 14, Mowbray Road, Brondesbury, London, N.W.
Lake, John Hinton, 41, High Street, Exeter.
Leigh, Marshall, 46, Dyke Road, Brighton.
Maltby, Joseph, High Street, Lincoln.
Martin, Nicholas Henry, 29, Mosley Street, Newcastle-on-Tyne.
Richardson, John George F., Elmfield, Knighton, Leicester.
Ross, Lewis Buttle, 7, Middle Street, South Driffield.
Schacht, George Frederick, 52, Royal York Crescent, Clifton, Bristol.
Spink, Harry Nelson B., 3, Marsham Street, Westminster, London, S.W.
Storrar, David, 228, High Street, Kirkcaldy.
Wells, Frederic Thomas Percy, 26, Cambridge Gardens, North Kensington, London, W.

The following *ten* nominees had declined or had not expressed their willingness to accept office if elected:—

Gilmour, William, 11, Elm Row, Edinburgh.
Hanbury, Cornelius, Plough Court, Lombard Street, London, E.C.
Johnston, John, 45, Union Street, Aberdeen.
Lance, William Nathaniel G., 207, Copenhagen Street, London, N.
Perry, George Edward, 171, Hagley Road, Edgbaston, Birmingham.
Pollard, Henry Hindes, 168, High Street, Ryde, Isle of Wight.
Robbins, John, 147, Oxford Street, London, W.
Sargent, George West, 75, Church Street, Kensington, London, W.
Saville, John, 4, Goodramgate, York.
Taylor, John, 13, Baker Street, London, W.

NOMINATION OF AUDITORS.

The Secretary also reported that he had received the following *five* nominations to fill the office of auditor and that all the nominees had expressed their willingness to accept office if elected:—

Lescher, Frank Harwood, 60, Bartholomew Close, London, E.C.
Stacey, Samuel Lloyd, 300, High Holborn, London. W.C.
Umney, Charles, 50, Southwark Street, London, S.E.
Watts, William Manning, 32, Lower Whitecross Street, London, E.C.
Yates, Francis, 64, Park St., Southwark, London, S.E.

REPORT OF FINANCE COMMITTEE.

The report of this Committee recommended the payment of several monthly accounts, also of a further sum not exceeding £1000 during the current month to Messrs. Kirk and Randall, contractors for the new building, subject to the architect's certificate.

The PRESIDENT (as Chairman of the Committee), in moving the adoption of the report and recommendations of the Committee, said there was nothing in it calling for special notice. He was glad to find that the subscriptions to the Benevolent Fund had come in fairly well during the month. The payments included a sum of £100, on account of the yearly grant of £300 made to the Research Laboratory. At the last meeting of the Council he had omitted to refer to one portion of the report of this Committee which deserved attention, viz., the receipt of the accounts of the North British Branch, which on being examined by the Finance Committee were found not only to be perfectly correct, but the Committee considered them very satisfactory. He had great pleasure in saying how pleasant it was to see how carefully the resources of the Society were husbanded by the friends in the north, and he must apologize to them for not having referred to the matter before. Mr. Gilmour, the Chairman of the Executive, was the Treasurer, and he and Mr. Hill, the Assistant Secretary, worked most zealously, not only in carrying on the statutory duties of the Society in the holding of examinations, but also in holding meetings and carrying on the business which devolved upon the Executive, and at a minimum cost, having due regard to efficiency. He had also to move that in addition to the payments recommended in the report of the Committee a sum of £200 be voted to the North British Branch for current expenses.

Mr. Watt said it would be very gratifying to the members of the Executive of the North British Branch to know that their efforts to carry on the business of the Society with efficiency and economy were appreciated by the Council. He might assure them that the members of the Executive in Scotland were very desirous to be loyal to the Society, however freely they might express their opinions on pharmaceutical matters.

Mr. Evans inquired how much had been already voted for the new building, including the £1000 now authorized.

The President said £4800 had already been paid. The motion was then put and carried.

Report of Benevolent Fund Committee.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 41) of an associate in business from 1874 to 1888, and a subscriber in 1880. Applicant's late husband died suddenly in December, leaving her with seven children under thirteen years, and no means whatever. (Grimsby.)

£5 to the widow (aged 47) of an associate in business, who died in 1884. Applicant is in bad health. (Liverpool.)

£10 to a registered chemist and druggist, and a subscriber to the Fund (aged 74), who was forty years in business, but finally failed, and is now unable to do anything. (London.)

£5 to the widow (aged 47) of a registered chemist and druggist, who had grants of £5 on three occasions, and died in April, 1888. Applicant is entirely without means, and her only daughter is not yet able to earn anything. (Plymouth.)

£5 to the widow (aged 49) of a registered chemist and druggist. Applicant has had nine previous grants, amounting to £80 in all, the last being made to aid in getting a son into the Commercial Travellers' School, but the candidature was unsuccessful. Applicant has recently been discharged from a hospital. (Manchester.)

£5 to the widow (age 53) of a registered chemist and druggist, who has had eight previous grants of £10 each. (Grimsby.)

Two other cases had been deferred for further information.

Death of two Annuitants.

The Secretary had reported the deaths of two annuitants, Henry J. Bellingham on March 10, age 66; and Richard J. Chapman on March 19, age 77.

The Vice-President (as Chairman of the Committee), in moving the adoption of the report, pointed out that the applications for relief had considerably increased. In one case, it appeared that the applicant had incurred a liability of £30 for funeral expenses. This fact, so far from adding to the strength of the application, in the view of the Committee, had very nearly prevented any grant being made, the Committee feeling great doubt as to the applicant's ability to wisely expend any money which might be voted.

Mr. Atkins having seconded the motion,

Mr. Watt thought it was very lamentable that so few applicants for relief had been subscribers to the Fund, and his own view was that anyone who had been a subscriber should have a preferential claim in the distribution of the Fund. He knew this was not the opinion of some members of the Council; but though it was a very catholic idea to put applicants on the Fund, irrespective of whether they were subscribers or not, he thought those who had been subscribers should always have a preferential claim.

Mr. Hampson said it was lamentable that so few of the applicants had subscribed, but he was quite sure that when this had been the case the circumstance always had some weight with the Committee.

Mr. Robbins was pleased to find that at last some one had come to the same opinion as himself. For years he had urged the unfairness of allowing those who had never subscribed a penny, to be put on an equality with those who had. The Committee had never admitted that any difference was made; but there ought to be, and it ought to be made known. Some years ago he had brought forward a motion that preference should be given to subscribers and members, for he was satisfied that the only way to strengthen the Society was to give members some additional privileges over those who always remained outside.

Mr. Leigh rather objected to the principle enunciated by Mr. Robbins, because he thought all who were engaged in the trade should participate in the benefits of the Fund when they fell into distress. At the same time he sympathized with Mr. Watt's contention that those who subscribed in their prosperity should receive some advantage when they fell into adversity. If some sort of preference could be shown it would probably induce many to become subscribers.

Mr. Allen said the Benevolent Fund was administered by the Council for the good of the trade generally, and on that basis subscriptions had been sought for and had been given independently of membership. They had been given by all sorts of people outside the Society, and in some cases outside the trade, and it seemed to him it would be impossible, even if the Council wished, to make any regulation which would give subscribers any preference over non-subscribers. He thought it would always be found that non-subscribers would form the majority of applicants for grants. The very fact of attaching themselves to the Society and subscribing to the Fund indicated to some extent a state of mind which would prevent their coming on the Benevolent Fund afterwards.

Mr. Robbins asked leave to say that a very small proportion of the Fund came from people outside the Society.

Mr. Cross said he could not endorse the Treasurer's remarks in their entirety. It was well to encourage the trade to be prudent; but at the same time, as long as he lived he hoped he should never see the Fund distributed in any other manner than it was at present. It was a Benevolent Fund, and not an Insurance Society. At the same time it could not be too widely known that the trade did not support the Fund as it should. In going about the country he constantly met with people who did not believe in the Society, but he never met with one who did not believe in the Benevolent Fund.

The President said he would remind Mr. Watt, who often had opportunities of advocating the cause of the Fund in Scotland, especially as he was a great believer in the proper performance of trusts, that one of the good points—if there were any good points—in the Act of 1868, was the clause by which the Society was constituted a trustee of the Benevolent Fund for the benefit of all registered persons. If the question were to be raised in the sense indicated by Mr. Watt and Mr. Robbins, it would be far better to supplement the Fund by an Insurance Fund, and possibly some day that might be done; but such a Fund did not exist at present. The Council appealed constantly and periodically to every one connected with the drug trade, on the ground that the benefits were not in any sense confined to the members of the Society. One gentleman he might mention, Mr. Charles Maw, had given a very large sum in the aggregate. Gentlemen in his position would not contribute to the Fund unless it were for the benefit of the whole trade. He hoped the

Benevolent Fund Committee would carry on its work in the way in which it was now doing; in fact the statute required that it should. The sole qualification for relief was being registered as a chemist and druggist. The advantage of being a subscriber lay in the fact that in case of an application for an annuity, such a case always received a large number of votes. Beyond that there could be no doubt that the very reason why a person did not subscribe was often the reason why he eventually had to come for assistance.

The Chemists' Ball.

The **President** said he had received a letter from the Secretary to the Chemists' Ball, thanking the Council for the use of the rooms for committee meetings, and enclosing a cheque for twenty guineas for the Benevolent Fund. He had also to add that a similar gathering had been recently held in Brighton, on the initiation of Mr. Marshall Leigh, as a result of which £5 had been sent up to the Fund. He believed that before long a similar communication would be received from the Junior Pharmacy Ball, and that as the result of the three meetings, if continued, one additional annuitant might be maintained.

REPORT OF THE LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

LIBRARY.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
February	Day	740	40	18	31
	Evening	211	17	5	11

Circulation of books.	Total.	Town.	Country.	Carriage paid.
February	251	141	110	£1 11 4

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Acland (Sir H. W.), Oxford and Modern Medicine, 1890. From the **Author.**
Victoria, Pharmaceutical Register for 1889. From the **Pharmacy Board.**
Transactions of the Laboratory Club, vol. 3, nos. 1–4. From the **Editor.**
Chicago College of Pharmacy, Annual Announcement, 1890. From the **College.**
Botanical Society of Edinburgh, Transactions and Proceedings, vol. 17, part 3. From the **Society.**
Curtman (C. O.), Uses of Chemical Reagents, no. 6. From the **Author.**
Davy (Sir H.), Agricultural Chemistry, 1821. From Mr. H. R. **Butson.**
Royal Society of New South Wales, Journal and Proceedings, vol. 23, part 1.
— Catalogue of Library, part 1. From the **Society.**
Durham University Calendar, 1890. From the **University.**
Becquerel and Rodier, Pathological Chemistry, 1857.
Thomson, Materia Medica, 1843.
Liebig, Animal Chemistry, part 1, 1846.
Trousseau et Pidoux, Thérapeutique, 1862, 2 vols.
British Pharmacopœia, 1867. From Mr. **Henry Wood.**
School of Pharmacy Students' Association, Papers, vols. 11 and 15. From the **Association.**
Deutsche Chemische Gesellschaft, Berichte, 1889.
Chemical Society, Journal, 1889. From Mr. **Walter Hills.**

The Committee recommended that the undermentioned works be purchased:—

For the Library in London—

Sachs, History of Botany.
Roscoe and Schorlemmer, Chemistry, vol. 3, part 2.

The Committee had ordered that the Library and Museum be closed from Thursday, April 3, at 5 p.m. till Tuesday, April 8, at 9 a.m.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
February.	Morning	586	32	13	24
	Evening	125	14	1	6

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of Pure Oil of Cinnamon Leaf. From Mr. J. J. **Sharp.**
Specimen of Artificial Musk, in Powder. From Mr. N. C. **Meyjes.**
Specimen of Crude Canadian Asbestos (Amianthus). From Messrs. **Werner** and **Koenig.**
Specimen of White Mogador Gum Arabic. From Messrs. **Wright, Layman** and **Umney.**
Specimen of American Lard, made with Cottonseed Oil. From the **Director,** Kew Gardens.

The staff of the Society's school had attended and reported on their respective classes.

The Committee recommended that a conversazione be held in the Society's premises in May next, to which ladies should be invited, and that a Committee be appointed to arrange and carry out the details.

It was also recommended that the front of the premises in Bloomsbury Square and Great Russell Street be washed from the basement to the first floor.

The **President** (as Chairman of the Committee), moved the adoption of the report and recommendations, the greater part of which was merely formal. With regard to the Conversazione, the Committee had carefully considered the matter, and thought the new building would be sufficiently far advanced to admit of a Conversazione being held on the evening preceding the annual meeting, to which ladies might be invited. It was suggested that there should be an exhibition of interesting scientific novelties, with music and other artistic entertainments. It was believed that the ground and first floor could be so arranged as to afford means for giving a considerable amount of gratification to those who were scientific as well as to those who only wished to be amused. The Committee thought it was desirable that once a year the members and friends of the Society should meet in these rooms, and if some regret were felt at not meeting in a large building like the South Kensington Museum, it was hoped that would be compensated for by the fact that in the Society's house, at least, the members could meet together and enjoy that intercourse which had not been possible at the larger gatherings. In fact, at some conversazioni there had been comparatively few of the members and a large number of other people, but the object was to afford an opportunity for the interchange of views between one another, and especially that the President and other members of the Council might have more opportunity of meeting and conversing with country members than the annual meeting afforded. If such a meeting had no other effect than that of allowing each member of the Council to talk to half-a-dozen members and associates whom he did not know before, it would be a very great advantage.

Mr. **Leigh** asked if it would be practicable to set apart a room for dancing.

The **President** thought that would be too revolutionary a step to begin with. What might be done in future he could not say, but he could not hold out any hopes of such a thing being entertained on this occasion.

Mr. **Allen** seconded the motion, which was unanimously agreed to.

CONVERSAZIONE COMMITTEE.

The President, Vice-President, Treasurer and Messrs. Allen, Greenish, Hampson, Hills and Martindale were appointed the Committee to carry out the arrangements for the Conversazione.

APPOINTMENT OF LOCAL SECRETARY.

Mr. Henry Oldfield was appointed Local Secretary for Hyde, in the room of Mr. Joseph Wild, resigned.

AUDITORS' REPORT.

The Auditors' report was laid upon the table.

THE SALE OF POISONS.

The **President** read a letter which had been received from the Privy Council enclosing one sent by a meeting of the Battersea Ratepayers Protection Association, addressed to the Home Secretary, calling attention to the apparent heedlessness with which poisonous drugs were sold in that parish and the ease with which they could be obtained by the public.

Mr. **Hampson** asked if any particulars were furnished.

The **President** said there was nothing beyond what appeared in the letter. It seemed to him that the proper answer would be that the Council took cognizance of all infringements of the law which were brought to its attention. He believed the real complaint arose with regard to the question of labelling, which was purely a police matter. He would suggest that the communication be referred to the General Purposes Committee.

This was agreed to.

REPORTS OF THE GOVERNMENT VISITORS ON THE SOCIETY'S EXAMINATIONS IN LONDON AND EDINBURGH.

The **President** said a copy had just been received from the Privy Council of the Annual Report by Dr. Stevenson, on the examinations in England and Wales, and by Sir Douglas Maclagan on the last four years' examinations in Scotland. He would read the reports which had been published, and copies would be forwarded to each member of the Board of Examiners.

"Privy Council Office,
"*March* 29, 1890.

"Sir,—I am directed by the Lord President of the Council to transmit to you, to be laid before the Pharmaceutical Society of Great Britain, the accompanying copies of reports by Dr. Stevenson, on the examinations held during the present year, and by Sir Douglas Maclagan, on those held during the years 1886–7 to 1889–90, by the Society in London and Edinburgh respectively; and I am instructed by his lordship to request that you will call the attention of the Society to the remarks made by Dr. Stevenson in his report.

"I am, sir,
"Your obedient servant,
"C. L. Peel.

"The President of the Pharmaceutical Society of
"Great Britain, 17, Bloomsbury Square, W.C."

"*Report on the Examinations held by the London Board of Examiners of the Pharmaceutical Society of Great Britain during the year ending March* 31, 1890.

"To the Lords of the Council,

"My Lords,—I have the honour to report that during the year ending March 31, 1890, I attended twelve examinations of the London Board of Examiners of the Pharmaceutical Society of Great Britain; and statistical information has been furnished to me respecting the Preliminary examination also, of which I have availed myself in this report.

Preliminary Examination.

Number of candidates examined	1380
„ „ „ who passed	680
„ „ „ „ failed	700
Percentage of failures	50·7

"The number of candidates examined was nearly the same as during the previous year; but the percentage of rejections was increased 2·3 per cent.

"Of the rejected candidates 332 failed in Latin, 333 in English, and 531 in Arithmetic; 278 failed in one subject only, whilst 26 failed in no particular subject, but were rejected in consequence of the fewness of their aggregate marks. On comparing these figures with those of the preceding year, it is seen that during the year under review there were fewer rejections in Latin, whilst the failures in English and in Arithmetic showed a large increase.

"It is evident that many imperfectly educated candidates present themselves at this examination; and it is to be hoped that the large proportions of rejections will not produce any desire on the part of the Society to lower its standard of preliminary education.

Minor Examination.

Number of candidates examined	787
„ „ „ who passed	303
„ „ „ „ failed	484
Percentage of failures	61·5

"There was a falling off of the number of candidates, and the rejections, when compared with the figures of the preceding year, show an increase of 6·7 per cent.

"Of the rejected candidates 79 failed in chemistry, 25 in botany, 50 in materia medica, 76 in pharmacy, 51 in the reading and writing of prescriptions, and 154 in dispensing; 323 failed in one subject only; whilst 105 were rejected in no particular subject, but in consequence of the fewness of their aggregate marks.

"The failures in pharmacy, the reading and writing of prescriptions and in dispensing, were in excess of those in 1888–9, and in dispensing there was a large increase in the number of rejections. I have observed no instance in which a candidate was rejected, except on quite sufficient grounds.

"The remarks which I made last year as to the want of an extended published syllabus of the subjects of examination, as to the desirability of a written examination, and as to the use of the microscope, still hold good. I am glad, however, to record that my views then expressed as to the inadvisability of the rejection of a candidate by one examiner, and not by the concurrence of two, have been in a measure met by the more prevailing custom observed during the past year of such examiner consulting with his colleague, in the same subject of examination, when a doubtful candidate is under examination, and by the practice of having such candidates examined by both examiners in a subject before rejection. The results show that rejections have increased; and I am of opinion that benefit has thereby accrued.

"Of the fairness with which the examinations are conducted I can speak in high terms.

"This being the examination which qualifies persons for the sale of poisons, I have again to express my conviction that an elementary examination in the statutory requirements as to the sale of scheduled poisons by chemists and druggists is needed. It is not unreasonable to expect that those who alone are allowed to sell poisons retail should know what are the scheduled poisons, and how the register book of the sale of these is required to be kept.

Major Examination.

Number of candidates examined . . .	137
„ „ who passed . .	75
„ „ „ failed . .	62
Percentage of failures	45·2

"There was a considerable increase of the number of candidates examined as compared with the previous year, and the rejections rose 3·5 per cent.

"Of the rejected candidates, 28 failed in chemistry, 13 in botany and 4 in materia medica; 33 failed in one subject only, whilst 21 were rejected in no particular subject, but failed in consequence of the fewness of their aggregate marks.

Modified Examination.

"No candidates were examined during the year.

"I have the honour to be,
"My Lords,
"Your obedient servant,
(Signed) "THOS. STEVENSON."

Report on the Examinations held by the Board of Examiners in Scotland during the four years, 1886–90.

"My reports have hitherto embraced a period of three years, but last year I was unable to accomplish this duty, and thus the present report includes four year, viz., 1886–7, 1887–8, 1888–9, 1889–90.

"The total number of candidates examined during the quadrennium 1886–90, and the results of the examination, are as follows:—

	Candidates.	Passed.	Failed.	Failures per cent.
Major . . .	27	16	11	41
Minor . . .	886	450	436	49
Modified . .	4	4	0	0

"The number of candidates for the Major examination is so small that it is difficult to draw conclusions from the numerical results, and the Modified examinations are so insignificant in numbers that they may be neglected.

"The interest of the statistics essentially centres in the young men essaying to enter the pharmaceutical profession by the Minor examination.

"The proportion of rejections to the total number of candidates varies a little in the different years, but still exhibits too large a proportion of failures.

"For the last four years it is exhibited in the following table:—

Percentage of candidates rejected in the various years.

1886–7	1887–8	1888–9	1889–90
60	52	41	43

"The mean of these percentages being 49.

"It appears from this that almost exactly one half of the candidates from one cause or another failed to satisfy the examiners. It is an ungrateful duty to have to repeat what I said on former occasions that this constantly high proportion of failures is evidence that the state of pharmaceutical education in Great Britain is bad. This state of matters confirms me in my opinion that it will not be better till candidates are made to go through a regular curriculum of some kind. The want of systematic training is to my mind strongly evidenced by the fact of a large proportion of remissions being due not to rejection on any special subject but to the candidates being unable to make up the aggregate number of marks (600) which entitles to a pass.

"I believe that if a regular curriculum—it need not be of too exacting a character—were insisted on, there would not only be a diminution in the number of rejections, but the pass numbers in the various subjects might be raised a little, and thus a higher standard of acquirement got in those who passed.

"It is so far satisfactory to me not to be obliged to state, as in my last report, that the number of rejections was increasing. This is not the case. It is not lessening, however; the average standard of acquirement is still far from what it should be, although there is a marked diminution in the number of candidates who come up totally ignorant of either or both of the scientific subjects, botany and chemistry, though instances of this are still by no means wanting. It may be said that these statements are adverse to the idea of a curriculum, and that matters are improving under existing circumstances.

"The improvement, however, is not general, and seems to apply only to individuals who are now restrained from going up totally unprepared, by their knowledge of the number of rejections.

"If a curriculum were established there might be introduced the important change of dividing the Minor examination into two parts, the first embracing the scientific subjects, botany and chemistry, and along with these perhaps prescription reading, and the second comprising the more strictly practical subjects, materia medica, pharmacy, and dispensing.

"There may be financial difficulties in accomplishing this, but I am certain from the experience of other examining bodies that it would be a great boon to candidates.

"As regards the various subjects of examination, I have only a few remarks to make. The following table exhibits the proportion of failures in each subject:—

Subjects.	Quadrennium 1886—90.
Passed in each subject but failed in aggregate	23·02
Botany	6·09
Chemistry	8·01
Materia medica	3·27
Prescription reading	·11
Practical dispensing	5·98
Pharmacy	2·70
Percentage of candidates who failed .	49·18

"As usual botany and chemistry are the subjects in which most failures occur. As regards botany I must revert to my often expressed opinion that there should be some application of the microscope to the examinations. It should for the Minors be of the most elementary character, but it is not too much to expect from such candidates the power of discriminating such simple matters as vegetable cells and vessels, pollen, and some of the starches used in medicine. I may suggest that if microscopy in the botanical examinations should be thought to partake too much of the scientific—which it does not—it might be applied to the practical subject of materia medica, where the recognition of the starches or the distinguishing of the layers of a medicinal bark or root would not be too high an acquirement.

"*Chemistry.*—The recognition by tests of substances placed before them is on the whole fairly performed by candidates.

"There is constant evidence, however, of this work being done too much by the chart, and not by manipulative experience.

"Very often the proper reactions are duly produced, but from want of practical experience the candidates do not recognize them.

"There is one subject, however, usually brought in as a sort of termination to the practical chemical examination which calls for remark. I allude to the instruments employed in chemical work, the thermometer, barometer, and hydrometer. The ignorance of candidates with regard to these is appalling.

"Many of them do not know how to use a thermometer or hydrometer, and almost none of them have any idea as to the principles of the barometer, and the indications which it affords. This results from simple neglect of the practical use and observation of such instruments.

"It is not that they are not aware that questions on these subjects may be asked, because the majority of candidates can glibly state the formula for reducing Fahrenheit to Centigrade and *vice versâ*. But they rarely show any adequate conception of the reasons why such arithmetical formulæ should be used.

"This is the more to be regretted that all the knowledge which they are called to exhibit can often be shown by boys at our elementary schools, and might be acquired from such a book as Balfour Stewart's 'Physics,' published by Macmillan for a shilling.

"Prescription reading yields a very small percentage of the failures, and this I attribute to the fact that the large majority of candidates can read Latin prescriptions well as regards the rendering of them into English, thus showing that they could dispense physicians' prescriptions correctly. In a majority of instances, however, they make sad mistakes in giving in full the usually contracted names and quantities of the medicines ordered. In the exercise of translating a prescription in English into Latin, the performance is generally deplorable, not one in twenty is free from grammatical errors, even in so rudimentary a matter as the agreement of an adjective with its substantive. I do not know how in the Preliminary examination candidates may acquit themselves in the matter of English and Arithmetic, because the papers on these subjects do not come before us here, but as regards Latin I am constrained to say that the Preliminary examinations as now conducted are quite unsatisfactory.

"The appearances in materia medica and pharmacy are in general good, and I am glad to observe an improvement in the very practical subject of dispensing.

"I have only to add that the examiners continue to conduct their work with a due regard at once to the safety of the public and the interests of the candidates.

(Signed) "DOUGLAS MACLAGAN."

Mr. MARTINDALE thought the suggestion in Dr. Stevenson's report with regard to the sale of poisons was well worth consideration by the Board of Examiners.

Mr. ALLEN said he had listened to these reports with great pleasure, because they bore out what he had often thought, and he hoped when printed they would be carefully studied by the members. It had been said sometimes with apparent sincerity that candidates in Scotland got through their examinations more easily than they did in England, but this idea was hardly borne out by these reports. The percentage of failures was only slightly less in Scotland.

Mr. SCHACHT thought it would be hardly right to discuss these reports in detail, but he remarked that while Dr. Stevenson attributed the majority of failures in the Minor to practical subjects, especially dispensing and reading prescriptions, Sir Douglas Maclagan said that exactly the reverse was observed in Scotland.

Mr. ATKINS asked if it was in order to express any opinion on these communications.

The PRESIDENT said it seemed to him very difficult to criticize these communications without due preparation, especially as they were reports on the acts of bodies of men appointed by that Council to do certain duties. A copy would be sent to the Examiners, and if they had any observations to make they would send them to the Council in due course, and then it would be open to the Council to take any steps which might seem desirable.

Mr. WATT said he should like the President or Vice-President to give a distinct answer to the question which had been referred to by Mr. Allen. He knew it had been said that it was easier to pass the examinations in Scotland than in England, and he should like it stated plainly that there was no foundation for such an idea.

Mr. EVANS hoped there would be an opportunity afforded at some time for discussing these reports, if only to draw the special attention of the trade to them.

The PRESIDENT said he thought the only duty of the Council with regard to them was to pass them on to the Board of Examiners.

Mr. HAMPSON remarked that it was very gratifying to have two such reports, testifying in the clearest manner to the perfect fairness with which the examinations were conducted.

Mr. CROSS had been particularly struck with that portion of Sir Douglas Maclagan's report in which he referred to the Preliminary examination, and especially to the Latin. As local superintendant for Shrewsbury he had often looked over the papers of the candidates, and felt sure from their almost complete ignorance of Latin grammar that they must fail, and yet to his surprise he had sometimes found their names in the pass list. Until this sort of thing was remedied, men would be constantly coming up for the Minor examination ill prepared.

Mr. ATKINS asked if the President thought it advisable to discuss these reports, either now or on any future occasion. He did not mean adversely, but with a view of pressing them on the attention of members.

The PRESIDENT thought the effect on the members of the unbiassed opinion of two gentlemen not connected with the trade ought to be much greater than anything the Council could say. In considering educational matters it was very difficult for some of them to forget that pharmacy was a trade or occupation, and consequently their opinions were not always perfectly unbiassed. If any member should in future desire to introduce any alterations into the Preliminary or other examinations founded on these reports he could attempt to do so.

Mr. EVANS said he had always looked upon pharmacy as a trade and not a profession, but none the less he highly appreciated these reports, which spoke out so distinctly that everyone could understand them, and he thought they ought to be brought prominently before the trade.

Mr. RICHARDSON suggested the desirability of the report on the Scotch examination being issued annually in the same way as the English one.

The PRESIDENT said the Council had no authority in the matter. These two gentlemen were appointed by the Government to report to the Privy Council, under a special clause in the Act, as to how the work of examination was done, that on the one hand the proper amount of knowledge was exacted, and that on the other hand the examiners did not unduly press the candidates. These officers reported to the Government, and the Government as a matter of courtesy sent the Council a copy. The reports referred to the action of the two Boards of Examiners, and if any proceedings were to be taken in consequence they should emanate from the Boards of Examiners, except in the case of the Preliminary examination, as to which it would be quite open to any member of the Council to move, basing his recommendation on these materials. With regard to the details of passing and rejecting candidates, the Council could not intervene. With regard to the suggestion as to the sale of poisons, Dr. Stevenson was probably not aware that it would be necessary for a new bye-law to be passed before any fresh subject could be introduced in the examinations. He referred to that matter last year, and mentioned the possibility of legislation and altering the bye-laws. As many were aware, there were certain bye-laws lying by ready for presentation to the Privy Council. With regard to Mr. Watt's question he could state from personal knowledge of both Boards of Examiners that the work was admirably done both in London and Edinburgh, and on identical lines, and it would not do for a candidate, trusting to statistics, to fancy that he could pass more easily in Scotland than in London. He had said that before. As official chairman of the Board in Scotland he had obtained certain statistics, and so had deputations which went down there, and his examination of them had shown this:—first that the average Scotch lad was better trained than the average English in preliminary education; secondly, that the average Scotch apprentice got much more practice in dispensing than was generally got in England; and thirdly, that there was an amount of prudence about Scotch lads which prevented them risking their money in paying fees unless they felt pretty sure of passing. If in any one examination in Edinburgh there were 50 candidates, of whom 28 passed, scarcely a Scotch lad would be found in the rejected list. Those, therefore, who thought they would pass more easily by going to Edinburgh had better save their railway expenses. If there was any advantage in Edinburgh in favour of the candidates, it arose from the fact that there were a smaller number at work at one time, so that it was quieter, but if the candidate were a little less nervous on that account, it was also true that the Board had no difficulty in being a little more exacting if need be. In the South it was a very common thing for young men to pay the fee just for the opportunity of going through the examination rooms, and he had remarked their consternation sometimes when they came to grief in one or two subjects, and were not allowed to go farther. They had no expectation of passing, but wished to go through the whole routine in the hope that it would enable them to pass more easily the next time. Amongst the young men in Scotland such a thing was hardly known.

Mr. **Evans** suggested that if the names of those who failed were published it would tend to stop this sort of thing.

The **President** said from an examiner's point of view he should be glad to do that, but such a thing was quite out of the question; it would be distinctly libellous, as tending to injure those who failed.

It was unanimously agreed that the visitors' reports be referred to the Boards of Examiners.

Honorary Members.

The **President** said it was usual to suggest names at the April meeting for election next month as honorary members, but looking to the fact that there was only one vacancy, it would probably be advisable not to make any election this year.

Report of the General Purposes Committee.

The report of this Committee included the usual letter from the Solicitor. In one case a verdict had been obtained by the Society, and in another the defendant had paid the penalty and costs without action. Execution had been issued against another defendant who had failed to pay the instalments ordered by the court.

Several cases of alleged infringement of the Pharmacy Act had been considered, in two of which proceedings were recommended, and in some others it was recommended that counsel's opinion be obtained.

This report was as usual read and considered in committee.

On resuming, the report and recommendations were unanimously adopted.

SCHOOL OF PHARMACY EXAMINATION QUESTIONS.

The following are the questions that were set for the Prize Examinations at the close of the Winter Course of the Society's School of Pharmacy:—

NOTICE.—In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

Pharmacy and Practical Pharmacy.

Mr. Ince.

BRONZE MEDAL.

Thursday, March 27.—Time allowed, three hours.

1. Identify specimens 1 to 12.
2. Describe various forms of apparatus used in Percolation, noting their adaptation to special purposes.
3. Make—Extractum Colchici, Extractum Quassiæ, Flemming's Tincture of Aconite, Hoffmann's Anodyne, Linimentum Saponis, Linimentum Terebinthinæ, Syrupus Ferri Iodidi, Syrupus Papaveris.
4. Write practical note on the dispensing of the so-called incompatibles.
5. Give approved methods of exhibiting Camphor, Chloral Hydrate, Pepsin, and Sulphate of Quinine in pilular form.

Materia Medica.

Mr. Holmes.

BRONZE MEDAL.

Friday, March 28.—Hours from 2 till 5.

1. Describe the flower and leaf of *Aconitum Napellus* and the characters that distinguish these organs from those of *A. paniculatum*. Mention the active principles of the two plants, and remark upon any difference that may exist between the extracts prepared from their leaves. State the best period for the collection of aconite root and describe the features it should present if of good quality.
2. Give a full account of Belladonna root.
3. Mention the respective sources of the essential and fixed oils of almonds of commerce.
4. Refer the following articles of materia medica to their several natural orders:—Coca, Colchicum, Gelsemium, Pomegranate and Podophyllum.
5. Name the specimens placed before you and describe the characters by which you recognize them.
6. How would you ascertain the purity of Kamala?

Practical Botany.

Professor Green.

BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR.

Friday, March 28.—Time allowed—11 a.m. till 1 p.m.

1. Make such microscopic preparations as you think necessary to display the structure of the specimen A. Mount them in glycerine.
2. Sketch your preparations and identify their leading features.
3. Identify the mounted specimens B., C., D. Write down briefly your reasons for your opinion.

Saturday, March 29. Time allowed—11 a.m. to 2 p.m.

Not more than Four Questions are to be attempted. The value attached to each Question is the same.

1. Give an account of the epidermis regarded as a tissue system. State what are its functions, and show how its structure enables it to discharge them.
2. Describe the several forms of cells which are characteristic of the bast of an ordinary fibro-vascular bundle.
3. Describe the body produced in consequence of the germination of the macrospore of Selaginella. Point out what corresponds to it in the life history of the Fern.
4. Show how the materials found in the soil are taken up by the plant. What forces are at work

causing their absorption? Upon what condition depends the amount of any substance absorbed?

5. Describe the differences which obtain between (i.) Dicotyledons and Monocotyledons. (ii.) Cryptogams and Phanerogams. Give the sub-classes of the first two of these groups, and the characteristic features of each.

6. Give an account of the process of respiration in plants.

CHEMISTRY

PROFESSOR DUNSTAN.

BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR.

Part I.—Physics.

Monday, March 31. *Time allowed*—11 *a.m. to* 1 *p.m.*

1. Describe how the latent heat of water has been determined.

2. Describe one form of calorimeter and explain how it is used to determine the specific heat capacity of iron.

3. How is the relative density of a liquid ascertained?

4. State the general facts connected with the solubility of gases and solids.

5. Write a brief account of the principal methods of ascertaining the densities of gases and vapours.

Part II.—Chemistry.

Monday, March 31. *Time allowed*—2 *p.m to* 5 *p.m.*

1. Compare and contrast the properties of copper and silver, and those of their principal compounds.

2. Describe the experiments you would make in order to prove that air is a mixture of nitrogen and oxygen. How has the composition of air, by weight and by volume, been ascertained?

3. Write a short account of the mode of action of copper and of zinc on nitric acid and on sulphuric acid.

4. Describe the experiments you would make in order to prepare specimens of pure hydrofluoric acid, hydrochloric acid, hydrobromic acid and hydriodic acid respectively.

5. What are the usual impurities in commercial sulphuric acid? How is the acid purified for medicinal use?

CLASS OF PRACTICAL CHEMISTRY.

PROFESSOR ATTFIELD.

April 1. *Hours*—10 *to* 1; 2 *to* 5.

Books and Memoranda permitted. Standard number of Marks, 100.

1. What is the specific gravity of the accompanying piece of "Stone?"

2. State what substances are present in the "Saline Draught."

3. What is the chief ingredient in the "Violet Powder?" State what starch, if any, is present.

4. How many volumes of nitric oxide are yielded by one volume of the "Spirit of Nitrous Ether?"

NOTE.—*Manipulation as well as results will be scrutinized.*

Proceedings of Societies in London.

NORTH KENSINGTON CHEMISTS' ASSOCIATION.

After several preliminary meetings at 48, High Street, Notting Hill, the first public meeting took place at the Leinster Hotel, Ossington Street, Bayswater, on Tuesday evening the 11th of March, at 9 p.m.

Mr. Long, Divisional Secretary of the Pharmaceutical Society for North Kensington, introduced the subject of The Promotion of Pharmaceutical Unity in the following address:—

Gentlemen: There is a very old proverb, "Union is strength. United we stand, divided we fall," which has been illustrated by the fable of the old man asking his sons to break a bundle of sticks, and after having cut the bundle, showing them how easily they could break each individual stick. The chemists have not been loyal and faithful to their own interests; there has been too much dissension, division and jealousy.

The Pharmaceutical Society was established by a number of eminent, generous, unselfish men, when a serious danger threatened the body, and what it has accomplished is wonderful. Look at its splendid home, the alma mater of pharmacy, with its past and present staff of Professors, its Museum, Laboratories, accumulated funds, the Benevolent Fund especially, of which the money, contributed chiefly by its own supporters, and generously thrown open to all in the trade, is a splendid memorial of what unity can do. Considering that this has been accomplished by about 25 per cent. of the body, what might have been our status if all chemists had come into the Society, can easily be imagined. What has been accomplished has been in the teeth of the most strenuous opposition, but for which at the time of passing the Pharmacy Act in 1868, we might have obtained everything that we wanted, and this again is another instance of the baneful effect of division in the ranks. Opportunities lost seldom recur. Alas! it is these very men who now ask, What has the Pharmaceutical Society done for the Trade? I answer that it is the only bond of union we have, that it has done us very much good. At its beginning it established a school in which some of our best men have acquired their knowledge from its lectures and laboratories, and this at a time when it would not have paid anyone to start rival institutions, and but for its inception the Society could not have continued to exist. Look at the struggles of the Irish Pharmaceutical Society. One of its principal difficulties is want of a school. And again, our Journal, although much abused, affords a means to give the benefit to all members and outsiders of a great deal of information, generously given by our most clever men, on matters which are of vital importance in conducting our business.

The Pharmaceutical Society was established for education, examination for qualification, benevolence, and protection of the interests of the body. In its early years it considered the best protection was the individual strength of its members in being qualified for their business; but I must admit, had the whole body rallied round it in times of danger, it would have been better to have been more self-assertive than so meek as we have been to allow our rights to be trampled on and taken away.

I hail with much pleasure the effort the Society is now making for enlargement by including Minor men as members. I am sorry more do not pass the Major, as it is none too high; it was the original master's degree, the Minor being the assistant's, and could be passed as soon as the necessary knowledge was acquired. It is a pity this was ever changed (and here again, thanks to the opposition), for we should not then have had the unqualified assistant difficulty.

As I have before said, there is much fault found with the Society, but the fault lies with the grumblers. The Society is its members, which choose their own executive, and if the Council does not do its duty, then the members can change fourteen of its members every year, and surely then the right track would be found. It is the interest and duty of every chemist to join the Society, and by his own individual action to give strength and dignity to it.

I have very humbly tried to unite the chemists in this borough. Twenty-one have joined our local association, as well as four from South Kensington, three from South and one from North Paddington, and, pending the like formation in their own boroughs, I shall be glad for any other chemists to join us. My desire is that all chemists should join their local centres throughout London (which is at present very loosely united) as well as through the country, to meet and discuss all subjects of interest to them, and to take such action as they may deem desirable, then the poor chemist would come out of his shell and the world at large would pay us more respect.

It is a pity this was not done long ago, but it is no use crying over spilt milk; let us make the best of what we have left.

I am convinced that the strength of the Society lies in the intellectual and general ability of its members.

The Bill which has been formulated by our Council, has been delayed by want of unanimity among chemists, and some of its members think that it has not been sufficiently discussed by the trade. I propose that we discuss it at our next meeting; but we must remember that there never was, or ever will be, anything that will please everybody, and we must surrender our foibles to the general good. Our vocation is a very intellectual and varied one, and has its lessons. The subjects we study, botany, by the order and regularity existing in plants, and in chemistry the exactness and obedience to general laws, ought to enable us to unite as a body more easily than combination is effected among mere tradesmen.

Years ago the hours of work were as long as at present, but everything was much simpler and easier that it is now; chemicals, drugs and galenicals were far fewer, to say nothing of sundries, and when anybody could, scarcely anybody did engage in pharmacy, save those regularly trained to it. But even then there was very little union amongst chemists. Some thirty years ago a better day was dawning, and for some time there was more fellowship and *esprit de corps* among us; but the invasion of our rights, instead of causing the ranks to close up firmer, has frightened many into injuring themselves, their neighbours and their cause.

In establishing this Society, personally I do not propose to interfere with individual action or dictate how its members are to conduct their business, but let us set up a high standard and each endeavour to attain it.

There is a general tendency at present to prolong the hours of business and reduce prices, but when you reflect on the smallness of some businesses, how hard a struggle it is to maintain existence, and the slavery it entails, this is certainly very suicidal. Many men are shut up from year's end to year's end: they cannot possibly afford to keep an assistant; some effort should therefore be made generally to shorten hours and at least to *maintain* prices.

We must not forget a chemist may shut up, but his business is never finished. He, unlike most other people, is frequently called up even from his bed. We must not burn our candle at both ends. I therefore invite your co-operation to promote pharmaceutical unity.

A vote of thanks was proposed by Mr. J. W. Smith, and seconded by Mr. A. G. Worsley.

The next and subsequent meetings will be held (at present) at the Leinster Hotel, Ossington Street, Bayswater, at 9 p.m., on the third Tuesday in each month.

Provincial Transactions.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The annual meeting of the above Association was held at the old Town Hall, Leicester, on Thursday evening, March 27. The President, Mr. J. G. F. Richardson, occupied the chair, and there was a very good attendance of Members and Associates.

The Secretary read the Annual Report, which was as follows:—"Your Committee in presenting the Annual Report are able again to congratulate the members on the continued success of the Association. During the summer months of last year a practical botany class was held at the Abbey Park Botanical Gardens, under the superintendence of Mr. S. F. Burford, F.C.S. Classes were also held during the winter months for practical chemistry, at the Wyggeston School Laboratory, and for materia medica and elementary chemistry at the Association Rooms. Our best thanks are due to the Rev. J. Went, M.A., and A. Poyser, Esq., M.A., for the use of the laboratory, and also to Messrs. Burford, James, Evans and Ward for the attention they have given in conducting the various classes. A ball was held at the Masonic Hall October last, when prizes were distributed to the successful students by the President, and also a handsome testimonial and an illuminated address were presented to Mr. J. J. Edwards, in recognition of his long and valuable services as Secretary. A trade meeting was held at the Town Hall Library, when a most interesting paper was read by Mr. W. Thirlby on the vexed question of the patent medicine stamp. The Committee have to thank Messrs. Squire and Martindale for a copy of the latest editions 'Squire's Companion to the Pharmacopœia,' and the 'Extra Pharmacopœia;' also the Pharmaceutical Society for the regular supply of the *Pharmaceutical Journal*, and the Pharmaceutical Conference for the 'Year-Book of Pharmacy.'"

The Treasurer's report was then read; this showed a substantial balance in hand.

Mr. Lewitt proposed, and Mr. Eldred seconded, a vote of thanks to the teachers, which was carried *nem. con.*

Mr. Edwards proposed a vote of thanks to the Council, congratulating them on the efficient manner in which they had discharged their duties during the year. Mr. Broof seconded and the resolution was carried.

The President in reply said how pleased he was to see such a large meeting of members and associates, which only proved that if such associations were conducted on proper lines, and thoroughly practical and reliable teachers found for the classes, the students would come in numbers sufficient to encourage them to go on with the work they had in hand. He strongly advised them to attend regularly, to master every detail of the subjects they were studying, not to depend on cram as a means of passing the examinations, as he not only believed the best men passed at the examinations, but that the examiners easily detected superficial knowledge in a student. He pointed out how much they would profit in after life by the knowledge gained now. He expressed regret at the departure from their midst of Mr. J. H. Shepherd, who for a short time acted as Secretary, but prophesied a brilliant future for him in the profession he had chosen. He assured all present that his heart was in the work, and that the Council were only too glad to receive and consider any suggestion for the good of the students. In referring to the Botanical Gardens, he pointed out how much they were indebted to Mr. J. Burn, head gardener, for the kindness he had shown to the students, and intimated that he hoped Mr. S. F. Burford, F.C.S., would conduct a practical botany class during the coming summer months.

Votes of thanks to the Mayor for the use of the rooms brought this very successful meeting to a close.

The election for Council for the ensuing year then took place, with the following result:—President, Mr. J. G. F. Richardson, F.C.S.; Vice-Presidents, Messrs. S. F. Burford, F.C.S., and W. Rowe; Treasurer, Mr. W. Thirlby; Hon. Sec., Mr. J. J. Edwards; Members of Council, Messrs. Butler, Woolley, Evans, Ward and Weall.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting of the 41st session was held at the Royal Institution on Thursday evening, March 27. The President, Mr. C. Symes, Ph.D., in the chair.

The minutes of the previous meeting were read and confirmed, and several donations announced, for which votes of thanks were accorded to the donors.

A discussion, initiated by Mr. J. R. Day, was held on the desirability of the earlier closing of shops, and it was resolved—

"That this meeting recommends that the Committee meet at the earliest possible opportunity to arrange to ascertain the wishes of the trade upon the point."

Mr. M. Conroy exhibited a sample of synthetic musk, and demonstrated how it compared with the real musk.

Mr. T. Williams read a paper on "The Testing of Urine: Introductory." A discussion ensued in which the President, Messrs. Abraham, Conroy and Parkinson took part, and a vote of thanks was unanimously accorded to Mr. Williams for his paper. Mr. Williams having replied—

The President, Mr. Symes, exhibited some specimens of caliche or crude nitrate of soda, a portion of a small consignment recently received from Chili. He gave some interesting details concerning the development and growth of the nitrate industry, commencing with the manufacture in small copper pans in the early part of the present century up to the time when the province of Tarapaca ceased to belong to Peru. On an assumption that the Chilian Government would deal unfairly with the owners of these properties there was a panic to get rid of them, and men of enterprise, such as Colonel North, Mr. Harvey and others, acquired valuable concessions at a small cost. He said in 1885 it was thought the output had so far exceeded the consumption that something must be done to check it, and the make was entirely suspended during December of that year; since then the output and the consumption had considerably increased, but to-day there was the same outcry as to over-production. In his opinion, notwithstanding the pessimist views of stock-jobbing speculators, the nitrate consumption for chemical, manure, and other purposes was still in its infancy, and new and increased uses would be found for the very valuable substance. There was a notion that the use of nitrate of soda impoverished the ground. This was quite a mistake; it enabled the agriculturist to get out of one acre of ground, in a given time, as much as he would get out of two without it, and in these days of competition it seemed to him this was just the thing that was wanted. The imports into the United Kingdom in 1889 amounted to 121,000 tons, and to the Continent direct about 673,000 tons; and as the Chilian Government received a duty of about 2*s.* 6*d.* per cwt., it would be seen that the revenue from it was considerable.

Dr. Symes presented a specimen of the crude nitrate to the Museum, and was awarded a vote of thanks.

The meeting then terminated.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The last general meeting of the session was held on Thursday, the 20th ult., when papers were read by Mr. Shaw on "The Estimation of Pilula Potassii Permanganatis;" by Mr. Mitchell on "Cannabis Indica;" and by Mr. J. R. Johnson on "Carum Ajowan." Owing to the lateness of the hour, when the last paper was reached Mr. Johnson was only able to give a brief outline of it. The President, Mr. H. Wyatt, Junr., was in the chair.

THE ESTIMATION OF PILULA POTASSII PERMANGANATIS.

BY A. SHAW.

There are some substances occasionally ordered to be made into pills requiring more than an ordinary amount of judgment in the selection of a suitable excipient. Amongst these may be mentioned the various salts of silver, as well as permanganate of potash, which are liable to undergo rapid decomposition in the presence of organic matter. It is in regard to the latter salt that I bring these few notes before you.

The subject is not a new one by any means; a good deal of discussion and correspondence has appeared in the columns of the Journal from time to time concerning the various excipients that have been suggested for the salt under consideration. At this stage I would just like to mention a few of the numerous substances which have been recommended for making potassium permanganate into pills. Fuller's earth and water, China clay, kaolin, vaseline, cacao butter, ung. resinæ, lanolin, and even sugar and syrup. I have tried most of these, with the exception of China clay, and the latter I have not tried, for obvious reasons. With regard to Fuller's earth and water, and kaolin and water, my experience is that neither give sufficient adhesiveness to make a good pill, besides staining the fingers to a much greater extent than a fatty basis. Cacao butter I do not consider a good pill excipient; directly the pills come to be handled it begins to melt. Yellow wax has also been recommended by some as a first-rate excipient, but its high melting point, 146° F., precludes its use; the temperature of the body being much below that, it is doubtful whether the pills would be properly disintegrated in passing through the system.

Some little time ago Mr. Grattan read a paper on dispensing before this Society, and recommended lanolin as an excipient at that time. I had never used it. I have since been making a few experiments with this substance to ascertain the amount of oxidation that takes place, and to compare it with other bases. I may say that as far as making what are generally considered to be the characteristics of a good pill it is all that can be desired. I have also noticed that it stains the fingers less than any other excipient I have used, but it has one drawback, that the pills are liable to undergo oxidation to a much greater extent than with ung. kaolin.

I have made analyses of potassium permanganate pills made with three different excipients, viz., ung. resinæ and kaolin, lanolin and kaolin, and ung. kaolin. The exact formula used is as follows:—

A.

Pot. permang.	24 grs.
Kaolin	6 „
Ung. resinæ	6 „

Ft. pil. 12.

C.

Pot. permang.	24 grs
Kaolin	4 „
Hard and soft paraffin	āā 4 „

Ft. pil. 12.

B.

Pot. permang.	24 grs.
Kaolin	6 „
Lanolin (anhydrous)	6 „

Ft. pil. 12.

It will be seen that the ung. kaolin is a modification of one suggested in the "Extra Pharmacopœia." I keep the hard and soft paraffins ready mixed, and add the kaolin at the time of making the pills, as I find the original ointment becomes somewhat granular on keeping, and does not seem to possess the same adhesive properties. I have adopted the B. P. method of estimating the pot. permang. in preference to oxalic acid, as it is more rapid and saves the trouble of standardizing.

The B.P. states that 44 grains of granulated sulphate of iron, acidulated with ʒij. of H_2SO_4 dil., is sufficient to decolorize 5 grains of pot. permang. I therefore dissolve 44 grains of sulphate of iron acidulated with ʒij. of H_2SO_4 dil., and made the solution up to 1000 grain measures with distilled water.

Two grains of pot. permang., if perfectly pure, would require 400 grain measures of this solution. In each case I took a 2 grain pill and broke it up in a glass mortar, and treated it with successive portions of distilled water, till no colour remained, the residue consisting of a sticky brown mass adhering to the mortar; the solution was filtered through gun cotton, and then estimated with the prepared solution. My first estimation was made three weeks after the pills were made, with the following remarks:—

A. 2 grs. required 300 grm. = 75 p.c. $KMnO_4$
B. 2 grs. „ 350 grm. = 87·5 „ „
C. 2 grs. „ 385 grm. = 96·25 „ „

Next analysis, six weeks after pills had been made.

A. . 2 grs. required 290 grm. = 72·5 per cent.
B. . 2 grs. „ 320 grm. = 80· per cent.
C. . 2 grs. „ 375 grm. = 93·75 per cent.

Next analysis, nine weeks after.

A. . 2 grs. required 235 grm. = 58·75 per cent.
B. . 2 grs. „ 240 grm. = 60· per cent.
C. . 2 grs. „ 355 grm. = 87·75 per cent.

From the above figures it will be seen that ung. kaolin is much the better excipient, $KMnO_4$ having undergone oxidation to the extent of about 11·75 per cent., whilst with the others almost 40 per cent. had become oxidized. It will be seen, however, that it is not advisable to keep a large stock of these pills in hand, as even with the best excipients deterioration cannot be avoided. I might say that the pills were varnished with a solution of spent tolu in chloroform.

The President suggested that French chalk might be used instead of kaolin, and did not think it advisable to varnish the pills.

Mr. Riddle said he had been working in the same direction as Mr. Shaw and arrived at almost the same results.

Mr. Mitchell then read his paper on "Cannabis Indica."

Mr. Mitchell said that although the hemp plant was indigenous to Persia and Northern India it was found all over the globe. The true Indian hemp differed little, botanically, from the American and English. It has been used as a narcotic from very early times, and is recommended for a variety of ailments, including hydrophobia, but has not met with great favour, owing to the difficulty experienced in obtaining it unadulterated. The diluted tincture has been recommended as a local anæsthetic in dentistry. The hemp answering the B.P. description is known in the Indian markets as ganja. Churrus and bang, or haschish, are other preparations of hemp. Mr. Mitchell traced in an interesting manner the history of a band of robbers known as Haschishin, or hemp-eaters, from which word our English word "assassin" is derived. He then compared the preparations of the American and British Pharmacopœias.

Mr. Edgerley Taylor remarked that in the course of a large dental practice he had found tinct. cannab. vastly superior to cocaine, being perfectly harmless to the patient.

Mr. Riddle drew attention to the varied colour of the extract. It was suggested that this might be due to the amount of stalk used in the manufacture.

Messrs. Wyatt, Johnson, Birchall, Walker and Shaw continued the discussion.

Mr. J. R. Johnson drew the attention of the members to a sample of *Carum Ajowan*, several bags of which had been landed in Liverpool, and described in the bill of lading as "angina seeds." The fruit was one of the official sources of thymol. He gave the results of an examination of the constituents of the seed and exhibited microscopical sections showing the position which the vittæ and embryo occupied.

This, the last meeting of the session, was largely attended and was one of the most successful held.

NEWCASTLE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The members and a few friends of the above Association held their first annual conversazione and dance in the hall of the Café, Mosley Street, on Wednesday evening, the 19th ult. The gathering was an unqualified success. Mr. John Pike, President, occupied the chair during the musical part of the programme, and in a few happy and well chosen remarks opened the proceedings. Reference was made to the loss the Association would soon sustain in the departure of Mr. D. H. Oxen, who leaves at the end of this month to fill an appointment in Newcastle, Staff.

The toast of the Association was given by the President, who coupled the name of the indefatigable Secretary (Mr. G. F. Merson). This was seconded by Mr. T. M. Clague, and Mr. Merson suitably responded.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The eighth meeting of the twelfth session was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, March 26, at 9.15 p.m., Mr. Donald McEwan, Vice-President, in the chair.

The meeting was an open one, and there was a large attendance.

The minutes of last meeting having been read and approved, the evening was devoted to the reading and discussion of the following communications, arranged by Mr. George Lunan, ex-President.

REPORT ON ACID. HYDROCYAN. DIL., B.P.

BY ALEXANDER LEYS.

The fact that commercial hydrocyanic acid was known to vary greatly in strength suggested to me the desirability of making the following estimations. In all nine samples of acid. hydrocyan. dil., B.P., were obtained from several dispensing establishments in Edinburgh and elsewhere.

The process employed for estimation was the official volumetric method; the strength of the argentic nitrate solution being one-third of the pharmacopœial standard. Four estimations of each sample were made; the first roughly, the remaining three with greater care. The following figures represent the mean of the last two estimations:—

1	1·92 per cent. HCN.
2	1·87 „
3	1·78 „
4	1·71 „
5	1·63 „
6	1·41 „
7	1·33 „
8	1·27 „
9	0·94 „

This gives a maximum of 1·92 per cent., and a minimum of 0·94 per cent., showing a difference of almost 1 per cent. Such a variation suggested that to make the report more complete, inquiries should be made regarding each sample. This was done, and it was found that some chemists make the official acid by diluting Scheele's; others buy the official acid in about 4-ounce bottles, and dispense it from the same;

some procure a 4-ounce bottle, but dispense the acid from a 1-ounce one; while others buy it in 1-ounce stoppered bottles, and dispense it from these. Sample No. 1, containing 1·92 per cent. of HCN, was estimated on the day it was received from a wholesale firm in London. In all the other samples it was found that the percentage of HCN varied according to the method of storing and dispensing it. Two samples had been made by diluting Scheele's acid, and these gave a small percentage. Two which had been a long time in stock also gave a comparatively low percentage. The others were stored with greater care, and consequently gave a higher percentage.

Sample No. 9 is worthy of special note. It had been made from Scheele's acid stored in a large bottle. Unfortunately I did not find out how long the Scheele's acid had been in stock. Thus it is seen that the reduction in strength takes place principally in the hands of the retail chemist, a result due no doubt to the great volatility of the acid. Various methods have been suggested for its preservation. In the U. S. Pharmacopœia we find an alcoholic solution of the acid, while in the German Pharmacopœia we find a weak solution containing only 0·1 per cent. HCN, a solution of this strength being thought to keep better. In this country, however, chemists have to do what they can to preserve an acid which it seems difficult or impossible to keep up to the official standard of 2 per cent. HCN. The result of this paper is to indicate that it is inadvisable for retail chemists to buy acid. hydrocyan. dil. in large quantities at a time or to keep it long in stock; that it is a mistake to dispense it from a large bottle, and, above all, that it should not be made by diluting Scheele's acid. The best plan is to buy it in ounce stoppered bottles and dispense it from these, keeping the bottle inverted in a tin case so as to exclude light.

At the British Pharmaceutical Conference last year Mr. Wright gave the analysis of 12 samples of commercial Scheele's acid, showing a variation of from 3·6 to 5·7 per cent. HCN. At his suggestion the Unofficial Formulary Committee has since published a formula for Scheele's acid standardized to contain 4 per cent. HCN. I had intended estimating some samples of Scheele's acid but only found time to examine two. These indicated 3·87 and 3·42 per cent. respectively, and were therefore both slightly under the B.P.C. standard.

In the discussion on this paper it was mentioned that a sample of acid. hydrocyan. dil. contained in an ordinary round shop bottle half full, was estimated, and indicated 1·8 per cent. The bottle was allowed to stand unstoppered for five hours and on again estimating the acid it indicated only 1·26 per cent. The sample had therefore lost HCN by evaporation at the rate of about 0·1 per cent. per hour.

NOTES ON SOME NEW REMEDIES.

BY GEORGE LUNAN.

Orexine.—The commercial article known under this name is really the hydrochlorate of a new synthetically produced, non-oxygenated basic substance possessing powerful tonic, stomachic and appetizing properties. It has the formula $C_{14}H_{12}N_2,HCl,2H_2O$. The chemistry of this new remedy will be found in the *Pharm. Journ.*, [3], vol. xx., page 709.

The hydrochlorate is a yellowish-tinted semicrystalline powder, and produces sneezing as urgently as salicylic acid during manipulation. It has a pungent and anæsthetic after-taste, not so persistent, however, as to preclude its combination with aromatics to form a very palatable elixir.

It is soluble in 20 to 25 parts of water at 60° F., and gives a white pulverulent precipitate with ammonia insoluble in excess, but freely soluble in ether and chloroform. The salt is insoluble in ether, but with ammonia the base separates, not as an oily, afterwards crystallizable alkaloid, as has been said, but in the manner stated above.

The dose is 2 to 10 grains in capsules, pills or cachets followed by a quantity of liquid to neutralize its pungency.

Exalgine.—There has been an increased demand for this new remedy in Edinburgh. One or two cases of severe cyanosis followed by collapse had almost forced it into oblivion when Professor T. R. Fraser published some results obtained by using small doses. Since then it has been in great demand, in powders containing 2 to 8 grains and also in mixtures, such as,

℞ Exalgine	grs. 24.
Sp. vini rect.	ʒiij.
Aquæ	ad ℥iij.
	Solve.

Also in capsules or pills containing—

℞ Exalgine	grs. ij.
Ext. belladon.	gr. $\frac{1}{6}$.

Should it be generally prescribed, I predict a number of dispensing difficulties, for its solubility is just sufficiently equivocal to tempt prescribers to order it dissolved and added, as it is sure to be later on, to incompatibles.

Among other new remedies shown and described were somnal, phenylurethan, ural, tetronal, hypnone, amylene hydrate, chloralamide and metaldehyde.

Mr. Lunan also exhibited a series of combinations of chloral sixty parts and sulphonal forty parts, chloral fifty parts and tetronal fifty parts, antifebrin fifty parts and chloral fifty parts, and exalgine fifty parts and chloral fifty parts. These were in the form of thick viscid liquids resembling chloral camphor. He hoped to study some of these, and report to a future meeting.

Mr. Hill exhibited and described a machine for pearl-coating pills. The essential part of the apparatus was a copper pan, rotating with a slightly eccentric motion at the end of an axis placed at an angle of about 45°. The pan was driven by an ingenious mechanism either by hand or by an electric motor. The machine had been designed and constructed in brass and steel by Mr. C. M. Dalziel, a chemist's assistant, who had devoted about three months of his spare time to the work. The whole apparatus was highly finished and reflected great credit on the mechanical skill and patient perseverance of Mr. Dalziel, whose first attempt it was at metal machine construction. The apparatus had been in use for a considerable time, and had given every satisfaction. The pills to be coated were first varnished with alcoholic solution of sandarac, not quite so strong as Martindale's varnish. They were then wetted with a mucilage consisting of tragacanth ʒss., syrup ʒi., and water to 1½ ozs. ½ a drachm of this mucilage was sufficient to wet one gross of pills. The coating consisted of powdered French chalk. Two coatings were sufficient, and two gross of pills could be finished in twenty minutes.

Mr. Hill also exhibited a chemical harmonica, producing musical notes by means of a jet of hydrogen and glass tubes of various diameters. He also performed an experiment to illustrate the principle of a vacuum evaporating pan.

The discussion which followed was taken part in by Messrs. Boa, Dougall, Findlay, Hill, Leys, Lunan, McEwan and Rawlinson, and on the motion of the Chairman a cordial vote of thanks was awarded to the authors of contributions.

A communication by Mr. Duncan was, owing to the lateness of the hour, postponed till next meeting, which is to take place on April 9.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The last ordinary meeting, the 22nd of the session, was held as usual on Thursday evening, March 20. Mr. John Forsyth, President, in the chair.

After the usual preliminary business an excellent paper was read on "Pharmacy," by Mr. William G. Lamont. This subject was treated in a style which proved highly interesting and instructive to the members. After an excellent historical sketch of pharmacy in its earlier days as compared with those of the present, the author made a brief reference to the experimental or more purely chemical department of his subject. This he thought too technical for any extended treatment on that occasion, but went on to consider the commercial aspect. In the course of a comprehensive sketch of galenical or preparatory pharmacy many valuable suggestions of a practical and technical character were thrown out. The necessity for standardization and the likelihood of its general adoption in the near future was touched upon among other important points. The paper concluded with an excellent *résumé* of the subject of dispensing, which the author characterized as the consummation of galenical and scientific pharmacy. He strongly warned against all malpractices, and urged that good manners were quite as essential behind a chemist's counter as in the drawing room.

An interesting discussion followed, in which many of the members present expressed their appreciation of Mr. Lamont's valuable address. General regret was expressed that he was about to leave Dundee for an important appointment in Brechin, the members wishing him every success in his new sphere.

Mr. W. Mair had pleasure in proposing and Mr. T. C. Henderson, Hon. Sec., in seconding that Mr. Lamont and Mr. Skinner, Vice-President, should be elected to the roll of honorary membership. This was unanimously passed and the meeting was brought to a close.

The first annual general meeting of the Association was held on Thursday evening, March 27, at 9.15. The President, Mr. John Forsyth, occupied the chair. There was a full attendance of members.

The Secretary submitted his report, and gave a short sketch of the Association's history and the work of the past session. The report showed that there were fifty ordinary members and twenty-six honorary members names on the roll.

The Treasurer then read the financial statement, which showed that there stood at the credit of the Association over £27, out of which, however, the rent of the premises would still have to be paid.

Both reports were considered extremely favourable, and were unanimously adopted.

The next business was the election of office-bearers for the coming year, and these are as follows:—Honorary President, Ex-Bailie Doig; Honorary Vice-Presidents, Jno. W. Russell, D. H. Ferrier and J. H. Thomson; President, Mr. William Edwards; Vice-President, Geo. Little; Secretary, R. M. Lindsay; Assistant-Secretary, Fred David; Treasurer, Mr. Alexander A. Adam; Members of Committee, Messrs. John Forsyth, Wm. Mair, Jas. A. Kinnear, and C. T. Duncan.

Mr. Donald Skinner then presented the prizes to the successful competitors in the recent essay competitions. During the evening Mr. W. G. Lamont, who is leaving for Brechin, was presented by the assistants and apprentices with a Gladstone bag and dressing case as a token of the high esteem in which he was held.

Votes of thanks were proposed to the retiring office-bearers for their services during the past year. These gentlemen having suitably replied a vote of thanks to the Chairman concluded the proceedings.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

This Association held its annual business meeting on the evening of Wednesday, the 26th ultimo. The President presided, and moved the adoption of the following report, which was seconded by Mr. Gilmour and unanimously approved.

"In presenting their Annual Report your office-bearers have pleasure in congratulating the Association on the termination of a successful session.

"The syllabus, containing subjects of interest to the scientist as well as the practical pharmacist, has been carried out in its entirety, and, together with the discussions following the various communications, has proved both interesting and instructive.

"The session was opened and closed by addresses of exceptional interest by the Honorary Vice-Presidents, Messrs. Alexander Kinninmont and John McMillan, whose experience and business capacity entitled them to the attention with which the addresses were heard.

"With a membership such as we have a higher average attendance might have been looked for, but if not large it has been encouragingly regular, and may be expected to increase both in size and regularity as the importance of the Association in its various capacities is recognized, and as the members determine to take a more active interest in its affairs.

"The intromissions by the Treasurer show a balance in favour of the Association of £1 8*s.* 5*d.*, and notwithstanding this satisfactory result the Association may congratulate itself that efficiency has not been sacrificed to economy.

"The readiness with which the Chemists and Druggists' Association, at present in (it is to be hoped only temporary) abeyance, granted the use of their library, instrument, cabinets, etc., calls for grateful recognition, and the hope may be expressed that they will be found increasingly useful to members. Not only by means of the social gatherings, with which the Association has been more or less intimately connected, but by being brought into contact with each other at the ordinary meetings, your office-bearers feel confident good fellowship among the members has been fostered and friendships formed which future sessions will only increase and cement.

"Notwithstanding the success which has attended the Association during the past session your office-bearers would earnestly impress on you the necessity of making this only a starting point whence to attain greater success.

"They would suggest that during the interval on which we are entering, members should select some subject of daily practical interest, work it up and be ready when called on by the Secretary to contribute a carefully prepared paper or short note, either on a studied subject or some difficulty encountered and overcome, or in any other way endeavour to make the Association increasingly useful and practical."

The following gentlemen were then elected office-bearers for the ensuing year:—Hon. President, Mr. Kinninmont; Hon. Vice-Presidents, Messrs. McMillan and McAdam; President, Mr. Robb; Vice-Presidents, Messrs. Gilmour and Laing; Secretary, Mr. Harley, Assistant Secretary, Mr. Martin; Librarian, Mr. Robertson; Treasurer, Mr. McDonald; Council: Messrs. Geo. McDonald, Abbot, Cartwright, Robinson, Currie, Ireland and Watson.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held on Friday evening, March 21, the president in the chair.

After the minutes of the previous meeting being read and approved of Mr. Clark was called on to read the papers he had received as contributions to the magazine.

The first paper was upon "Physical Training," with special reference to druggists. The writer recommended walking as the most beneficial form of exercise, and as being within easiest reach of the hard worked chemist. Gymnastic exercises were also highly recommended.

The next paper was on "Bandages and Bandaging." The writer showed that he had a thorough knowledge of this department of surgery. The more important bandages were described and a series of carefully drawn diagrams clearly demonstrated the methods of applying the "double spiral," "figure of eight," "double-headed spiral with reverses," "roller with reverses," etc.

The last paper read was entitled "The Spectroscope." This was an eminently practical paper, and the subject was skilfully handled, and well illustrated by diagrams. It was considered to be by far the best magazine paper read this session.

This being the last magazine night of the session, Mr. Clark was heartily thanked for his services as Editor.

On Friday, March 28, a very successful smoking concert was held in connection with the Association in Hay's Athenæum.

Review.

A Pocket-Book for Pharmacists, Medical Practitioners, Students, etc. By Thomas Bayley.*

In external appearance this closely resembles the same author's well-known and extremely useful "Chemists' Pocket-Book," and like that work it contains a large quantity of collected information, classified, and packed into the smallest possible amount of space by the aid of the free use of abbreviations. The first 140 pages consist of a condensed materia medica treatise, alphabetically arranged and divided into official and unofficial, definite and indefinite substances. Brief descriptions of the drug are given, with the dose, source, composition, therapeutic action, and its presence or absence in the Pharmacopœias of the United States, France and Germany; a large number of substances unofficial in either of the Pharmacopœias, including the many drugs of recent synthetic origin, are included in this list. After a few notes on the composition of ordinary food materials, cereals, spices, etc., another hundred pages are occupied by a tabulated arrangement or digest of the galenical preparations of the British and of the United States Pharmacopœias. The contents of the two Pharmacopœias are given separately, and the letters B.P. or U.S.P. are prefixed to each batch of preparations; but in spite of this there seems room for an occasional mistake or confusion between two formulæ, which perhaps could only be entirely obviated by using paper of a different colour for the section relating to the United States Pharmacopœia. There is a useful table of the volatile oils, giving the composition, specific gravity and action on polarized light of each; a list of the American eclectic remedies and their doses is also given in this part of the volume. This is followed by a list of official drugs systematically arranged in their natural orders, which will scarcely be so useful to the pharmacist as to the student, and a very good glossary of the terms employed in systematic botany. Other glossaries are also given of medical terms, of the chief Latin words used in pharmacy, and of technical Latin words and phrases occurring in prescriptions; in fact, this section of the book constitutes a small pharmaceutical dictionary. The table of symptoms and treatment in cases of poisoning, which follows, may be very useful in cases of emergency.

Among the other contents of this collection are tables of boiling points, specific gravities, solubility in water, alcohol, ether and other solvents, of medicinal and chemical substances, directions for qualitative analysis of salts, alkaloids, etc., tables of the percentages of ash in drugs, memoranda for volumetric analysis, properties and reactions of alkaloids, and various tables for conversion of British to metric weights and *vice versâ*, or of the different thermometric degrees into each other, etc. There is also a short list of "useful recipes" containing formulæ for rather more than a hundred preparations often put up by pharmacists, who will find the book a very useful one.

Obituary.

AQUILLA SMITH, M.D.

We have to record the death in Dublin, on the 18th ult., of Dr. Aquilla Smith, in his 84th year. Dr. Smith was formerly Professor of Materia Medica in the School of the University of Dublin; for many years he also represented the Kings and Queens College of Physicians on the General Medical Council and served as a member of the Pharmacopœia Committee. He took great interest in the formation of the Pharmaceutical Society of Ireland, and was named in the Act of Parliament constituting the Society as member of the first Council and Vice-President.

Notice has also been received of the death of the following:—

On the 19th of March, Mr. Richard James Chapman, Chemist and Druggist, High Street, Smethwick, Birmingham. Aged 76 years.

On the 20th of March, Mr. Robert Edwin Whiteside, Chemist and Druggist, Finsbury Grove, Beverley Road, Hull. Aged 47 years.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

University Degrees for Pharmacists.

Sir,—With your permission I will treat the points in Mr. Johnston's letter seriatim:—Firstly, then, had Mr. Johnston carefully read my opening paper upon the subject in question, he could not but have inferred that I am a staunch supporter of the Society; it would not then have been necessary to have gleaned such information from my last letter. With regard to my error in doctrine or "heresy," as Mr. Johnston is pleased to term it, I take this to be merely a matter of opinion, and therefore Mr. Johnston is equally liable to error as myself.

Should a university degree be instituted for pharmacists I would certainly make the examinations most severe, because upon this alone would depend the value of the degree. The Society's present examinations are sufficient for all ordinary business purposes; the university degree should be, therefore, for those who desire to obtain a higher state of efficiency, who have the brains, and do not mind paying for it. Mr. Johnston's reference to the Edinburgh M.D., C.M., etc., is not relative to any of my points, I therefore pass on to his final paragraph, *re* a sanitary degree. Upon this point I am afraid I must again refer him to my previous communication, published in the *Pharmaceutical Journal*, wherein I have mentioned the sanitary science certificates open to pharmacists, including the one he mentions, *i.e.*, the South Kensington. I may tell Mr. Johnston this is a fairly severe examination in the advanced and honours stages; but I would also point out there is such a thing as "prestige," and people do not look upon a certificate from South Kensington as being equal to a University diploma, although the "honours" papers of South Kensington compare favourably in most subjects with University papers in the respective branches of the Sciences.

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* London: E. and F. N. Spon. Royal 32mo. Pp. 528. 6s.

Mr. Johnston says, "When local boards or vestries want special chemical advice they go to the public analyst for it." This is unfortunately true, and arises merely because the pharmacist at present holds no special qualifications in sanitary science. The pharmacist is materially affected by the "Sale of Food and Drugs Act," and yet the average public analyst is sadly deficient in the knowledge of drugs. As a case in point, look at the Durham public analyst, *re* tincture of rhubarb, and the substantial sitting on which Mr. C. Umney gave that gentlemen for reporting upon a preparation which practically he knew nothing of. Now I take it, Sir, that if a pharmacist (not actually in business, for the Act will not permit appointment, if such is the case) held a degree in sanitary science, and consequently possessed a thorough knowledge of the "Public Health Acts," he would be the person appointed to give an opinion upon such cases as the one mentioned, and not the public analyst; in fact, there should be especially appointed persons to examine drugs and galenical preparations. I think everybody will agree with me that the pharmacist would be the person best calculated to fill such office.

Finally, I think if the Pharmaceutical Society were to initiate voluntary examinations in sanitary science for chemists only, it might increase its funds very materially, for no doubt plenty of candidates would be forthcoming, and in a few years a charter might be obtained rendering the sanitary examinations compulsory to chemists.

86, *Newington Causeway, S.E.* FREDERICK DAVIS.

THE LABELLING OF PROPRIETARY PREPARATIONS CONTAINING POISON.

Sir,—I cannot help expressing my sympathy with Mr. Matthias in this recent prosecution. If the Pharmacy Act is intended to apply to stamped proprietary medicines containing poisons, then it is equally clear they cannot be sold by unqualified persons. The fact of Mr. Matthias's cough mixture being labelled "To be kept out of the reach of children," was, I think, more appropriate than the word Poison. It is just as reasonable for the law to compel wine merchants to fix the word Poison on their bottles of spirits for fear their customers should drink the contents of the bottle at one draught. I hope the prosecution will have the effect of getting the Act made more definite.

389, *High Street, Cheltenham.* JAMES STEWART.

CHEAP JACK.

Sir,—You are rendering good service to the retail trade by directing attention to the doings of Cheap Jack.

The other day I captured a bottle that looked like a 1-ounce; its contents were, however, barely 6 drachms—weight of bottle 3½ ounces. The customer was surprised to find she had been paying at the rate of 6*d.* per ounce for a very inferior article called Friar's Balsam.

Herewith I enclose a sample of "Compound Rhubarb Pills," professedly B.P. I should feel obliged by your saying if anyone is justified in retailing such under the pretension that the article is genuine, and whether proceedings could be taken on public grounds to prevent the sale of such compounds. AN INQUIRER.

STATE OF TEETH IN PREHISTORIC SKELETONS.

Sir,—I can corroborate Mr. Ward's letter, published in the Journal for March 22. Some months ago, I was asked to examine a quantity of black earth which had been dug out of a long barrow in Wiltshire, known as Bowl's barrow. It had been opened several times previously, the last occasion being in 1886, when Mr. W. Cunnington, of Devizes, a well known antiquary, cut a trench and brought away a large number of bones and several skulls. The teeth to the number of at least 200 were submitted to Mr. Storer Bennett; most of them were worn down, some sloping at an angle of 45°; even the upper bicuspid tooth of a child of about 12 years of age, though not fully developed, bore marks of wear on the masticating surface; yet not more than two instances of caries was found, Mr. Bennett noting but one.

Tartar in considerable quantity had been deposited on many of the teeth, and an attempt was made by decalcifying with acid under the microscope to ascertain if the food had been animal or vegetab'e, but without success, a solitary spiral fibre being noticed.

Experts disagree as to the cause of the attrition constantly met with in these ancient teeth, but I think I am correct in saying they agree in stating instances of caries are few and far between.

The whole subject is well worth a thorough investigation. A comparative study of the teeth of old and aboriginal races would almost certainly yield valuable results. It is strange, two such observant men as Darwin and Wallace failed to notice so important a matter.

Mr. Cunnington informed me many of these barrows seem to have been opened in amateur fashion long ago, and suggested they may have yielded the "Ossa humana" which were highly prized 200 years ago for their healing virtues and which furnished the pharmacists of those days with preparations known as magisterium cranii humani, tinct. cranii quercetani, aqua and oleum cranii humani, sal and essentia cranii humani.

116, *Denmark Hill.* T. H. POWELL.

A DISPENSING QUERY

Sir,—I note an interesting paper in a recent issue, by Claude F. Henry, read at the meeting of the Edinburgh Chemists' Assistants' Association and entitled "A Dispensing Query."

I have investigated this little matter since reading it, and subjoin a few experiments to prove the cause of coloration when the powders are mixed in water.

1. Potassium iodide (free from iodate) was mixed with saccharin and stirred into a little water, but no coloration took place.

2. Iodine was added to liquor potassæ until faintly yellow, the solution evaporated to dryness and the remaining salt dissolved in water, and kept for examination.

3. A small quantity of this solution was mixed with a little saccharin, when an intense yellow colour was obtained which turned starch blue.

When iodine is added to liquor potassæ, iodide and iodate is formed, and saccharin being a weak acid is capable of freeing the iodine from the potassium iodate.

Inference:—That the sample of iodide of potassium used in making the powders contained iodate, consequently the child was taking free iodine.

This may be remedied by adding a quarter to half a grain of potassium bicarbonate to each powder, but if the iodide is pure this is unnecessary.

Birkenhead. A. F. BROOKES.

ACTION OF HYDROCYANIC ACID ON CALOMEL.

Sir,—The writer of "The Month" mentions a paper by M. Fouquet (*Journ. Pharm. Chim.*, Nov. 1, p. 400) on the "Action of Hydrocyanic Acid upon Calomel." If you will refer to the *Pharmaceutical Journal* of April 8, 1876, page 801, you will find M. Fouquet's paper merely corroborates the results we arrived at fourteen years ago.

116, *Denmark Hill.* T. H. POWELL.

A. Wolstenholme.—Gray's 'Supplement to the Pharmacopœia' and Martindale's 'Extra Pharmacopœia.'

The Sal Volatile Cases.—We have received a letter from the wholesale house that supplied Mr. Hewitt with sal volatile, requesting us to state that six months had elapsed since the preparation left their premises. Now that the case has been decided, we do not think it desirable to open a discussion as to who was responsible for the deficiency of the article sold.

R. S. Farrer.—We do not think any advantage would result from the publication of your letter, for the reason stated in our answer last week.

G. Dimond.—We think your letter is more suited for publication in a medical Journal.

Erratum.—On p. 784, col. i., in the paragraph on Sorbite, for "If heated with concentrated HCl," *read* "If heated with concentrated HI."

COMMUNICATIONS, LETTERS, etc., have been received from Messsrs. Millard, Pascall, Kay, Pickering, Pank, Williams.

EXAMINATION OF THE "CREAM OF TARTAR FRUIT" FROM PRETORIA.

BY E. J. MILLARD,

Pharmaceutical Chemist.

Towards the end of last year I received from Mr. T. B. Groves two specimens of the so-called cream of tartar fruit, in order that the acid or acids it contained might be separated and identified. Some short time ago Messrs. Heckel and Schlagdenhauffen had published* (*Pharm. Journ.*, [3], xix., p. 246) the results of their chemical and therapeutical researches upon the baobab, *Adansonia digitata*, the fruit of which they found to contain tartaric acid and cream of tartar. The "cream of tartar tree" is stated in text-books† to be *Adansonia Gregorii*, a native of North Australia, and there was no evidence that this species was indigenous to or had been introduced into South Africa. It became therefore of interest to ascertain whether the Transvaal fruit, in spite of the name under which it had been received, was not after all identical with that examined by Messrs. Heckel and Schlagdenhauffen, especially as the baobab is known to be widely spread throughout Africa.

The fruits were about the size of small cocoa-nuts, with smooth and exceedingly hard and moderately thick pericarps.

They weighed 222·4 and 176 grams respectively. On sawing open the fruits the seeds were discovered imbedded in dry pulp, arranged in nine loculi.

The pulp weighed 66·7 grams in the one and 57·3 in the other. It was of a pale brown colour, with a slight acid and sweetish mucilaginous taste and a fruity odour.

Under the microscope was seen a small amount of crystalline substance, but no starch cells.

The numerous seeds were reniform, the testa being hard and dark coloured. The average weight of each seed was 0·487 gram.

An analysis of the pulp yielded the following data:—

Moisture		Per cent.	12·26
Ash	Soluble in water 4·1 Insoluble . . 1·27	"	5·37
Petroleum ether extract		"	0·24
Alcoholic extract		"	4·75
Aqueous extract		"	54·33
Alkaline extract		"	5·07
Insoluble residue		"	16·23

The alcoholic and aqueous extracts were next carefully examined and their constituents separated, in order to identify any organic acids or their salts that might be present.

The principal constituent of the alcoholic extract was an uncrystallizable sugar, reducing Fehling's and also Nylander's solutions; it was estimated by titrating with Fehling's solution. There was no indication of the presence of tannin, but a small quantity of phlobaphene, which was extracted with diluted ammonia, dried and weighed. The extract also gave a faintly acid reaction, which was found to be due to traces of tartaric acid. Other acids were entirely absent.

The aqueous extract consisted chiefly of gum and plant mucilage which were precipitated in a dense mass on the addition of three volumes of absolute alcohol. The precipitate, when collected and dried, was found to be distinctly acid, whilst it yielded 8·6 per cent. of ash, principally carbonate of potassium. It was therefore highly probable that an acid salt of potassium was present.

Several methods were tried in order to completely separate this acid salt from the mucilaginous matter, the following being adopted finally as most satisfactory:—

The alcohol employed to precipitate the mucilage was acidified with acetic acid, and the mucilage washed with 66 per cent. spirit until free from acid reaction. A little water was added to the filtrate and the alcohol distilled off, solution of neutral lead acetate added to the acid liquid until it ceased to precipitate, and the moist precipitate suspended in water and decomposed with sulphuretted hydrogen. On concentrating the filtrate it was found to contain traces of mucilage, and the whole operation was repeated. A portion of the solution thus obtained yielded on the addition of lead acetate a crystalline precipitate, which, on heating with water, was found to be fusible and partly soluble, and which crystallized out on cooling.

Malic acid thus identified was further recognized and estimated by treating the lead precipitate with ammonia and dissolving out the malate of ammonia with absolute alcohol. Reprecipitated with lead acetate, and the precipitate washed with alcohol, dried and weighed, gave a result which when calculated to acid malate of potassium was equivalent to 9·43 per cent. Direct titration of the aqueous extractive with standard alkaline solution gave 9·98 per cent. Other organic acids and their salts were proved to be absent.

The gum reduced Fehling's solution, after boiling some time with dilute hydrochloric acid, and yielded mucic acid upon oxidation with nitric acid. It was precipitated by ferric chloride, lead acetate (neutral and basic), and by silicate of sodium, the latter precipitate being soluble in excess of water. It was not precipitated by borax. Glucose was also present in the aqueous extract, and was estimated in the usual manner.

The insoluble residue, after treatment with petroleum ether, alcohol and water, was exhausted with a 1 per cent. solution of sodium hydrate, which dissolved out some red colouring matter and metarabin, but no albumenoids.

The residue contained no oxalates, starch or pararabin, and consisted simply of cellulose and fibre.

The following were the proximate constituents of the pulp, as far as were ascertained:—

Petroleum ether extract	per cent.	0·24
Phlobaphene	"	1·02
Glucose	"	7·85
Gum and plant mucilage	"	41·20
Tartaric acid	"	0·08
Acid malate of potassium	"	9·98
Metarabin and colouring matters	"	5·07
Cellulose and fibre	"	16·23
Moisture, salts, etc.	"	18·33
		100·00

These results show that the fruit differs very materially in its composition from that of the baobab, for it contains no cream of tartar whatever. They approximate, however, to the qualitative examination of a "cream of tartar fruit" by F. L. Slocum,* received from the American Consul of the Orange Free States. This fruit was considered by Professor Maisch to belong to *Adansonia Gregorii*, but I have reason to believe that this opinion was formed without the opportunity of comparing it with an authentic specimen of the latter.

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* *Nouv. Rem.*, xxi., p. 487.

† 'Treasury of Botany,' i., 17.

* *American Journal of Pharmacy*, 1880, p. 129.

At the suggestion of Mr. E. M. Holmes, Curator of the Museum of the Pharmaceutical Society, I communicated with M. Heckel, who informed me that his specimens of the baobab came from Senegal and the island of Réunion. He was also unable to supply me with any of the pulp and seeds upon which he had worked, the former having been all utilized and the latter planted in the botanical gardens.

I am also much indebted to Mr. Helmes for a careful examination of the specimens upon which this report is based. After comparing them with fruits and seeds in our national collections, he is of opinion that they belong to *Adansonia madagascariensis*, Baillon; but in the absence of both flowers and leaves it is impossible to state the source with scientific accuracy.

THE SUCCESSFUL DRUGGIST.*

BY PROF. D. M. R. CULBRETH, M.D.

The popular acceptation of this caption has reference mainly to the amount of worldly possessions an individual can accumulate by following purely and simply the retail drug business. We therefore evidently find it to be the exception and not the rule when a druggist calls himself successful. Indeed, while a few amass a handsome competency, the many obtain from its pursuit only a sufficiency for absolute necessities.

It is true that the subject should be considered in a broader sense than in this prescribed one of sum total wealth. To illustrate from the other professions; a lawyer is successful, in the eyes of the populace, when he wins many and important cases; a physician when, as with magic power, he benefits confirmed incurables or resolves obstinate diseases; a surgeon when from his knife few deaths occur; a dentist, whose vocation is part professional and mechanical, and for that all the more comparable with ours, has a ranking dependent upon the minimum pain produced as well as upon the acceptability and durability of his work. It is different in pharmacy. We are confronted with disadvantages:

1. *Professional.*—In the healing art, honours should be easy between the druggist and the doctor, yet it is a plain fact that all good results that could possibly accrue to the former professionally, are intentionally absorbed by the latter as a natural component of his own skill. Since the last dose of medicine months may have elapsed and all that while perfect immunity from any ills may have been vouchsafed, yet that original dose nor the compounder gets any credit for having placed the system in such a condition as to remain normal for an indefinite period. All honour to the physician. It is he, like the surgeon, who says: "Instruments and appliances are nothing; it is my knowledge in handling them."

2. *Mercantile.*—It is equally an undisputed fact that we also suffer from a false consideration by the multitude of our products. We are engaged in manipulating for the most part positive rather than negative elements; that is, drugs are substances which act perceptibly for better or for worse, hence have to be handled by the laity with reason and not rashness. Most other vending pursuits cater to fancy or appetite, regardless frequently to limitation, thereby becoming luxurious in character. Ours are always used under the same one agency—that of necessity. Thus, a confectioner may have chanced luck by making a magnificent line of candies—no druggist can ever have a reputation for preparing delicious medicines. In these frequently smell nor taste can detect much for commendation; and as far as expectancy, they are often very disappointing. Here we notice a difference in cause and effect. It must therefore be admitted that judgment is passed, whether correct or not, upon all commodities according to direct (primary) and indirect (secondary) properties. Thus, in fabrics, durability first; harmonious colouring second. In food and sweets, pleasure of taste; nourishment of the system. In drugs, curative effect; attractive and palatable form of administration. Being then known specially as dispensers of distasteful and nauseous materials, for the taking of which the majority has such an aversion and in which some experience such trite benefits, and these in regular turn falling into the hands of the sick, with morbid appreciation and sensibilities, it becomes very apparent that the public alone having the prerogative of placing an estimation upon each one of its individual constituents does so in our case without cognizance of professional attainments, as also of the intrinsic value of our wares. It is therefore from these conditions a natural sequence that the mercantile phase of our calling is the one recognized decidedly the most prominent; as that fails so is one a failure. The entire question simply reduces itself to this: If a pharmacist can vend sufficient for the profits to yield him a reputable living, and also allow the laying aside of means besides, he only then is said to be prosperous.

There is little doubt of the good faith or intentions on the part of all who first enter our mystic circle that they will endeavour to succeed. They may be stimulated strongly by fostering hopes of excelling some one of their fancies—at least may have laudable convictions in the possibilities of making more out of it than a mere living. It is quite true they are upheld in this belief by the accepted lay opinion, that all "drug stores are gold mines," while added to this the idle tales of our fabulous profits startle and amaze the tender mind as do those of the Arabian Nights. In order now that one's preconceived as well as distorted ideas may not seem misplaced, what are the essential points that must be observed in order to be a successful druggist? These are neither few nor easy—to the contrary many and difficult—nevertheless not at all insurmountable or even discouraging to the ordinary ambitions.

Franklin said the solution of success was embodied in two words—*industry* and *economy*, and claimed that anyone, regardless of the following, by adhering to these underlying truths would not die poor. In this age of feverish activity, increased population and sharp competition, we cannot altogether lay at ease upon Franklin's epilogue. There must be associated with these other cardinal principles of equal importance bearing directly towards the purposed end.

Let us preface all arguments by insisting upon the consummate understanding that in all occupations by a slightly different *modus operandi*, men reach about the same goal, though that may vary greatly in degree. The reasons for this irregularity are many, but in the beginning none more glaring than a failure at self-analysis. It is then you must endeavour to see what you are best fitted for. The strongest characteristics of every person should assert themselves in their life-work and according to the development of these, coupled with the advice of thoughtful parents, all other things being equal, should a final selection be made. Thus, generally speaking, one who has no innate mechanism could seldom prosper at an artisan's trade; one who has an aversion for children could not expect to make the best of teachers. In other words, for thrift as a druggist he who has intuitive adaptation always has the advantage ground, and this we always presume to be possessed by prospective pharmacists, to no trifling extent.

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* From the *Pharmaceutical Record*, March 17.

Though it is true that in time water will seek its level—that you may grow to greater proportions, so as to occupy enlarged fields, and not the converse, yet, whenever outside circumstances do not largely control one's destiny, at the very start the *place* where one determines he is capacitated to encounter trade to his best likings is *par excellence* the one to select. I have divided location into four classes:—1, Small towns; 2, Small cities; 3, Thoroughfares in large cities; 4, Residential sections in large cities.

The leading features for success in either class may be about the same. There are, however, some minor requisites that each singly possess and demand; these must be recognized and satisfactorily performed, or else luck will go against you. For this reason I divide requisites into:

1. *General*, which apply to all regardless of place.
2. *Special*, those varying according to place peculiarities.

I.—GENERAL REQUIREMENTS.

(*a*) All other considerations presuppose that you will have a store well stocked—attractive and inviting to the public—compact and conveniently arranged for yourself so as to facilitate work. To obtain this it is often better to buy out an already established than to start a new stand. If the latter is decided upon, one fact must not be forgotten, that it is of little use to crowd stores together in any vicinity with the hope of realizing great expectations. To a certain extent there must be territory—hence do not overlook the question of "demand and supply." Each store should serve at least 2000 inhabitants, and when new ones are created breaking this quota, unless one or all competitors are unpopular, the universal verdict has been simply a division of patronage, in which case the profits to each, though hitherto small but continuous, has been reduced to *nil*. On the other hand, it is often not only more wisdom to supplant some one willing to retire, but also more economy, if even "good will" is high and enough has to be expended for complete renovation.

(*b*) One should have a good general education, the more in reason the better. This must be supplemented with a fair portion of business tact. These must harmoniously subserve each other. His pharmaceutical training should be thorough—familiar with every detail practically, with the major portion theoretically. Ordinarily it is not enough to be a graduate of pharmacy in *nomen*—must ever carry for your diploma a *quid pro quo* of pharmacal knowledge, putting it into legitimate application at every turn. The old must not be forgotten; the new must be continuously sought after and absorbed.

(*c*) Must while educating the mind strive to cultivate a manly, charitable disposition—flexibility, if you please; also a polite, affable and easy manner, and inclination to accommodate and favour others, regardless of the inconvenience or exertion it may occasion oneself personally.

(*d*) Should have character, honesty, sobriety and morality on one's side. Make not out of your store an inebriate asylum, with yourself the lone occupant; nor, worse yet, a mockery of religion and its votaries. Let temperance be one of your mottoes and Christianity a helping guide.

(*e*) Good health is paramount for success in anything, specially so here, where the working hours are unparalleled as to number, and even those intended for rest are seldom safe from frequent calls of service. With few or many complaints it is impossible for any one to always play the agreeable to customers, yet that is a thing which must be done in every instance. A negative *personnel* behind the counter gives not a favourable impression, while it may sometimes lead persons once patrons to go elsewhere. On the other hand, healthy appearance, neatness in dress, affable manners and a pleasant word go a great way toward drawing and keeping trade. Do not fall into the vice of frequently taking medicine because it is everywhere around and you fancy its need. Take a long walk or a brisk run in the open air instead. Fight clear of all habits—opium, cocaine, chloroform, ether, etc.

(*f*) Reconcile yourself from the first to one fate—that you have to be a slave to incessant application, physically and mentally; hence, be not lazy, but ever industrious. Appear always to customers that you enjoy waiting on them—that they give you pleasure rather than trouble. Do not have yourself to seem as though you thought you were conferring a favour by serving to them whatever they may call for; show that the compliment is on the other side. Be always eager to place yourself at the barter counter, even though other things claim your attention elsewhere in your establishment; it is your sales you depend upon. Waste no unnecessary time with anybody or at anything. Learn to be a good salesman by never missing a sale. Though out of an article called for, do not point-blank say so, nor try and force another's preparation—put it milder: "*The only make of that we have is so and so's.*" This is quite a sufficient hint, and if the party is willing to use the one you mentioned he will say so—not be provoked—in fact, thank you for your timely, yet modest, suggestion. If, on the contrary, the one you have will not answer offer to procure his and send it in the shortest possible time.

(*g*) "Economy is wealth," likewise "take care of the pennies and the dollars will mind themselves." Be therefore economical in every way. See that there are few leaks; that expensive liquids are not poured all over the floor in forming a line to obtain a few drops; that chemicals are not wasted around scales and that measurements be precise and accurate. Keep your breakage down by the system that everything your employees break carelessly you go them halves in replacing. If this be perfectly understood there will seldom be any objections, and besides protecting your own interests it will instil a carefulness in others, which when once acquired is of incalculable benefit throughout life. Have just as far as your trade demands a full line of pharmacopœial and National Formulary product of *your own manufacture*; dispense them every time when no make is specified, but never when others are directed. Do not marry, unless wealth, before your income is sufficient to defray creditably all likely expenses. While it is the proper relationship to bear toward society, yet you must remember the mode in which one lives is a criterion by which he is often judged and, as druggists claim a part professional ranking, their style of living must measure up to that of others, or suffer by the comparison.

(*h*) "Cleanliness is next to godliness" with the pharmacist, and in every department this must be enforced. A neat, clean and tidily kept store is not only "a thing of beauty" but a guarantee of interest taken, of gentility and a safeguard, as to impression, against carelessness, serious mistakes in prescriptions and other work.

(*i*) See that all your assistants are with you in these details; if not, replace them with others who will be in sympathy with you. Never forget that one dissenting-inclined individual will demoralize all the other clerks in the store.

(*j*) Although "a thing well bought is half sold," never deal with wholesale firms so much for cheapness as for reliability and punctuality. The neglect of either frequently causes the retailer to lose sharply in reputation, and pecuniarily at least to a far greater extent than for which their low prices can compensate. Be yourself prompt to all appointments and engagements. Also progressive not lagging. Active not passive. Have an eye single to your stock; neither letting it run down nor increasing faster than need be. Adhere always to the ten-day discount rule; the amount thus saved will be surprising.

(*k*) When you shall have accumulated a limited surplus let that act as a nucleus toward something greater. With the assistance of a lawyer in whom you have confidence, loan it on mortgages at 4, 5 or 6 per cent. Do not trust yourself too far in outside enterprises. You may be a success as a druggist but not so elsewhere; therefore, stick closely to that in which you are well trained and follow the advice of your attorney in other affairs. While numerous undertakings may seem more inviting, upon the whole they seldom average more than a mortgage per cent., and not infrequently give you abstraction from store duties; also lots of worry and trouble which is beyond price or compensation. *Indorse no man's paper be he suspected of ever so much worth.*

II.—SPECIAL REQUIREMENTS.

(*a*) *For Stores in Small Towns.*—Here it is that the druggist should be "a hail fellow well met," so far as pure sociability is concerned; must enter into the spirit of the people, assist every charitable organization as far as possible, acting on the faith "cast thy bread upon the waters; for thou shall find it after many days." Be a power in one of the churches, keep in sympathy with entertainments fostered by home talent, lending yourself, when possible, as one of the useful members. Favour your physicians though they are compelled to carry and dispense medicine to their far-off country patients. Furnish them with their drugs at an advance of 10 per cent. Put up proprietary articles such as there is always a demand for; essences, extracts, tinctures, cough syrup, pills, &c. Supply the cross-road stores throughout your country with these; you will soon get a run on them provided they have merit. Advertise in your local papers; it will be money well spent.

(*b*) *For Stores in Small Cities.*—Here one must be socially more reserved than in small towns. The physician can be your greatest friend. Send him or some member of his family a slight remembrance occasionally, though it be ever so insignificant. While this does not buy him it shows a liking, which never fails to be appreciated. Make preparations according to his proffered formulæ—these will find a ready sale. Be friendly with neighbouring druggists. Keep a full line of goods, so that when they are out of an article your stock can accommodate them. This gives you a reputation for having everything, and soon your competitors begin to depend upon you to no small extent. In this way you can gradually enlarge your business with a wholesale department. Advertise your proprietary articles of merit in your papers—by fence-writing and bill-posters. Push them in your country towns so that they will gain sale.

(*c*) *For Stores on Thoroughfares in Large Cities.*—It is here that energy and push must assert themselves, specially if competition around be very great. The window dressing becomes quite an element. This should always be fresh, neat, with frequent changes. In these varying novelties can be handled and advantageously displayed. Associate allied interests, such as soda-water, cigars, small stationery, limited confectionery. These each separately will give a profit and serve also to bring customers, thereby increasing business generally. Buy in large quantities, getting greatest discount. Sell at modest margin, thus turning your money over often—the percentage in the end will be handsome. Keep your line of proprietary goods, pushing them when and wherever advisable; advertise them at home and in pharmaceutical journals, thus getting yourself prominently before the public. Be friendly to all physicians, and in becoming a representative of outside lines of reputable goods, notify them of the fact by well-worded circulars, or better, a handwritten letter.

(*d*) *For Stores in Residential Sections of Large Cities.*—It is the physician whom you must depend upon here to a very great extent, so be not slow in recognizing the fact. Visit them occasionally, thus showing yourself to be no humbug, but a man of clever parts. Make for them ideal preparations which they can use in their practice. This serves a twofold purpose; helps forward yourself and backward the introduction of other men's preparations from elsewhere. Establish yourself in their confidence, not only by your methods, but by always seeming desirous to please and favour. Be expeditious in all prescription work, not only in those waited for, but those to be sent out. A few household remedies may be attractively gotten up and quietly pushed, but that is the judicious extent. Treat well your patrons, because the most of them you will know, and for that they will expect all the more of you. Here you may have many running accounts; collect them promptly every one, two or three months, according to your city's custom. Know with accuracy the finances of those to whom you give long and liberal credit. Your store is recognized to be a convenient place for the neighbourhood, telephone messages, stamps, directory, messenger service, bank accommodations, car depôt are all to be had at the druggist's, and while they are ungrateful innovations, you must make the best of them, being polite and agreeable through all, and indirectly a gain will, partially at least, repay you.

"A prophet is not without honour save in his own country," so while a pleasant word in conversation may not be amiss in the store, yet do not mix up socially to any degree with families round about you. They will not appreciate you so much and they will fancy you inattentive and neglectful of business, hence have your visiting friends elsewhere.

To conclude: one might ask is the observance of all this minutiæ indispensable in order to be successful? To this I would answer: that while some few might be neglected they, however, are all vital components of an eventful whole, and that in the proportion as one or many are adhered to will prosperity be genuine or alloyed. To follow all of these will in many cases be well nigh impossible; this presumes contraction of desire as well as aggressiveness, hence no elevation to the coveted summit. At the same time there is no use in manifesting despondency, because to even such there usually comes an equilibrium in some other form or shape, proving that even they, though not bondholders, have lived not in vain, and that their lives have not been absolute failures. Above all, as a source of self-satisfaction to the average pharmacist, I place his universally recognized honesty in never tampering with or adulterating his medicines thus utilised for the good of suffering humanity. Opportunities are thousand, but the base and inhuman thought never suggests itself. The Romans had a saying: *probitas laudatur et alget*, "honesty is praised and left to starve." The converse of this would be: "practice dishonesty if you wish prosperity." If in these modern days all avocations represent wealth commensurate with disreputable methods of acquiring same, it remains to the druggist a glorious thought, a living legacy that a loftier sentiment than dishonesty has ever pervaded the members of his craft, so that there is left at least to the smallest of us a resigned willingness to die poor rather than live by discreditable means. Though we may not be considered successful in popular parlance, we should be thankful that we have pursued our line of duty, practising in our transactions honesty not alone when it was simply policy, but always because it is the best policy and in obedience, as to every thought, to the quotation from Pope that "*an honest man is the noblest work of God.*"

PEROXIDE OF HYDROGEN.*

BY D. B. DOTT.

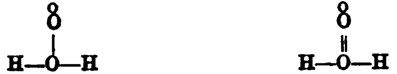
Peroxide of hydrogen, or hydrogen dioxide, was discovered in 1818 by Thénard, who prepared it by the action of dilute hydrochloric acid on barium peroxide. This is the method still generally employed, though the process is varied by the employment of other mineral acids, as sulphuric, phosphoric, and carbonic acids. Although the reaction is theoretically the same, it does not appear that the yield of dioxide is equally good whatsoever acid is used. Hydrogen peroxide is likewise formed in the oxidation of a multitude of organic compounds in presence of water. It was first observed by Schönbein that peroxide of hydrogen results from the oxidation of essential oils in presence of moisture, and within recent years a practical process for the preparation of the peroxide by the oxidation of turpentine has been worked out by Kingzett. The precise reaction which occurs is not certainly known, but is believed by Kingzett to be approximately as follows:—The terpene is first oxidized to a body $C_{10}H_{16}O_3$, which by the action of water forms soluble camphor and hydrogen dioxide:

$$C_{10}H_{16}O_3 + H_2O = C_{10}H_{16}O_2 + H_2O_2.$$

The constitution of hydrogen dioxide is usually represented graphically as:

$$H—O—O—H$$

Kingzett maintains that the character of the substance and its facility of decomposition are altogether opposed to such a view. "Oxygen is to be regarded as either a triad or a tetrad in valency, and the one atom is combined with the other, which alone is directly combined with both atoms of hydrogen, thus:—



$$\mathrm{H-\overset{\overset{8}{|}}{O}-H} \qquad\qquad \mathrm{H-\overset{\overset{8}{\|}}{O}-H}$$

This view accords with the general sense of chemical opinion that when in a compound an atom of one substance is directly combined with another such atom, the combination is weak, and there is consequently facility of decomposition." Mr. Kingzett further remarks, "The reason he had represented oxygen as either triatomic or tetratomic was that it could not possibly be diatomic. If it were diatomic the two atoms of oxygen in the peroxide of hydrogen molecule, would be equally associated with each atom of hydrogen, and consequently of equal stability, which was not the case, seeing that one atom only was so easily dissociated. Chemical common sense clearly showed that the two atoms could not have the same combined value in peroxide as the one atom of oxygen had in water. It followed, therefore, that it must be either triatomic or tetratomic. He inclined to the view that it was triatomic, because it undoubtedly was so in ozone." Well, I venture altogether to disagree with Mr. Kingzett. In the first place, I am not aware of any evidence that the oxygen atom is triatomic in ozone, and therefore cannot admit the validity of argument based on that assumption. We may admit that the instability of hydrogen peroxide is due, at least, partly to the fact that it contains two oxygen atoms in immediate combination; without being required to agree that the formula as ordinarily received is inadmissible. I think "chemical common sense" rather teaches us to regard the matter in this light: the unstable compound hydrogen dioxide readily decomposes, and its products of decomposition naturally result in the stable oxide water, and the stable oxygen. There is no reason for assuming that the peroxide molecule has an oxygen atom, loosely tacked on, as it were, and therefore easily slipped off. I think such views frequently arise from a mistaken idea of the nature of graphic formulæ, which are held to represent the relative positions of the atoms in the molecule, instead of being purely symbolic of the actual condition of things. There are other objections to the formulæ above referred to. An element which is known to be bivalent in nine hundred and ninety-nine cases ought not to be assumed to be trivalent in the thousandth, unless there is irresistible proof of its being so. I object also to that system of representing an atom with two of its combining powers saturating themselves, as of questionable validity and doubtful reasonableness. If we were compelled to accept one of Mr. Kingzett's formulæ, I would prefer to suppose that the oxygen was monad and triad in the one case, and dyad and tetrad in the other.

Hydrogen dioxide is a typical peroxide, readily parting with one of its oxygen atoms, and is therefore a valuable oxidizing and bleaching agent, yet at present its employment is somewhat limited. Two circumstances have militated against its more general use, firstly its rather considerable cost, and secondly its proneness to decomposition. It is only as these barriers are gradually overcome that the peroxide can have a wide application in chemical industry. It is not practicable to prepare a very strong solution directly; recourse must be had to evaporation in vacuo. When that is done it is found that the aqueous solution gradually decomposes, the more rapidly the stronger the solution. Decomposition is more rapid in an alkaline than in an acid solution, and the presence of certain metallic oxides greatly increases the rate of decomposition. Ether and alcohol are among the best preservatives, though not always admissible; and as recently brought under notice by Kingzett, some of the metallic salts considerably retard decomposition. Like some other oxidizing agents, peroxide of hydrogen is a good disinfectant and antiseptic, and it has been introduced into medicine both as a local application and as an internal remedy. There are other instances, such as nitrous acid, where an oxidizing compound acts also as a reducing agent, but in none is this property so strikingly exemplified as in the case of hydrogen dioxide. When manganese dioxide is added to the solution, oxygen is slowly evolved, and on the addition of an acid the reaction proceeds rapidly as follows:—

$$MnO_2 + H_2O_2 + H_2SO_4 = MnSO_4 + 2H_2O + O_2,$$

that is, each molecule of manganese dioxide gives up an atom of oxygen along with that from the molecule of hydrogen peroxide with which it reacts; so that when the reaction is used as means of estimating the peroxide, we have only to measure the evolved oxygen, and calculate O_2 as equivalent to H_2O_2. Similarly, potassium permanganate in acid solution is reduced by hydrogen peroxide:

$$2KMnO_4 + 3H_2SO_4 + H_2O_2 =$$
$$H_2SO_4 + 2MnSO_4 + 4H_2O + 2O_2.$$

This reaction may be employed for determining the amount of peroxide present, either by measuring the oxygen evolved, or by noting the amount of standard permanganate decolorized. The reaction likewise proceeds in an alkaline solution. Mr. A. H. Allen recommends the use of the nitrometer as a convenient means of measuring the amount of oxygen given off on mixing hydrogen dioxide and permanganate, and it is doubtless a useful method. I have employed the same instrument filled with a solution of ordinary bleaching powder, which is to all intents and purposes a solution of calcium hypochlorite and calcium chloride, along with a small proportion of calcium hydroxide. The peroxide of hydrogen reacts with the hypochlorite, liberating oxygen, according to the equation

$$CaCl_2O_2 + 2H_2O_2 = CaCl_2 + 2H_2O + 2O_2.$$

To obtain a very accurate result one would require to know the vapour-tension of the solution employed, and the amount of oxygen dissolved under the particular conditions; but for practical commercial purposes these factors might probably be disregarded. Another method by which the peroxide may be easily enough estimated is by its action in liberating iodine from potassium iodide, the iodine being then titrated with standard thiosulphate. In my experience these methods yield appreciably different results, and I think it would be worth while for someone who has the time to investigate the matter, and so determine which of the various methods affords the most trustworthy means of estimating peroxide of hydrogen. The hypochlorite process seems to give rather higher results than the permanganate, and as there is no obvious source of error appertaining to the former it is probably the more accurate of the two. In any case it is always useful to have an alternative method. It was noted by Hanriott that Fehling's solution is reduced by peroxide of hydrogen. The accuracy of this statement I have confirmed, and there is little doubt that the reduction of the cupric solution might be used as a means of estimating the peroxide if it were more convenient to employ that method.

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* Read at a meeting of the Edinburgh University Chemical Society, February 26, 1890.

OPTICAL ILLUSIONS.*

BY J. F. LIVERSEDGE, A.I.C., M.P.S.

If any one wishes to make an emphatic statement about an occurrence or thing, and says, "It must be so, I saw it myself," he considers the matter is settled. To-night I shall try to show that seeing is not always believing, and that many things we see are merely optical illusions and not to be entirely depended on as facts.

I use the term as a title in the widest possible sense, and intend including in the subject any case in which we see, or think we see, anything differently from what it is in reality. My paper will be divided, more for convenience, than with scientific accuracy, into three parts. Firstly, illusions depending on optical contrivances—reflection and refraction being the chief causes of deception; secondly, illusions depending on the structure of the eye—here we shall discuss colour, irradiation and binocular phenomena; and thirdly, optical illusions depending on the brain, or the interpretations of the sensations received by the eye. In this section I shall give instances in which the judgment is misled, and conclude with a few words on apparitions.

I.—Illusions Depending on Optical Contrivances.—Probably the best known optical illusion is Pepper's ghost. Here a plate of plane glass is placed at an angle of 45° near the front of the stage, before it the stage floor is some feet lower, and any strongly illuminated object on the floor in a horizontal position appears upright and on the stage. One of my friends recently showed me a device depending on the same principle by which a photograph on glass is superposed on an ordinary carte.

Reflection is responsible for some of the tricks of the Davenport Brothers, and for the curiosities known as living heads without bodies, etc. The converse of this may be seen in the palace of Versailles, where a combination of mirrors makes spectators appear headless.

The "optical paradox" enables one apparently to see through a brick, but really four plane mirrors carry the light round the obstacle.

In the "phantom bouquet" concealed flowers are made by a concave mirror to appear in a vase. Concave and convex cylindrical mirrors cause strange and amusing distortions of the faces of those looking at them.

Refraction makes a pond appear shallower than it is, and a stick put in water appears bent. By refraction of light through layers of air of different densities the strange illusions known as mirages are produced.

If a wine glass is partly filled with water and inverted on a plate with a coin on it, refraction causes the coin to appear on the surface of the water, and it is also seen directly but enlarged. By means of the double refraction of Iceland spar a dot placed under it appears as two.

II. Illusions Depending on the Structure of the Eye.—Several interesting illusions depend on the fact that an image on the retina lasts about an eighth of a second. In the thaumatrope a card has an object drawn on each side, say a bird on one side and a cage on the other; if the card is rotated the images are superposed and the bird appears in the cage. In the zoetrope and the phantascope a moving object, as a swinging pendulum, is drawn in successive stages, and while the series is rotated and viewed through slits the pendulum appears to be swinging backward and forward. For the same reason a vibrating string appears as a flat plate, and we think lightning lasts much longer than it actually does, while without this "persistence" fireworks would lose most of their beauty. The rotating vacuum bulbs form a very pretty illustration of this, but as the illumination is intermittent, the tube appears as a rayed star and not as a continuous circle.

That white light is composed of all colours may be shown by rotating a disk with segments, coloured in proper proportions, when the colours are blended, and it appears white, or more correctly, grey.

Physiologically, white light is made up of the three colours, red, green and violet, which we probably perceive by three sets of nerve fibres of the retina. On the border of the retina the red-perceiving nerve fibres are absent. We can see this by holding a red pencil in front of the eye at arm's length, and while keeping the eye fixed moving the pencil round sideways, until we reach a point at which the pencil is visible but appears black. If the eye has an excess of one colour presented to it for some time, the nerve fibres corresponding to that colour are incapable of acting for a short period, and a white surface appears tinged with the complementary colour. This effect has been largely used by a certain firm for advertising purposes. Similarly a strip of white paper on a piece of bright green covered with white tissue paper, appears pink.

An ingenious advertisement has blue figures on a red ground. When these are viewed in the shadow and slightly moved, the blue marks appear to dance about the paper, for when the eyes are in focus for the red an image of the blue is formed in front of the retina, and is therefore indistinct; when the blue is right, the red is indistinct, as the red rays converge to a point behind the retina, the rapid changing of the focus of the eye from one to the other position makes the edges indistinct, and gives the idea of motion.

If santonin is taken white appears yellow, as this drug has the property of destroying the violet perceiving fibres.

If a thin platinum wire is made incandescent with an electric current its apparent thickness is greatly increased; this is due to "irradiation," or the encroaching of bright parts on darker ones; similarly, anyone looks larger in light than in dark clothes, and a white wafer on a black ground looks larger than a black wafer on a white ground. The effect of background may be noticed in a snowstorm; the snow looks black against the light sky, but white against the dark earth. Irradiation also explains the appearance of a pole with the sun as background, when the pole appears narrower, or even discontinuous, where in front of the sun's disk. A piece of black thread held in front of the gas shows the same phenomenon.

A defect of the eye, known as spherical aberration,

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[*] Read at a meeting of the Midland Counties Chemists' Association, February 18.

causes the eye to see a bright point as a star. Gas lamps in foggy weather show this well.

Milk looks white and blood red, because the eye has not sufficient magnifying power to perceive that coloured or opaque particles are floating in a colourless liquid.

The part of the retina where the optic nerve enters the eye is quite blind; to observe this put a dot and a cross on a piece of paper about three inches apart, close the left eye, and fix the right eye on the cross to the left of the paper, and at a certain distance (about nine inches) the dot entirely disappears.

If a pin be held by the point quite close to the eye, and a pin-hole in a card be held between the eye and a light, the pin will appear head downwards, owing to the upright shadow being inverted by the judgment, as if it were the inverted image usually received on the retina.

The experiment known as Scheiner's is curious. By looking at a pin through two holes very close together two pins are seen, as an image on the retina is produced by the rays of light passing through each of the holes.

Our having two eyes makes some strange illusions possible. Let a paper tube be placed to the left eye and the hand be placed by the right side of it, when a hole will appear in the middle of the hand. This property of the brain of combining the images of the two retinas is occasionally of use in tracing the form of an object under the microscope without the aid of a drawing prism.

The stereoscope gives the appearance of solidity by combining two slightly different views by means of prismatic eyepieces. Two somewhat similar "cartes" placed under it are blended to a curious composite portrait. If two bank notes are observed in it, and there is any appearance of solidity, they are not identical, and therefore one is forged.

That our judgment of distance largely depends on having two eyes, may be amusingly shown by trying to thread a needle with one eye closed.

The pseudoscope is a combination of prisms which inverts the normal relation, and makes near objects appear distant, and *vice versâ*, in a most bewildering way.

The curious rotation of "strobic circles" partly depends on persistence and partly on the fact that the curvature of the eye is not exactly the same in the vertical and horizontal direction.

III. *Optical Illusions Depending on the Brain.*—Our belief of the nature or shape of an object depends on two factors, the nature of the stimulus of the optic nerve and the interpretation the brain puts upon it. Until now we have neglected the latter factor.

To show the influence of the brain, consider this six-rayed star surrounded by a hexagon; at will, we can see either a star, two cubes standing on one, or one cube standing on two, although the image in the eye is unchanged. Again, this drawing appears either as the bottom or top of a flight of steps. Occasionally the decorator's art furnishes examples of this kind.

Pictures must be classed as optical illusions, for all artists attempt to make objects on a flat surface appear to have three dimensions. So well is this done at times that we think the eyes of a picture follow us as we move about a room.

Perspective may mislead us, as in the "politicoptical illusion." On the stage it is also used to mislead.

We know that in going down a hill the slope of another hill facing it appears greater than it is in reality; we suppose the road we walk on is horizontal, and that the whole of the angle between the two is due to the steepness of the other road. The surface of the reservoir at Edgbaston appears from some positions quite to slope to the observer. Near Olton a stream appears to flow uphill, due to the slope of the road being greater than the inclination of the bed of the stream.

If parallel lines have arcs of circles drawn outside them the appearance of parallelism is destroyed. In Zöllner's figure parallel lines appear to converge because they are crossed by other lines.

The effect of neighbouring forms in misleading the judgment may be shown by placing two exactly equal somewhat horseshoe-shaped pieces of cardboard with the narrow part of the one opposed to the broad part of the other, when the latter will always look larger.

How big does the sun look? is a question which would get various answers; or to put it more definitely, what is the diameter of a sphere which just hides the sun's disk at a certain distance, say ten feet? As far as I can answer the question I should say between three and four inches. This is an example of the difficulty of estimating the size of an object with nothing to compare it with; when on the horizon the sun appears larger, for there we may have comparison objects. When we see people walking on the top of a small hill, the summit of which is sharply defined against the sky, they appear gigantic. The "Spectre of the Brocken," a shadow cast by the rising sun, may also be mentioned.

An amusing error of judgment is often made when one attempts to show the distance from the floor a hat on a gentleman's head would reach.

If a square is divided in one direction by parallel lines, it appears elongated in the direction of the lines; in dress this is useful, for vertical stripes make a lady look taller and thinner.

Illusions of motion are common. We may watch a waterfall till the water appears to stand still, and the rocks behind it move up. While sitting in a train and watching another train passing it is impossible, if the latter be of closed coaches (like a mail train), to say which of four things is happening. The other train may be at rest, or we may be at rest, both trains may be moving in the same direction, but ours quicker, or in contrary directions; we can only settle the question by looking out of the other window. Other illusions of motion are chromatropes, which I throw on the screen with the limelight.

On looking at a bright sky I can see spots moving up and down, and looking like snakes. These are known as muscæ volitantes, and are due to moving opaque particles in the vitreous humour of the eye, throwing a shadow on the retina.

If my hearers think the belief in apparitions has quite died out, they will be surprised to hear that recently in my presence, a gentleman said seriously, and in a way that left no doubt of his sincerity, "There are ghosts, for I have seen one," and proceeded to give particulars. I believe he did see a ghost, but I also believe there was not a ghost to be seen. I will illustrate this by the use Shakespeare makes of apparitions. In four plays, Cymbeline, Henry VI., Henry VIII. and Richard III., they appear in dreams; for example, the guilty Richard sees the ghosts of eleven of his victims appear on the night before the battle of Bosworth Field. In Julius Cæsar, Brutus, while reading in his tent, sees Cæsar's ghost. Hamlet, while in his mother's room converses with his father's ghost, to her amazement, as she cannot see it. Macbeth has two very interesting examples. As he is going to murder the king, he says:—

"Is this a dagger I see before me,
The handle toward my hand? Come let me clutch thee:
I have thee not, and yet I see thee still.
Art thou not, fatal vision, sensible
To feeling as to sight? or art thou but
A dagger of the mind, a false creation,
Proceeding from the heat oppressed brain?
I see thee yet, in form as palpable
As this which now I draw.
Thou marshall'st me the way that I was going,
And such an instrument was I to use.

Mine eyes are made the fools o' the other senses;
Or else worth all the rest . . . . .
. . . . . There's no such thing."

Later on at a banquet he sees the ghost of Banquo, whom he has had murdered (and possibly *himself* assisted), though the queen and guests see nothing.

But ghosts are not confined to Shakesperian drama. I will refer those who are interested to two papers in the *Nineteenth Century* of 1884 by Gurney and Myers, and only abstract two cases which are there authenticated by the name and address of the authorities.

"A physician, while fielding at cricket, goes near a hedge, over which he saw his brother-in-law in a green shooting-suit with his gun on his shoulder; feeling very sad he told his uncle, and noted the time. Two days later he heard from his father that his brother-in-law had died one hundred miles away, exactly at that time, and in a green shooting-suit. He did not know that he was dangerously ill."

This may be called a curious coincidence, but accepting the facts as stated, the probabilities are heavily against the exact coincidence of time and also the unusual death in shooting costume.

"A canon went to see his brother, a barrister, and found a note saying he had gone to a dance. The canon dozed in an arm chair, but awoke at one o'clock seeing his brother on a landing and then catching his foot on the top stair and falling headlong. Half-an-hour later his brother came in and told him he had nearly broken his neck by falling down stairs just at one o'clock."

Can any explanation be suggested for this? We may trace it some distance by considering some physiological facts. In muscæ volitantes we see as external objects particles within the eye. When the eye is struck we "see stars," for any stimulation of the optic nerve, either at its termination or in its course, we perceive as sight. A parallel is found in the case of persons who have lost a limb. When a nerve of the stump is irritated, it is felt, not in the stump, but in some portion of the lost limb.

But further back still, if that portion of the cortex of the brain is stimulated, which is related to sight, objects are seen though there may be no stimulation of the optic nerve. It follows from this if a suitable impression is made on the brain an object which has no external existence may be seen, as Macbeth's dagger, and the apparitions spoken of above.

Gurney and Myers make the suggestion in their papers, that ideas may be transmitted between the brains of two persons in close sympathy, irrespective of distance, particularly at the time of death, and the term "telepathic transference" is used to express this communication.

Psychology cannot say this is impossible, and *if* well authenticated satisfactory cases are found science must enlarge its border to admit the new truth. What I mean by satistactory cases may be thus defined :—

1. The one who sees the ghost must be sensible, better scientific, and not in the habit of seeing apparitions.
2. There must be no previous knowledge of the illness of the person appearing.
3. The impression must be so powerful that others are told at once and notes of the facts should be made.
4. The testimony of the others should be ascertained.

If "telepathy" rests on psychological fact, it would explain some curious thought reading performances, and some doings of the spiritualists.

My task is done. I have mentioned many optical illusions, and pointed out the direction in which an explanation is to be found, and I hope you have been interested in the fact that often the "eyes are made the fools o' the other senses."

NOTES ON ESSENTIAL OILS FROM MESSRS. SCHIMMEL AND CO.'S REPORT.

The following notes on various essential oils and allied substances are taken from the April *Bericht* of Messrs. Schimmel of Leipzig:—

DISTILLATION IN VACUO.—In some introductory remarks Messrs. Schimmel report that they have succeeded in attaining a practical solution of the problem of distilling essential oils on a large scale in a vacuum. It is stated that the first large apparatus of the kind erected in their establishment has been in work for some weeks, and that the results leave no doubt that the influence upon the distillation of essential oils will be great, since the injurious action of heat upon the easily decomposable oils is avoided in proportion to the diminished atmospheric pressure under which they are distilled.

ANISE OIL AND ANETHOL.—As characters for determining the value of anethol the specific gravity of the pure compound at 25° C. is given as 0·986 and the melting-point as 21–22° C., the latter being taken by simply inserting a thermometer into a flask with melting anethol. Ordinary anise oil is said to melt at 15° C., and the inferior qualities of anethol obtained by fractional distillation, between 15° and 21° C., according to the degree of purity. By repeated contact with air a small portion of anethol is oxidised, probably to anise aldehyd, the change involving an increase in specific gravity and a lowering of the melting-point. A sample of anethol that had been remelted frequently and come into contact with air had a melting-point of 19°–20° and a sp. gr. of 0·990 at 25° C.

ARNICA ROOT OIL.—The stock of arnica-root oil having become exhausted, and no German roots being available, an experiment was made in distilling Italian roots, but these proved utterly worthless.

BETEL OIL.—Referring to Eykman's latest communication upon betel leaves oil the opinion is expressed that the differences observed by that chemist in the constituents of the oil distilled by himself and that distilled by Schimmel and Co. cannot be attributed exclusively to the fact that the former was distilled from fresh leaves and the latter from dry, but are more probably referable to differences as to soil and climate in the conditions under which the plants they were derived from were grown. According to Eykman not only the two oils, but the phenols separated from them, differed in odour, the phenol from the oil distilled by Schimmel and Co. from dry leaves not even recalling the smell of betel leaves. But in comparing the phenols from a specimen of oil distilled from fresh leaves, placed at their disposal by Dr. de Vrij, Messrs. Schimmel failed to distinguish the slightest difference in odour from that of their own betel-phenol, notwithstanding that the mixture from this oil of fresh leaves evidently contained a second phenol. Further experiments are deferred until the receipt from India of a supply of oil distilled from fresh betel leaves.

CARROT OIL.—The oil obtained in the distillation of the dried fruit of *Daucus Carota* has been examined by Dr. Landsberg, who finds it to consist essentially of two constituents: (1) a terpen boiling between 159° and 161°, belonging to Wallach's group of pinens; (2) an oxygenated body, of the composition of $C_{10}H_{18}O$, standing in near relation to cineol and that may be considered as terpen monohydrate. No practical use for this oil has yet been found.

CASCARILLA OIL.—There has been a remarkable demand for this oil within the last six months, but it is not known for what purpose it has been required.

CASSIA OIL.—As a consequence of the exposure in a former report of the adulteration in China of cassia oil with resin, it is stated that this practice was at once abandoned. Some subsequent shipments, however, although of normal specific gravity, thin and beautifully clear, and free from adulteration with resin, petroleum or fatty oil, were deficient in sweetness, and left on the tongue an unpleasant bitter taste. Upon determining the proportion of cinnamic aldehyd, this was found to be low, varying between 49·4 and 69·8 per cent. Further remonstrance was therefore made, with the result that a later consignment contained from 70·9 to 77·7 per cent. of cinnamic aldehyd, a quantity more nearly corresponding to that found in some old samples of the oil, as recorded in a previous report (see before, p. 264). Incidentally to the discussion, Messrs. Schimmel received the information that the Chinese now export two qualities of cassia oil, one distilled from the leaves and the other from the root of the cassia shrub, but it is not known at present which kind contains the larger proportion of cinnamic aldehyd. It is still considered that cinnamic aldehyd is the most important constituent of cassia oil, and the following indirect method of estimating it is recommended:—75 grams of oil are mixed in a good sized flask with 300 grams of a boiling 30 per cent. solution of acid sodium sulphite. Cinnamic aldehyde separates immediately as a coagulum, and the mixture is well shaken and left to stand. When the proportion of aldehyd is large there is considerable development of heat, which must be controlled with cold water. About 200 grams of hot water are then added and the whole is heated with frequent agitation in a water-bath until the compound of aldehyd with the bisulphite is completely dissolved, and the non-aldehydes form an oily layer on the top. After cooling the non-aldehydes are removed by shaking first with 200 c.c. and then with 100 c.c. of ether, the ethereal solution is separated, the ether carefully driven off and the residue weighed. The weight, deducted from that of the oil taken, gives the proportion of cinnamic aldehyd.

Elemi Oil.—This distillate is said to be coming into demand as an addition to soap perfumes.

Eucalyptus Oil.—It is reported that eucalyptus oil is now prepared on a large scale in the south of France. In Gladstone, Queensland, arrangements are said to have been made by a local chemist for the distillation of oil from *Eucalyptus citriodora*, a species that grows plentifully in Port Curtis district, to the extent of working up half a ton of leaves daily. The distillation of an oil from a eucalyptus having a peppermint-like odour is also spoken of. This oil, it is thought, would probably be derived from *Eucalyptus Hæmastoma*, since an oil from this species, previously examined, was found to contain, besides terpen and cymol, an oxygenated constituent, possibly identical with menthon.

Fennel Oil.—The knowledge of the composition of fennel oil has hitherto been very superficial, being limited to the fact that it consists principally of anethol. A recent examination of the fractions boiling at low temperatures has shown that besides acids and aldehyds, dextro-pinen is present in large quantity. The fraction boiling at 160° consists of dipenten. There was also found a substance boiling at 190°–192°, having an intensely bitter camphoraceous taste, to which, conjointly with pinen and dipenten, the peculiar odour of fennel is due. This body is being further investigated.

Galanga Oil.—Sp. gr. 0·921 at 15° C.; boils between 170° and 275°. The oil contains considerable quantities of cineol, to which the camphor-like odour is due.

Galbanum Oil is described as pale yellow and of pronounced galbanum odour; specific gravity 0·914 at 15°; boils between 165° and 300° C., apparently without decomposition.

Pine Oils.—The consumption of different varieties of pine oil is said to have considerably increased during the recent epidemic. The oil from *Pinus Picea*, as well as the finer sorts of oil from *P. sylvestris*, have also been recently much used in the bonbon industry. It is pointed out that in the manipulation it is necessary before all things to prevent resinification by adding the oil dissolved in a little spirit to the sugar after it has cooled; if this rule be neglected the bonbons acquire a disagreeable resinous taste. Ol. pini pumilionis has been introduced into the new edition of the Australian Pharmacopœia, where the characters of it given are "colourless or green-yellow, peculiar aromatic agreeable odour, aromatic bitter and acrid taste; specific gravity, 0·850; boiling point 170° C." Messrs. Schimmel say that unfortunately these statements do not correspond to facts, and give no assistance in judging a genuine oil. According to their experience with pure distillates the specific gravity is 0·861 to 0·865 at 15° C., while the boiling point is about 160°–250°.

Valerian and Kesso Oil.—The oil distilled from Japanese valerian or "kesso root" is said to have rapidly come into favour (*Pharm. Journ.*, [3], xix., 327, 843). From a practical point of view it is considered to be at least equal to the distillate from German roots, and possibly of still more powerful and persistent odour. The remarkable difference in the yield and composition of the essential oils, it is thought might have its origin in climatic and soil conditions, especially since it has been shown that kesso root is not, as at first supposed, derived from *Patrinia scabiosæfolia*, Link., but from a variety of *Valeriana officinalis*, L. It is pointed out that in the new edition of the Pharmacopœa Neerlandica the specific gravity of valerian oil is given at 0·930–0·960 and in the Austrian Pharmacopœia at 0·950, and that only the distillate of the European root would meet this requirement. The kesso oil or Japanese valerian oil has a sp. gr. of 0·996 at 15° C.; it is of a green colour, possesses a somewhat thickish consistency, and in respect to odour can scarcely be distinguished from ordinary oil of valerian. When distilled over an open fire considerable quantities of aldehydes and the lower fat acids first pass over; then a hydrocarbon boiling at 160° recognized as lævo-pinen. In the portion boiling between 170° and 180° dipenten was detected, but whether it was originally in the oil, or was first formed under the influence of the acids and other constituents, has not yet been determined. The fraction boiling between 200° and 220° showed the presence of l.-borneol and terpineol. Between 240° and 260° the acetic and valerianic ethers of the l.-borneol passed over. Some of the foregoing bodies were already known with certainty to occur in ordinary valerian oil, whilst the presence of the others was highly probable. One constituent absent, however, from the ordinary oil, but present in the Japanese, is an oil boiling at 300°, heavier than water, and almost odourless. This oil proved to be the acetic ether of an alcohol that has been named "kessyl alcohol," and represented by the formula $C_{14}H_{24}O_2$. It was obtained by saponification with alcoholic potash in large crystals shaped like a coffin-lid, melting at 85°, boiling under ordinary atmospheric pressure undecomposed at 300°–302°, and under a pressure of 11 mm. at 155°–156°, and yielding a lævogyre alcoholic solution. By oxidation with potassium bichromate and sulphuric acid, a body was obtained containing two atoms of hydrogen less than the alcohol, which crystallized in dense needles, melting at 104°–105°, and boiling between 305°–307°; a solution was strongly dextrogyre. Kessyl alcohol is a monacid alcohol, the acetyl compound, which has the formula $C_{14}H_{23}O_2{\cdot}CH_3CO$, is a thick, oily colourless liquid, with a lævogyre action on polarized light. In addition kesso oil contains another constituent boiling at about 260° C.; it is probably a sesquiterpen, but no crystalline hydrochloric compound was obtained from it. Finally, in the highest boiling portion there is a blue oil contained, possibly the same as that which occurs in chamomile oil and other essential oils.

The Pharmaceutical Journal.

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SATURDAY, APRIL 12, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

CHEMISTS' TRADE INTERESTS.

FOR some time past there has been a considerable amount of vague declamation in regard to the trade interests of chemists, and since the subject has excited much interest, it will not be out of place to consider somewhat in detail what are the trade interests which chemists can regard as belonging to them especially. There are no doubt some chemists who thoroughly believe that the trade in patent or proprietary medicines ought to be restricted to registered persons, and so far as those articles are medicinal there is, on principle, little to be said against such a view of the matter. But there are other considerations to be taken into account. In the first place the view already mentioned is not in accordance with what has been the customary practice. Neither is the trade in these articles of such a nature as to call into exercise those functions upon which the chemist has to rely for being ranked by the public in a different category from the grocer. All these articles are sold in packets, without any knowledge on the part of the seller of their contents or any act on his part to call for greater confidence in his supply than in that of any other trader. Again, in the case of drugs, though the principle that the chemist is the proper medium of supply is correct enough, it is of little practical value, unless the purchasing public can be impressed with a sense of the value attaching to the individual knowledge and skill of the chemist in connection with the supply of drugs. The law demands that those engaged in business as "chemists and druggists" shall have given proof of competent knowledge and skill; but that demand is made only in the interests of the general public, not for the protection of the chemist, and it leaves the trade in the greater number of drugs as free and unrestricted, as, for instance, the practice of medicine. The only thing restricted is the use of the titles by which the ostensible trading in drugs is denoted, and it rests with chemists individually and collectively to connect with those titles a public recognition of the advantages offered by those who are legitimately entitled to use them. The time is past when the chemist can be expected to say that he makes all the preparations which he supplies. The progress in chemical manufactures, and in the manufacture of medicinal preparations on a large scale, has taken that pretty well out of his hands, but it does not follow that the chemist has thereby been deprived of the power to say that he personally vouches for the purity and good quality of every article that leaves his establishment. He still retains the power to test and certify his goods as fully as if they were made by himself, and the extent to which he exercises that power will be the measure of his claim to preferential consideration from the public as well as the measure of the protection which he can hope for against the competition of unqualified traders in drugs. If this view of the matter be correct, it follows that protection of the trade interests of chemists is to be sought for rather as the result of individual action and concerted co-operation among chemists themselves, than from any legislative measures that are likely to be obtained at the present time.

These remarks have been suggested to a great extent by a letter from a correspondent which appears in this week's Journal, which calls to mind the inverted view of affairs indicated by the question, What has the Pharmaceutical Society done for the trade? It would be more to the point to ask what has the trade done for the Pharmaceutical Society? Just in the same spirit Mr. PICKERING, an Associate of the Society, suggests that something must be done by the Society to strengthen its power if it is ever to benefit the trade by obtaining any useful Acts of Parliament. Here the inverted point of view is strikingly apparent. It is for the trade to strengthen the Society if it ever hopes to obtain any benefit through its influence. It is true that a Society numbering only about 4500—not 3000, as stated by Mr. Pickering —out of 14,000 registered persons is not fully representative of the body, but it is equally evident where the defect lies. Mr. PICKERING's reply to the question why this is the case is simply a putting of the cart before the horse. The Society as a body owes nothing to those who persist in remaining outside. So long as they continue in that position they constitute an obstacle to progress, are the real cause of their own grievances and a positive detriment to the interests of their colleagues who do belong to the Society. The views expressed by Mr. PICKERING in his letter appear to indicate in the main that he regrets the abandonment of the proposed Pharmacy Bill, but he seems to overlook the fact that this result was due to the opposition and to the indifference with which the measure was met by the trade. Can there be any hope of passing a Bill that is thus regarded by the class which it is designed to benefit, especially when some of the provisions sought for are of a restrictive nature that may be held by many persons to be inconsistent with prevailing free trade doctrines?

In referring to these points of Mr. PICKERING'S letter, we have adopted it as representing a vast amount of indefinite opinion concerning the Pharmaceutical Society, trade interests, and legislative possibilities or impossibilities, which might be usefully subjected to a stricter critical treatment than has yet been offered. We have not attempted to do this except in the most cursory and superficial manner, since it is rather our desire to have the several points dealt with by correspondents who have a more direct personal interest in them than we can pretend to have in the editorial capacity. From those who believe that trade interests can be better cared for than has hitherto been done we shall be glad to receive definite statements of the means by which they consider this could be done. In this connection, however, we would suggest that the prevailing abstinence of the trade from taking any part in the work of promoting pharmaceutical progress should not be overlooked. Neither is the failure of the Chemists' Trade Association to secure adequate support to be disregarded, or the fact that the present Council of the Pharmaceutical Society, which is so loudly condemned as the root of all evil, comprises a large majority of country chemists and three past presidents of the late Chemists' Trade Association. If there be a widespread conviction that the Council of the Society is out of harmony with the larger portion of the body that conviction would appear to be strangely inconsistent with the facts just stated and to be based rather on a want of true appreciation of the case. It has frequently been remarked that the feeling of hostility to the Society is really due to want of knowledge more than anything else, and not long since it was admitted by one of the members of the Council that since further knowledge had altered and matured his judgment he had ceased to be so critical of the action of that body as he had been before he became a member of it.

An Evening Meeting of the Pharmaceutical Society will be held at 36, York Place, Edinburgh, on Wednesday next, the 16th inst., when the adjourned discussion on Mr. Storrar's paper on "The Future of Pharmacy as a Trade and as a Profession," will take place. The chair will be taken at half-past eight o'clock.

* * *

We wish to draw attention to the announcement of the reopening of the School of Pharmacy of the Pharmaceutical Society, especially in connection with the new courses of lectures in the various subjects. Professor Dunstan will be occupied during the term chiefly with physical and organic chemistry. Professor Green has made an alteration in his arrangements this year, whereby the lectures on botany, instead of being delivered at the gardens of the Royal Botanic Society, Regent's Park, will be given in the lecture room at 17, Bloomsbury Square. They will be supplemented by practical work, to which attention will be given immediately after lecture, and which will entail the detailed examination by the student of typical specimens of the chief British natural orders. The students will have the privilege also of using the gardens at Regent's Park for study. Mr. Holmes will deliver a course of lectures, supplemented by microscopical work in vegetable and animal materia medica. The chemical laboratories will be open daily for practical instruction under the direction of Professor Attfield and his demonstrators, and the laboratory for instruction in practical pharmacy and dispensing will be open under the direction of Mr. Joseph Ince. Students will find it advantageous to enter the School at this time, when new courses of lectures are being commenced, particularly as several of them have in view the requirements of the Major examination. Full information and advice can be obtained by applying to any of the professors or lecturers.

* * *

Several retail chemists and "stores" in Edinburgh have recently applied for licences for the sale of wine, and opposition was offered by the Chief Constable on the ground that no licence is required for medicated wines prepared according to the directions of the British Pharmacopœia, and also because chemists' shops are open on Sundays. On the part of the applicants it was urged that they were quite willing to limit themselves to the sale of medicated wines. If that be the case, however, the recent declaration of the Board of Inland Revenue (see p. 628) would appear to do away with the need for a licence. On the part of the Licensed Grocers' Association it was contended that there would be danger in allowing chemists to sell wines so slightly medicated that the admixture could scarcely be detected. The magistrates appeared to take this view of the matter, but adjourned the decision of the question until Thursday next.

* * *

The *Lancet* of last week, in commenting upon the case reported at p. 805, takes exception to the suggestion of the Lord Mayor, that the words of the seventeenth section of the Pharmacy Act do not include mixtures containing poison, and remarks that the comment appears to be singularly ill-advised, but the writer of the paragraph has confused chemical compounds with pharmaceutical preparations, by giving as an illustration the instance of common salt which is innocuous, but contains a poisonous ingredient. What the Lord Mayor suggested was that the terms of the section related only to the sale of poisons in an unmixed state, assuming also that the words "the name of the article" applied to the poison sold. As Mr. Gill pointed out that view could not be maintained because the sale of a bottle of medicine would be a sale of every ingredient in the medicine, and if one of those ingredients were a poison, the provisions of the section would apply as much as if the poison were sold separately. The *Medical Press and Circular* is singularly unhappy in its answer to the question it raises as to What is a poison? To say that a poison is something that will cause death may be correct as the expression of an abstract principle, but that would not apply in relation to the case before the Lord Mayor, or to the legal view of the question, according to which a poison is any substance comprised in the schedule to the Act.

Transactions of the Pharmaceutical Society.

FIRST OR PRELIMINARY EXAMINATION.

April 8, 1890.

The following are the questions that were set for the Preliminary examination on that date:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin:—*

1. He gave his son the name of Brutus.

2. The daughters of that king were terrified by the anger of their father.

3. It is the duty of a good citizen to observe the laws.

4. When the slave had given the letter, he demanded a reward.

5. Having said this, the general dismissed the soldiers.

II. Translate into English either A. (Caesar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CAESAR.

1. Quibus rebus cognitis quum ad has suspiciones certissimae res accederent, quod per fines Sequanorum Helvetios transduxisset, quod obsides inter eos dandos curasset, quod ea omnia non modo injussu suo et civitatis, sed etiam inscientibus ipsis fecisset, quod a magistratu Aeduorum accusaretur; satis esse causae arbitrabatur, quare in eum aut ipse animadverteret, aut civitatem animadvertere juberet.

2. Bello Helvetiorum confecto, totius fere Galliae legati, principes civitatum, ad Caesarem gratulatum convenerunt; intelligere sese, tametsi, pro veteribus Helvetiorum injuriis Populi Romani, ab iis poenas bello *repetisset*, tamen eam rem non minus ex usu terrae Galliae, quam Populi Romani *accidisse*; propterea quod eo consilio, florentissimis rebus, domos suas Helvetii reliquissent, uti toti Galliae bellum *inferrent*, imperioque *potirentur*, locumque domicilio ex magna copia deligerent, quem ex omni Gallia opportunissimum ac fructuosissimum judicassent, reliquasque civitates stipendiarias haberent.

Grammatical Questions.—For those only who take Caesar.

1. Give the genitive singular and accusative plural of the following words, and state the genders of the nouns:—*has suspiciones*, *certissimae res*, *injussu suo* (par. 1).

2. Write, in full, the indicative perfect and subjunctive present of the verbs in italics (par. 2.)

3. Parse fully the following words:—*cognitis*, *transduxisset*, *dandos*, *inscientibus*, *satis*, *quare* (par. 1).

4. Write in Latin:—11, 27, 365, 19*th*, 2000*th*, *twice*.

B. VIRGIL.

1. Lucus in urbe fuit media, laetissimus umbrae;
Quo primum jactati undis et turbine Poeni
Effodere loco signum, quod regia Juno
Monstrarat, caput acris equi; sic nam fore bello
Egregiam, et facilem victu per secula gentem.
Hic templum Junoni ingens Sidonia Dido
Condebat, donis opulentum et numine Divae;
Aerea cui gradibus surgebant limina, nexaeque
Aere trabes, toribus cardo stridebat aënis.

2 His animum arrecti dictis, et fortis Achates,
Et patas Aeneas, jamdudum *erumpere* nubem
Ardebant. Prior Aeneam *compellat* Achates:
Nate Dea, quae nunc animo sententia surgit?
Omnia tuta vides, classem, sociosque receptos.
Unus *abest*, medio in flucto quem vidimus ipsi
Submersum; dictis respondent cetera matris.

Grammatical Questions.—For those only who take Virgil.

1. Give the genitive singular and accusative plural of the following words, and state the genders of the nouns:—*urbe media*, *acris equi*, *templum ingens* (par. 1).

2. Write, in full, the indicative perfect and subjunctive present of the verbs in italics (par. 2).

3. Parse fully the following words:—*quo*, *jactati*, *fore*, *victu*, *hic*, *nexaeque* (par. 1).

4. Write in Latin:—11, 27, 365, 19*th*, 2000*th*, *twice*.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. Divide the sum of 12 cwt. 3 qr. 17 lb. 10 oz. and 5 cwt. 2 qr. 23 lb. 11 oz. by 324.

2. Reduce $\frac{8}{11}$ of $\left(\frac{2\frac{1}{2}}{3\frac{1}{2}} \div \frac{4\frac{1}{4}}{5\frac{1}{5}}\right)$ of £15 3*s.* 10½*d.* to the fraction of £6 6*s.* 6*d.*

3. Multiply 322·5 by ·0101 and divide the product by ·00000215.

4. Simplify ·635 of a mile + $.10\dot{4}\dot{5}$ of a furlong — 1·75 of 3 yards + $\cdot\dot{1}4285\dot{7}$ of 1·4 feet.

5. A service of plate was made up of certain articles, which weighed, respectively, as follows:—4 kilog. 9 dekag.; 15 hectog. 5 decig.: 1 kilog. 560 gr.; 3594·7 centig. What will be the approximate value of this service in English money at 5*s.* 6*d.* per oz.?

6. Find the cost of a carpet 1 ft. 11¾ in. broad at 5*s.* 2½*d.* per yard, for a room 17 ft. 4 in. long and 14 ft. 3 in. broad.

7. If I buy 14 oxen for £157 5*s.* 10*d.* and sell six of them at £7 4*s.* each, for what must the remainder be sold that I may gain 4 per cent. on the whole.

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following:—

"I stand
On a sure ground, unshaken as a rock
That bears the force of storms, yet still remains
Firm on the base, and rears its lofty head
Above the clouds."

2. Write short sentences to show the different meanings each of the following words may have:—*own*, *very*, *as*. In each case parse the word you illustrate.

3. Correct the following sentences, giving your reasons:—

(i.) Either of the three will do.
(ii.) The man whom you thought was a philanthropist turns out to be a scoundrel.
(iii.) The two first girls in that form have sang well.

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—poor jeffreys humbled to the dust behaved with abject civility and called for wine i am glad sir he said to see you and I am glad answered the resentful whig to see your lordship in this place i served my master said jeffreys i was bound in conscience to do so where was your conscience said tutchin when you passed that sentence on me at dorchester it was set down in my instructions answered jeffreys fawningly that i was to show no mercy to men like you men of parts and courage.

*5. Write a short composition on *one* of the following subjects:—

(i.) "A stitch in time saves nine."
(ii.) Should emulation be encouraged in education.
(iii.) The importance of a good character.
(iv.) "None sends his arrow to the mark in view,
Whose hand is feeble, or his aim untrue."

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* This must be attempted by every Candidate.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 2nd instant, at No. 11, Harcourt Street, Dublin, the President, Mr. Charles Evans, in the chair.

There were also present, the Vice-President, Mr. Wells, Messrs. McCormick, Baxter, McNaught, Montgomery, Dr. Burnes, Merrin, Hayes, Beggs, Hodgson (Treasurer), and Professor Tichborne.

A letter dated January 15 was read from Mr. J. H. Young, Secretary and Registrar of the Pharmaceutical Society of South Australia, in reply to an inquiry which had been addressed to him as to whether any provision was made in the intended Pharmacy Act in that country for the acceptance of kindred societies. The answer was "Yes;" and the writer added that any applicant who satisfied the Registrar as to his membership of another society, or as to his examination credentials from schools of pharmacy, would be welcomed, but that in South Australia, although the harvest was great the labourers were too numerous, which was due partly to the free trade manner in which all were allowed to keep open shop at present.

Mr. Hodgson: Are we to understand that our licentiates are free to practise in South Australia? The letter seems rather indefinite.

The Vice-President: It refers to a new Bill about to be introduced in the Legislature there.

The Registrar: The Bill was introduced, but it did not pass. I suppose they will have it on again. The letter to Mr. Young was written some time early in last year. From the reply it appears that there is great freedom in South Australia.

Mr. Hodgson: "Welcomed" is an indefinite expression.

The Vice-President: There is no Act in force there at present. If they get us included in any Act that they pass that is all we want.

On the motion of Mr. McCormack, seconded by Mr. Baxter, the best thanks of the Council were voted to Mr. Young for his letter, and the valuable information contained in it.

A letter was read from Mr. James Hartford, M.P.S.I., of New York, stating that in compliance with the request of the Council he had taken steps to procure for them the information which they desired as to the pharmacy laws of the different States of America with reference to the status in each of them of licentiates of the Pharmaceutical Society of Ireland. The writer said the procuring of the information would take a little time, but that as soon as he should have obtained it he would have it published in the *Pharmaceutical Era* of Detroit.

On the motion of Mr. Baxter, seconded by the Vice-President, the best thanks of the Council were voted to Mr. Hartford.

A letter was read from Mr. Williams, Managing Director of the City School of Chemistry and Pharmacy (Limited), London, requesting that that school should be added to the list of schools recognized by the Society. Full particulars were given as to the course.

A letter was read from Mr. Eugene McSweeny, of 43, Grays Inn Road, London, asking the Council to accept from him a certificate of his having attended the prescribed courses in the City School of Chemistry and Pharmacy (Limited), London.

The letters having been discussed in committee,

Mr. Hayes moved that the City School of Chemistry and Pharmacy (Limited), London, be recognized by the Society.

Dr. Burnes seconded the motion, which was unanimously agreed to.

A letter was read from Mr. R. J. Downes, stating that he would be happy to withdraw his resignation of membership of the Society if he were assured that the circumstances that occasioned it would not recur.

The President: We all regret very much that Mr. Downes should have sent in his resignation, but I do not see that the Council can pledge themselves to any future course.

The Vice-President: Especially as our action was perfectly legal.

Mr. Hodgson: What was the point?

The Vice-President: What he objected to was our suspending the standing orders in order to take up out of its place a motion which appeared at the end of the paper for the election of a gentleman as a member of the Society.

It was ordered that a letter should be written to Mr. Downes stating that the Council regretted his resignation, but could not pledge themselves to any definite course of action in the matter.

A letter was read from Mr. William N. Allen stating that as the published reports of the meetings of the Council did not contain any resolution of the Council establishing a school of chemistry, he concluded that no such resolution could have been forwarded as was necessary for approval by the Privy Council.

Mr. Hodgson: We could not take cognizance of a chance conversation which Mr. Allen had with the Registrar on the subject.

The Vice-President: It may be well to inform Mr. Allen that the resolution establishing the school was passed at a special meeting of the Council held on December 23 last. It was not thought worth while to have the meeting reported, but its proceedings are on our minutes.

The President: There was no meeting of the Council in January.

Mr. Baxter: That answers Mr. Allen's letter.

Mr. McCormack: The question as to the school first came before us upon a motion, and it was then referred to a special committee, who considered the subject and responded to the Council. Their report was referred back to them, and after they had considered it again their report came before the special meeting in December and was then adopted.

Mr. Hodgson; Did we give notice of the resolution establishing the school to the Privy Council?

The President: We wrote asking them whether it is necessary to have their sanction for the school at all, and we are awaiting their reply. There was no quorum for our January meeting, and there has been a long delay. The matter did not come up again until February.

On the motion of the Vice-President, seconded by Mr. Baxter, it was ordered that Mr. Allen should be informed that the Council passed a resolution that an Evening School of Practical Chemistry should be started, at the special meeting in December last.

A letter was read from Mr. T. R. Connolly, L.P.S.I., of Clanbrassil Street, Dundalk, in reference to an election of an apothecary for Louth Infirmary for which he was a candidate. The writer stated that there was no mention on the occasion, as far as he knew, of the apothecary being obliged to act as medical officer in the absence of the physician; and he thought the only thing the Council could do now was to take steps to have their Act amended, as the same question that had arisen in connection with his candidature might arise again.

The President: Unless we know definitely what is required from the apothecary of the Louth Infirmary we cannot act in the matter.

Mr. Hodgson: If he is required to prescribe that would exclude our licentiates. If we ascertained that the officer in the infirmary in question is never called in to act in the absence of the surgeon, we could make a stronger stand in reference to such appointments.

On the motion of Mr. Beggs, seconded by Dr. Burnes, it was ordered that Mr. Connolly should be informed that unless he supplied the information asked for in the last letter addressed to him the Council could not proceed further in the matter.

A letter was read from Mr. G. Dimond, of Maryborough, complaining of statements which had appeared in a weekly newspaper called the *Lady*.

Mr. Hayes said that he saw the statement in the newspaper in question, and, feeling indignant, wrote a reply, which was inserted in the *Lady* about three weeks ago. The *Chemist and Druggist* had also published a *résumé* of his reply.

The Vice-President: Did any further statements of the kind appear in the *Lady* since?

Mr. Hayes: No, I think not.

On the motion of Mr. Baxter, seconded by Mr. Merrin, a resolution was passed that as Mr. Hayes had answered the statements which appeared in the *Lady*, the Council did not think it necessary to take any further steps in the matter.

A report of the Law Committee and a letter from Dr. Tweedy with reference to the marking for the Preliminary examination were considered and disposed of.

A letter was read from Mr. David W. Moore asking the Council to accept a certificate in practical chemistry which he holds from the chemical school of the Queen's College, Belfast.

On the motion of Mr. Hodgson, seconded by Mr. Beggs, a resolution was passed stating that as it appeared that Mr. Moore had not got the requisite number of hours in practical chemistry certified by the school which he had been attending, he should be informed that if he got the balance of the required time certified by another school recognized by the Society, it would be accepted.

Mr. Baxter and Mr. Beggs stated that the Queen's College School of Chemistry was an excellent one.

The President moved the following resolutions pursuant to notice:—

(1) "That a letter be written to the Privy Council, requesting that liberty be granted to the Council of the Pharmaceutical Society to change the day of any examination, either Preliminary or Final, should such day be a general holiday, or the Examiner be unable to attend.

(2) "That the Privy Council be requested to grant the Pharmaceutical Society power to establish an examination to qualify assistants to become dispensers of medicine in medical establishments."

The want of power to alter the day of an examination without leave from the Privy Council sometimes caused great inconvenience.

Mr. Merrin said it would be well to send details to the Privy Council, as to the sort of examination for assistants that they proposed to have.

Mr. Hodgson: Better ventilate the matter a little more before we go to the Privy Council.

Both resolutions were referred to the Law Committee.

Some other business having been disposed of, the Council adjourned.

APRIL EXAMINATIONS.

Messrs. Curtin, O'Hagan, Millwood, Gilbert, O'Donnell and Cosbie have passed the examinations for the licence.

Five failed to pass.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At the meeting of the above Association, held on Thursday, February 27, the following paper was read:—

THE POLARISCOPE AND ITS APPLICATIONS IN PHARMACY.

BY W. LLOYD WILLIAMS, A.I.C.

Of the various physical phenomena with which the pharmacist must profess acquaintance, none is more interesting and few more instructive than the section which is included under the head of optics. At the same time the subject of light is one that calls for a considerable amount of application before its principles can be thoroughly mastered, and to this fact probably one may attribute the common disinclination to pursue this study beyond the narrowest limits which experience dictates as indispensable for a purpose which need not be further particularized.

It therefore seemed to me not altogether inappropriate that a paper bearing upon one phase of the subject and partaking somewhat of an educational nature should be read before the members of this Association, more especially as it would appear to form one of a series of such papers, the earlier members of which on the microscope, thermometry and crystallography have already been communicated to the Association.

The fact that some year and a half ago, in the course of an investigation upon the iso-amylic alcohols, I was making daily polarimetric observations, has also had its part in influencing my desire to become better acquainted with the instrument myself, and to diffuse such knowledge as my limited opportunities have permitted me to acquire.

Naturally upon a subject to which many thoughtful men have devoted almost a life-time of study, the amateur can say nothing that is new; hence I disown all claim to originality as regards the main facts of my paper, and would at once disarm the hostile critic by this avowal.

To enter into a long dissertation upon the theories of optics would be to stray from the path which the subject of the paper bids us pursue, but a faint and hasty outline of general principles will serve to help us on the way.

The imponderable ether which permeates all space is the medium whose tremulous motions received upon the retina excites within the brain the sensation which we term light.

Ordinarily the transmission of these vibrations is in all possible directions perpendicular to the axis of the ray, just as a stone dropped into the middle of a still pond causes a general wave-like disturbance of the water. In the case of polarized light however the ethereal billows suffer a species of coercion and are compelled to travel in one direction only.

This effect of polarization, as it is termed, may be produced in several ways, perhaps most easily by reflection. A ray of light falling upon a reflecting surface at a particular angle, termed in consequence the polarizing angle, becomes reflected and polarised. The light which comes through a pane of glass is also slightly polarized, and if a number of glass plates be arranged in a bundle the amount of polarization may be greatly increased; refraction is responsible for the change in this case.

This is true too of the polarization which is communicated to the rays of light as they pass through the atmosphere on their way from the sun to the earth.

But the change is much more marked in the passage of a ray of light through certain well-known crystals, where the phenomenon is due to double-refraction, and instruments in whose construction such crystals take part are ordinarily employed for producing the polarized ray.

The ordinary pencil of light which enters a crystal of Iceland spar gives rise to two polarized rays differing in the intensity of their refraction, and consequently in the direction which they follow; they are commonly known as the "ordinary" and "extraordinary" ray. As a matter of fact, only one of these rays is employed in making polarimetric determinations, the less refracted or extraordinary ray.

The manner in which the ordinary ray is removed from the sphere of action is so striking an instance of the adaptation of mechanical ingenuity to natural phenomena that I am constrained to notice it in passing.

By suitably splitting and grinding a piece of Iceland spar and re-uniting the severed portions with Canada balsam, a combination of prisms is obtained, named after its inventor a Nicol's prism.

The refractive indices of Canada balsam and of the extraordinary ray are almost identical, being 1·52 and 1·54 respectively; in accordance with the well-known law in optics, therefore, this ray will proceed through the balsam with very little deviation.

But the relations between the ordinary ray and the Canada balsam are much more strained, 1·66 and 1·54 representing the refractive indices, hence the ordinary ray already bent to such an extent as to preclude the possibility of harmonious progression with its fellow ray, now meets a medium of much feebler refractive power and becomes still further estranged, undergoing total reflection, and becoming absorbed by the case of the prism.

Certain substances undoubtedly owe their power of optical activity to physical causes; this is the case with bodies which exhibit the phenomenon in the crystalline state and lose it when brought into an amorphous condition by solution. In this class are found cinnabar, quartz, some salts of sodium, several dithionates, etc. They all possess certain relationships each with the other in form, and occur in right-rotating and left-rotating crystals, which a crystallographer can at once distinguish by a simple examination of their faces.

Other substances exhibit their rotatory power when in solution, and retain it even when the solution has been made to assume the more attenuated form of vapour. No *inorganic* substance is known which in solution exhibits rotatory power; hence the conjecture that this power is an attribute of the carbon atom becomes irresistible.

The phenomenon in the case of liquids might be due to physical causes. Liquids might be pictured as being built up of groups of molecules which the change of state has not separated; but the conversion of the solution into vapour must involve a breaking down of such groups. Thus we are driven to the conclusion that optical activity is a power resident here in the molecule itself, and being dependent upon the atomic structure is essentially chemical in its nature.

A survey of molecular architecture is thus rendered possible, in which the chemist and physicist may both join; the former prosecutes his inquiry for the purpose of knowing whence arises the reason for various chemical phenomenon; the latter gets a step nearer to the solution of that difficult but fascinating problem, the arrangement of the atoms in space.

It is impossible to distinguish by means of the naked eye a polarized ray from an ordinary pencil of light; hence it is necessary in experiments on polarization to have two distinct pieces of apparatus, the one to effect polarization, the other to make the effect evident; the former is termed the "polarizer," the latter the "analyser," and such a combination is described as a polariscope. Though these two parts constitute the essentials of each instrument, the construction of any one of them will bear more expansive treatment than this bald statement of fact at first sight suggests.

A description of the polariscope was given, which was rendered more interesting and intelligible by blackboard sketches and demonstrations with a Zeiss's saccharimeter which had been kindly lent for the occasion by Mr. Baker, Holborn. The chief differences in the best known instruments were explained, and the devices for obtaining the "sensitive tint" and the "half shade" found in Laurent's apparatus were also described.

Provided the normally graduated arc of any polariscope be replaced by a conventional scale, that polariscope may be used as a saccharimeter; as a general rule, however, instruments are specially constructed for determining solutions of sugar.

Soleil's saccharimeter was described and attention was directed to the application of the fact in the construction of this instrument that the rotatory dispersion of cane sugar was identical with that of quartz.

O'Sullivan defines the specific rotatory power of an optically active body as being simply the standard to which the activity is referred for the sake of comparison. Divested of all complication, it is the angle through which the plane of polarization of a given ray is rotated by passing through a layer 1000 m.m. in length of a solution containing 10 grams of dry substance or of known composition in 100 c.c.

As white light is a compound of colours whose vibrations are not identical, it is customary to refer rotatory power to a particular part of the spectrum in order that the experiments may be comparative.

The sodium flame supplies such a reference point, and determinations which have been made with a sodium flame as the illuminant are indicated by placing the letters α_D after the figures denoting the rotatory power.

In the "transition tint" instruments the reference point lies between the red and violet rays, and the yellow rays are here completely obscured. In cases where this point is employed the angle is designated by the observed number of degrees and the letters α (jaune moyen).

Though α_D and α_j represent the observed rotatory power in any given instance, it rarely happens that this corresponds with the specific rotatory power; hence a slight modification is made, when the specific rotatory power is recorded, thus:—$[\alpha]_j$ and $[\alpha]_D$; the bracket indicating that the necessary corrections have been made.

For the conversion of $[\alpha]_j$ into $[\alpha]_D$ all that is needed is to multiply by 0·903; and to convert $[\alpha]_D$ into $[\alpha]_j$ multiply by 1·107 for $[\alpha]_j : [\alpha]_D :: 24 : 21{\cdot}67$.

When different active substances are placed in the tube the ray will have to pass through varying masses of molecules in accordance with the densities of the liquids.

Hence the necessity for calculating the observed angle of rotation to some common standard of density.

In making comparative experiments it is necessary to employ the solutions at the same temperature, for an increase in temperature generally involves a decrease in the angle of rotation, occasioned by the expansion of the molecules.

It must not be supposed that the absolute rotation value of an active substance may be obtained by the observation of a single solution of any optically active body. A vast number of determinations must be made, and only a very few solids, such as camphor, cane-sugar and glucose have as yet had their direct specific rotations accurately determined.

Provided an active substance is dissolved in a liquid so as to yield a solution of given composition, the specific rotation is constant, but for such a solution to be of value for reference, in addition to the rotatory value it is necessary to state—

(i.) The ray with which the observation has been made.

(ii.) The description of solvent used; and if anything but water be employed, the specific gravity being stated.

(iii.) The proportion of active substance in 100 parts by weight of solution (p=percentage composition), or else the number of grams in 100 c.c. of solution (the concentration).

(iv.) The temperature, t, of the solution when the angle of rotation was observed. (Specific gravity of solution must be taken at the same temperature.)

(v.) The direction of rotation described as dextrorotatory or lævorotatory, and indicated by the + or − signs respectively.

Such a statement appears on paper in the case of cane-sugar, for example:—

Cane-sugar (solution in water, $p = 16{\cdot}993$) $t = 20°$, $[a]_D = +66{\cdot}49°$.

Ordinary camphor:—

Ordinary camphor (solution in alcohol of specific gravity ·796 at 20°, $p = 15{\cdot}092$, $t = 20°$), $[a]_D = 43{\cdot}66$.

To determine the specific rotation of an optically active body the following data must be obtained by actual experiment.

i. The measurement of the angle of rotation, a, for a given ray.

ii. The measurement of the length of the experimental tube in millimetres.

iii. The weight, p, of active substance in 100 parts by amount of solution.

iv. The specific gravity, d, of the active liquid.

v. The concentration, *i.e.*, number of grams in 100 c.c. solution.

The formula for calculating liquids then becomes

$$a = \frac{100 \cdot a}{L\,.\,d.}$$

The formula for calculating solutions then becomes

$$a = \frac{10^4 \cdot a}{L\,p\,d},$$ from the percentage composition.

The formula for calculating solutions then becomes

$$a = \frac{10^4 \cdot a}{L\ \ c},$$ from the concentration.

Having then discussed at some length such facts and descriptions as are essential for understanding the phenomenon of polarization, we may now turn our attention to an inquiry as to the reason why certain substances should exhibit the remarkable property of rotating a ray of polarized light in one direction, some in another, and a large number of bodies be altogether devoid of this rotating power.

The earliest observations are those recorded by Arago in 1811, but Biot in 1815 first noticed that the property was present in organic bodies, and he directed his time and attention to the subject for more than forty years. His researches and deductions form the basis of modern conceptions of the subject, which, however, have been enriched by a wealth of added facts and inferences from the unwearied labours of Pasteur, and the elaborate investigations and ingenious hypotheses of Le Bel, van t'Hoff and some others.

Fresnel propounded a theory to account for the circular polarization which quartz imparts to rays of light.

He states that the linear polarized ray which traverses a piece of quartz in a direction parallel to the main axis of the crystal becomes decomposed into two rays, each of which pursues a helical course, the one right-handed the other left-handed.

On emerging these rays again unite, but if the velocity of the two rays has not been identical the plane of vibration will now be changed, the more rapidly vibrating ray impressing its individuality upon the emergent ray.

The theory suggested for the explanation of circular polarization in other crystalline bodies is based upon the supposition that the ether surrounding the molecules is in an unequal condition of condensation, and the connection between right and left handed hemihedric planes in crystals and the direction of rotation is believed to be due to the arrangement of the ultimate parts of the crystals in right- or left-handed helices.

Sohncke, by arranging a number of mica plates in a spiral manner was able to produce an optical combination, which caused rotation of a ray in a manner precisely similar to that observed in certain crystals.

Le Bel and van t'Hoff trace the optical activity of substances to the presence of what they term an asymmetrical carbon atom, a carbon atom whose four affinities are each satisfied with a different radicle. Certain it is that all optically active substances contain such asymmetric carbon atoms, but it does not follow as a matter of course that bodies containing this specialized atom should possess rotatory power, and the reason for this apparently contradictory behaviour is not as yet satisfactorily established. In some instances the absence of optical activity in such bodies is due to their compound nature; they are composed of right-rotating and left-rotating moieties which compensate or neutralize each other. Racemic acid, the so-called inactive tartaric acid, is a case in point.

Naturally occurring active substances when prepared artificially are almost invariably inactive; this is true of the artificial alkaloids, and it is due either to compensation or to our inability to control the reaction. The proof of the compensatory theory lies in the fact that by means of certain ferments an inactive substance may be split up and made to yield one which is active.

The ferment destroys one active modification more readily than the other.

Applications.—The applications of the polariscope in general pharmacy are very limited. Though the number of optically active carbon compounds already noted totals some 300, and the great majority of them are constantly being handled by those who dispense medicines, yet it is questionable if half-a-dozen are subject to systematic polarimetric observation by either the manufacturing or retail pharmacist.

The saccharimeter is the constant companion of the sugar-refiner, and the brewer is scarcely less attached to the instrument, but the affections of the pharmacist lie in other ways.

In the Pharmacopœia we read under carbolic acid that "It does not affect the plane of polarization of a ray of polarised light," and under creosote "it turns the plane of polarization of a ray of polarized light to the right." I believe these are the only instances where reference is officially made to polarized light.

The preparation of terebene is controlled by the use of a polariscope, and the instrument has been employed to discriminate in admixtures of the cinchona alkaloids, but much experience and patience are required of the experimenter, and the one who has worked most at this part of the subject has expressed his dissatisfaction with the results obtained.

The sugars and carbohydrates generally have yielded many of their secrets to this instrument in the hands of specialists, but it is rather as a subsidiary agent in research work that the pharmacist will find his best and greatest opportunities for using the polariscope.

I have to acknowledge my indebtedness to the following works:—Landolt's 'Handbook of the Polariscope,' Bernthsen's 'Organic Chemistry,' *Comptes Rendus* (var.), J. van t'Hoff's 'La Chimie dans l'espace,' and Johnson's 'Analyst's Laboratory Companion,' and my best thanks are due to Mr. Baker, Holborn, for the loan of the very fine Nicol's prism and Zeiss's saccharimeter which he has so kindly placed at my disposal.

The Chairman (Mr. T. A. Ellwood) said he quite concurred with Mr. Williams's opening remarks, for he too regarded the Association as having a right to include amongst its objects the enlightenment of the members upon points which though frequently closely related to pharmacy, were yet just far enough removed to escape notice in the ordinary way. Some of the remarks which fell from him the previous week respecting the introduction of crystallography into a scheme of pharmaceutical education he thought were equally applicable here; amidst the multiplicity of matters that it was deemed essential for the pharmacist to know he thought there was scanty room for the incorporation of the science of crystallography, and the accommodation for the polariscope was equally limited. When, however, a member of their body took the trouble to collect and present in a compact and intelligible form the gist of such matters, he was as much entitled to their thanks as if he had brought before them an account of his own experimental work; and such papers were especially valuable for reference when published in their 'Proceedings.' He noticed that Mr. Williams had not alluded to the use of the polariscope in the examination of essential oils, where he believed it was sometimes employed. He supposed the pharmacist usually disregarded the use of polarized light in the official instances which Mr. Williams had mentioned; at any rate he had never met with a retailer who examined his creosote and carbolic acid in this manner.

Mr. Dymond said Mr. Williams had treated the subject in an exhaustive manner, but he was a little surprised to find that he had not touched upon the magnetic rotation of liquids, which in the hands of Dr. Perkin had undergone much development, and was now capable of furnishing much satisfactory information. One of the objections to the use of the polariscope was the fact that the observations were so greatly influenced by the presence of even small quantities of impurities, an influence quite as pronounced in its alteration of the ordinary rotation of the substance as were melting points and boiling points by the same cause.

Mr. Robins remarked that the polariscope exhibited was extremely sharp and precise, and inquired if Mr. Williams found any difficulty in getting a good sodium flame.

Mr. Fawssett alluded to the use of the polariscope in connection with the cinchona alkaloids, and the uncertainty which attended its application therewith.

Mr. Frank A. Rogers mentioned the anomalous behaviour which he had observed in a certain sample of morphine tartrate, and inquired if an estimation by means of the polariscope would enable him to discover in what respect it differed from normal specimens.

Mr. F. Ashley Rogers inquired if it would be possible to use a modified polariscope in connection with the microscope, as such a combination would doubtless prove useful.

Mr. L. Ough and others also joined in the discussion.

In reply Mr. Williams said he had not alluded to the use of the polariscope in connection with volatile oils, for a clever rogue could always manage to regulate his samples by the judicious use of French and American turpentines, which were possessed of opposite optical activities. He had not overlooked that remarkable discovery of Faraday's, magnetic rotation, but considering that the property was dependent upon magnetic action and ceased as soon as the disturbing influence was removed he thought it best to omit the notice of the phenomenon. He quite agreed with Mr. Dymond as to the modifying influence that impurities exerted in all cases where determinations of the physical constants were made, and he was being rapidly driven to the conclusion that Nature had as great abhorrence for perfect purity as she was reputed to have for a vacuum. He had been in the habit of using rock salt as the source of his sodium flame, a small piece on a small platinum gauze support, if carefully arranged in the ordinary gas lamp flame, gave good results. He was unable to say if morphine tartrate was optically active. Though morphine was lævorotatory it did not follow that its salts or derivatives would necessarily possess similar rotatory power; indeed it was impossible to foretell whether the compounds of an active substance would be characterized by optical activity or not. Mr. Rogers would be pleased to know that a number of excellent papers had appeared in the *Pharmaceutical Journal* some years ago from the pen of Mr. Pocklington, treating of the use of polarized light for examining starches, etc. In conclusion he thanked the members for the kind manner in which they had received what he was afraid had proved a dry paper, and reminded them that his duties as secretary had prevented him from giving the subject all the time and attention that it deserved.

On Thursday, March 13, a paper by Mr. C. F. Rideal on "Dickens: His Heroines and Women Folk," was read before the members of the Association.

The paper was of high literary excellence, and exhibited the author as a close student of the accomplished novelist.

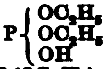
A vote of thanks was proposed to Mr. Rideal by Mr. W. L. Williams and seconded by Mr. Goodman, and suitably acknowledged by the lecturer.

At a Council meeting held on March 21 it was proposed by Mr. H. H. Millhouse, seconded by Mr. T. S. Dymond, and carried unanimously, "That the Council disapproves the action of the Dinner Committee in permitting the general circulation of the programmes of the dinner by a firm of advertising outfitters, without first consulting the Council."

ROYAL INSTITUTION.

THE GLOW OF PHOSPHORUS.

A lecture on this subject was given on Friday, March 14, by Professor T. E. Thorpe, who began with a notice of the ancient use of the term phosphorus in a general sense to denote any substance which glowed in the dark, just as the word phosphorescence is still employed. He alluded to the various phenomena of this description which had been known from very early times, and which occurred in the animal, vegetable, and mineral kingdoms; glow-worms, fireflies, fungus on decaying tree-stumps, were examples in the two former, and in the latter, besides certain gems capable of shining by their own light, the sulphides of the alkaline earths were prominent for this property. In the seventeenth century it was known that barium sulphate when ignited with white of egg and other carbonaceous materials produced a kind of "phosphorus." The sulphide of calcium, now so well known as "luminous paint," was first produced by Mr. Canton by igniting a mixture of oyster shells and sulphur. The singular property possessed by these alkaline earth sulphides of absorbing light when exposed to it, and emitting it again afterwards, is not due, so far as we know, to any chemical change in their composition. Their phosphorescent properties are in some cases enhanced by warming, and suspended by cooling; in others the converse is true, the phosphorescence disappearing on heating, but re-appearing on cooling. The real source of light is not the calcium sulphide, this substance when quite pure not being phosphorescent, but resides in adventitious matters which are present

A great variety of colour is attainable according to the nature of the substances present, traces of bismuth, antimony, tin, copper, gold or zinc giving blue or violet tints, while manganese imparts a purplish and lead a yellowish-green hue. Examples of substances exhibiting phosphorescence when heated were shown by sprinkling a variety of dolomite, which glowed with a red colour, and fluor spar, which shone blue-green, on a hot plate. Other examples were enumerated, such as the light emitted by mica when split along its cleavage planes, that observed in the crystallization of some salts, the light emitted by mercury impinging on a bell jar in a partial vacuum and which can also be seen in a Sprengel pump, and the glow produced by electrical discharges in highly vacuous tubes. Many very beautiful illustrations were shown of the glow emitted by various substances, such as fluor spar, zinc sulphide, rubies, diamonds (which become gradually converted into graphite by the process), pure alumina, etc., when submitted to molecular bombardment in a high vacuum by passing an electric current. The lecturer then proceeded to the discussion of the element to which the term phosphorus is now restricted, describing it as the most remarkable of all the elementary substances known. He quoted many of the observations of Boyle, who noticed that it was only luminous in presence of air, the character of the light and the effluvia accompanying it, the odour of the water in which it was kept, that it was soluble in oils but that certain oils prevented the glow. In the *Philosophical Transactions* it is stated by Dr. Scherer that the glow of phosphorus is increased when the air is rarefied, but on the other hand it does not glow in a Toricellian vacuum. It was shown also by Lavoisier that it is not possible to ignite it with a burning-glass in a barometric vacuum. The glow is evidently due to oxidation, and yet phosphorus does not glow when immersed in pure oxygen at ordinary pressure instead of air. When warmed, however, or when the oxygen is rarefied, the glow appears, and conversely it ceases to glow in air when the latter is condensed. John Davy, brother of Sir Humphrey, showed that phosphorus just ignited in ordinary air could be extinguished by suddenly compressing the air, and recently Brereton Baker has shown that it does not glow or burn in absolutely dry oxygen under any conditions. Graham found that minute traces of many substances, *e.g.*, turpentine and ether, were sufficient to prevent the luminosity. It is known that ozone is produced whenever phosphorus glows, and it appears that if the conditions are such that no ozone can be formed, there is no glow; no ozone is ever produced in the presence of essential oils, and there is no glow in their presence. A speculation of the lecturer's to account for the formation of ozone was that in the formation of P_2O_5 a molecule of oxygen is necessarily separated into its constituent atoms, and that one of these unites with another molecule to form ozone, thus: $P_2+3O_2=P_2O_5+O$; $O+O_2=O_3$. The maximum glow, and maximum formation of ozone take place at 24° or 25° C., and although the glow is extinguished by immersion in oxygen, the introduction of a little ozone causes it to reappear. The reason the luminosity and formation of ozone increase with the temperature is probably that these effects are due to the oxidation of phosphorus vapour, which of course is given off more freely at higher temperatures, although at ordinary temperatures a good deal volatilizes, as is shown by the fact that notable quantities of phosphorus are carried off in the state of vapour by inert gases, such as hydrogen. The lecturer has recently been working on the products of combustion of phosphorus in a limited supply of air, and found that when it was strongly heated an intermediate oxide of phosphorus P_2O_4 was produced. A crystalline deposit was also noticed on the tube in which the experiments were performed. This was very volatile, readily melting by the heat of the hand and darkened by the action of light. The substance is obtained with some difficulty by allowing the P_2O_5 and vapour of phosphorus to condense in the cold part of the tube, and passing the uncondensed vapour into a receiver kept cold by a freezing mixture. It turned out on examination to be what has hitherto been supposed to be P_2O_3, but this probably does not exist, the true formula, as shown by its vapour density, being P_4O_6, corresponding with the corrected formula As_4O_6 of arsenious oxide. The P_4O_6 melts at 23° C., and distils easily without decomposition, but is decomposed by the action of light with liberation of free phosphorus. It slowly absorbs oxygen, forming P_2O_5, and the P_2O_5 is found to be in crystals, proving that the P_4O_6 is in the state of vapour when it combines with the oxygen. It is readily soluble in benzene and carbon bisulphide, but not at once in water; when thrown into water it sinks to the bottom and remains unchanged for many days. When gently heated it ignites, and when thrown into chlorine at ordinary temperatures it also takes fire. When thrown on to the surface of alcohol it inflames, and when the action on alcohol is moderated and kept under control the product of the reaction is the third and hitherto unknown phosphorus ether  $P\left\{\begin{array}{l}OC_2H_5\\OC_2H_5\\OH\end{array}\right.$; the other two previously known being $P(OC_2H_5)_3$ and $P(OC_2H_5)(OH)_2$. P_4O_6 shows exactly the same phenomena with respect to luminosity as phosphorus itself, the glow being modified in exactly the same way by similar conditions, and the glow of phosphorus was probably caused by its oxidation to P_2O_5 and P_4O_6 with production of ozone, and the reaction of ozone on the vapours of P_4O_6 and phosphorus.

ELECTRO-MAGNETIC RADIATION.

On Friday, March 21, Professor Fitzgerald delivered a lecture on the "Nature of Electro-Magnetic Radiation," and performed a series of experiments to show that it is of the same character, and obeys the same laws as in the case of light and radiant heat. After referring to the method explained by Professor Lodge last year, of obtaining very slow vibration, and consequently very long waves, he stated that a comparatively short wave length was required for these experiments, the most suitable being from two or three to ten or twelve, corresponding to about one hundred million vibrations per second, a number intermediate between those which are audible and those which are visible. Vibrations of this particular degree of velocity were obtained by the discharge of a condenser of suitable capacity, which consisted of two brass plates hung in line with each other, and bearing small knobs which were at a small distance from each other. A similar condenser was hung at a considerable distance from the first, and after illustrating the production of nodes and loops by the interference of waves travelling in opposite directions, and showing that a node was always formed at the point of reflection of a wave, these phenomena were shown to hold good in the case of electro-magnetic radiation by placing metallic screens in such positions as to make the second condenser occupy the positions of a node and a loop respectively. As the second condenser is charged by the first when in the position of a loop, but not when in the position of a node, the only possible explanantion is that of wave propagation. Another analogy to light was shown by imitating the phenomena of polarized light with an electro-magnetic tourmaline, made of parallel wires stretched on a frame, which allowed the energy to pass freely when held in one direction, but stopped it when held in a position at right angles to the first. The experiment was performed with two small condensers hung in the foci of large metallic parabolic reflectors, the electromagnetic tourmaline being placed between them.

Provincial Transactions.

NEWCASTLE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first annual meeting of this Association was held in Lockhart's Café, 17, Blackett Street, on Wednesday evening, April 2, at a quarter past eight o'clock, Mr. Fred Park in the chair.

There was a fair attendance.

The reports of Secretary, Treasurer, and Prize Committee were read and unanimously adopted, being very satisfactory.

The following office bearers were elected for the ensuing year.—President, Mr. Fred Park; Vice-Presidents, Mr. John Pike and Mr. Campbell Russell; Secretary, Mr. Geo. F. Merson, 20, West Grainger Street; Assistant-Secretary, Mr. Matthew Bell; Treasurer, Mr. Peter Bell, 11, Grey Street; Committee, Messrs. J. G. Davison, T. S. Herd, H. Hodgson, T. H. Kellett and B. T. Ord.

Reviews.

THE FLOWERING PLANT, as Illustrating the First Principles of Botany. By J. R. AINSWORTH-DAVIS, B.A., Lecturer on Biology and Geology in the University College of Wales, Aberystwith.*

The work just published by Mr. Davis purports to be especially adapted for London matriculation and other examinations of about the same standard, and hence is evidently intended to be read by elementary students. It gathers together into the small compass of about one hundred and forty pages the leading facts of elementary botany, so far as the phanerogams are concerned. The plan on which it is written differs considerably from that adopted by most authors. Instead of taking the separate sections of morphology, anatomy, physiology, etc., in their order, Mr. Davis treats of all these in connection successively with the several members of the plant. He introduces to the student first the conception of living substance with its different properties and functions, and shows how the same substance is concerned in the life of both the animal and the plant. This leads on to the discussion of the processes which mark the latter during its life, and to the relation between structure and function in its different organs. The latter are taken in the following order:—Root, stems, leaves, flowers, fruits and seeds. The structure of each is briefly examined, and its various physiological duties explained. There is a certain advantage in this method of treating the subject, apart from its comparative novelty, for the whole of the life history and working of any part is gathered together into a small compass. On the other hand the method is not so generally useful as that adopted by most of our standard botanical writers, for the idea of the plant is more easily grasped by considering it from one point of view at a time, and therefore studying separately the laws which regulate its outward form, the phenomena of its vital processes, and the peculiarities of its anatomy.

Regarded from the point of view of the elementary student the book may be thought to contain too much detail. The author has striven after completeness in each section, but to get the subject within the limits of a small book he has been compelled to make his information so concise that there is danger of a beginner becoming lost in the details. The principles of the subject are not made so clear as to lead the student gradually on from point to point, and might with advantage have been more fully elucidated, even at the expense of sacrificing some amount of matter interesting rather to more advanced students. From the point of view of the latter again the information given is much too concise. The effort to condense such a mass of material has in many cases led the author to make statements which in the absence of explanation may easily be mistaken and give rise to grave misconceptions. Thus the description applied to the epidermis on p. 7, the cuticle p. 30, the statement made about the structure of the bark, p. 37, are all misleading, while the illustration given on p. 16 of the causes of the polygonal shape of the cells of parenchyma is singularly infelicitous.

The author very rightly emphasizes the need for a practical study of living forms during the time the student is working at the text book. In this his course is justified by the experience of all engaged in teaching the subject. An appendix to the work, consisting of about 20 pages, is devoted to giving directions as to the way to carry out such practical work.

A second appendix, which from all scientific standpoints had been far better omitted, is devoted to a quotation of specimen questions taken from various examination papers. One cannot but fear from these, and from a sentence in the author's preface, that his aim has been too little to teach the subject and introduce his readers to scientific modes of thought and study, and too much to have them use the volume as a handbook to examination only.

THE EXTRA PHARMACOPŒIA, with the Additions introduced into the British Pharmacopœia, 1885. By WILLIAM MARTINDALE, F.C.S. Medical References and a Therapeutic Index of Diseases and Symptoms, by W. WYNN WESTCOTT, M.B. Lond. Sixth Edition.*

Messrs. Martindale and Westcott's little volume has now become so well established a favourite with both pharmacists and medical practitioners that it partakes somewhat of the character of a work of supererogation to dilate at this stage in its history upon its merits. But at least the surprising fact is worth mentioning that this sixth edition, issued within seven years of the appearance of the first, brings the total number of copies printed up to 36,000. Moreover the present edition is not a mere reprint of the fifth edition, since the pruning knife has been applied vigorously in some parts, whilst in others there has been a development that has more than occupied the space thus saved. As giving some indication of the nature of the latter, as well as of the recent enormous influx of chemical compounds into the materia medica, it may be mentioned that although only about twenty months have elapsed since the last revision it has been necessary to make room in the present edition for references to—among other substances—benzanilid, chloralamide, cresalol, exalgin, hydracetin, methacetin, orexin hydrochlorate, phenylacetic, phenylpropionic and trichloracetic acids, sodium dithiosalicylate, somnal, ural and tetronal. In addition the therapeutic information respecting several other recent compounds has been considerably enlarged. In every respect the book is well up to date and the authors seem determined to deserve a continuance of the remarkable favour hitherto accorded to them.

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* London: C. Griffin and Co., 1890. Small 8vo. Pp. i.-x., 1-181.

* London: H. K. Lewis, 1890. 24mo. Pp. i.-xii., 1-485. 7s. 6d.

Obituary.

WILLIAM VALENTINE RADLEY.

We regret very much to have to record the loss of Mr. William Valentine Radley, who died in Southport, on Sunday last, at the age of 70 years. Mr. Radley was born in the neighbourhood of Rotherham, and received his education in Doncaster. He was apprenticed to Mr. Belk, chemist, of Orchard Street, Sheffield, and subsequently acquired by purchase the old-established business of Mr. Gillatt, 74, Market Place, Sheffield, where he carried on a large and eminently successful business for about forty years. Mr. Radley was one of the founders of the Pharmaceutical Society, and did a great deal in promoting its interest in Sheffield and the surrounding neighbourhood. He was the first local secretary for the district, and held that office for many years. In the year 1872 he was elected a member of the Council of the Pharmaceutical Society, but withdrew in May, 1875. In 1880, however, after he had retired from active business, he again became a member of the Council, and it was only in 1888, when increased age with its infirmities began to tell upon him, that he relinquished his seat with mutual regret on his part and that of his colleagues. The progress and welfare of the Pharmaceutical Society had ever been his keen desire, and he had endeavoured in a single-hearted and earnest manner to further the cause to the best of his ability. Mr. Radley was a man of kindly disposition and manner, ever ready to lend a helping hand to those requiring it, and many are left to testify to the quiet generosity and help he was ever so ready to afford. He was for many years closely identified with the Wesleyan Society, and held the most important lay positions in that denomination.

The local Pharmaceutical and Chemical Society at Sheffield owes a great deal to the memory of Mr. Radley. He was one of its originators, and early its president; afterwards for a long period he acted as its treasurer. A great deal of the success of the Society and interest in pharmaceutical affairs shown in that district is due to his patient and persistent efforts. In politics Mr. Radley was a Liberal Conservative, but he never took a very prominent part in political affairs.

Mr. Radley's death was rather sudden. For some time past he had been in rather delicate health, but had so far recovered as to reassure his family, and indeed he himself spoke of how much he felt his condition to be improved. On Sunday last he attended his usual place of worship, where he seemed to have much enjoyed the Easter service, and returned home to dinner in apparently his usual state of health. After dinner he was left sitting comfortably with a book in his hand, but within a minute or two he was found by his daughter insensible. A medical man was immediately summoned, but pronounced life to be extinct. Mr. Radley was interred on Thursday at the Burngreave Cemetery, Sheffield. The funeral was attended by Mr. G. W. T. Newsholme, as representing the Pharmaceutical Society of Great Britain; by Mr. Fox, President, Mr. Bradwall, Vice-President, and Mr. Morrison, Hon. Secretary of the Sheffield Pharmaceutical and Chemical Society, and by a number of other gentlemen representing various religious and professional bodies.

Notice has also been received of the death of the following:—

On the 21st of March, Mr. Henry Augustus Higgins, Chemist and Druggist, Stamford, Lincolnshire. Aged 68.

On the 24th of March, Mr. Henry Gale, Chemist and Druggist, Addington Road, Margate. Aged 71.

On the 4th of April, Mr. Frederick William Kent, Pharmaceutical Chemist, East Moulsey, Kingston-on-Thames. Aged 55 years. Mr. Kent had been a member of the Pharmaceutical Society since 1861.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PHARMACEUTICAL SOCIETY.

Sir,—It is quite evident, from the sudden abandonment of the proposed Pharmacy Bill, that something must be done by the Society to strengthen its powers, if it is ever to benefit the trade by any useful Acts of Parliament it intends to attempt to pass, especially when clauses more or less restrictive are introduced, which are sure to meet with strong opposition from the stores and other interested exponents of free trade principles. It is also evident that a Society containing only some 3000 members out of some 14,000 chemists, cannot be said to be truly representative. How is it that we have not at least 10,000 on the roll? Simply because the Society does not sufficiently protect the trade's interests. How is it that we are compelled to spend so much time and money in obtaining our knowledge of drugs and chemicals, and obtain the necessary diploma before we can use the title of chemist, and then be turned adrift to compete with innumerable others who may undersell all that we may, excepting a few poisonous articles? What has the Society done to protect our trade interest in this respect? Surely it is reasonable that if we for the public protection conform to the law for their benefit, we should in return have some protection!

One of the causes of the abandonment of the Bill was the apparent apathy shown by the trade. This was probably because there was so little in it to rouse any great interest. The sixth clause appeared to be the best of the lot, and that was simply a more definite repetition of the present Pharmacy Act, section xv., which for its purpose only requires more stringent enforcement.

It would be wise for the Society to endeavour to increase its popularity amongst the bulk of the chemists throughout the country by earnestly considering the desirability of at once adding a purely trade section, entirely separate and distinct from its educational department, that the trade may assist in the elaboration of some useful measures for the real advancement and welfare of its members. This would undoubtedly add strength to the Society, and make it more representative and worthy of the trade, and its support. We are justified by past events in expecting to learn from candidates for election on the Council next May what they are prepared to do "for the protection of those who carry on the business of chemists and druggists," which the calendar tells us was one of the main objects for which the Society was founded.

London. C. E. PICKERING.

Erratum.—On p. 825, col. ii., lines 18 and 19 from bottom, *for* "tragacanth" *read* "pulv. tragacanth. co."

G. C.—A prosecution under the 17th section of the Pharmacy Act, 1868, for the sale of a proprietary preparation containing a scheduled poison insufficiently labelled may be initiated by the police or any person interested. A clause in the 16th section exempts dealing in "patent" medicines from the operation of the previous sections restricting the sale of scheduled poisons to registered persons.

H. Curtis.—We should think the article could be obtained from Messrs. Howards and Sons.

Cupiditas.—Apply to the Secretary for a copy of the leaflet entitled "Hints to Apprentices."

Creta.—The effervescence is due to a reaction between the borax and the glycerine, resulting in the formation in the presence of water of free boracic acid, which then acts upon the sodium bicarbonate. See papers by Senier and Low (*Pharm. Journ.*, [3], viii., 819), and Dunstan (*Pharm. Journ.*, [3], xiv., 41).

NOTICE.

Chemical Society.—A meeting will be held on Thursday the 17th inst., when a paper will be read on "Phosphorus Oxide," by Messrs. Thorpe and Tutton.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Warden, Maiden, Umney, Alpha.

LESSONS FROM FIELDS AND LANES.

APRIL.

When wake the violets
Winter dies;
When sprout the elm-buds
Spring is near;
When lilacs blossom
Summer cries,
"Bud little roses, spring is here."

In the plant world Nature loses no time in taking measures for the perpetuation of species. Simultaneous with the bursting of the leaf-buds of the hawthorn and the lilac there greet us in our country walks quite a host of early flowers. The daisies and dandelions, which had just reported themselves last month, are daily adding to their numbers. The daffodil has not yet deserted us. The starry heads of the coltsfoot are just beginning to succumb to the fatigue involved in seed production, and the catkins of the alder and the hazel have not yet lost all their brightness. The hard work of the season commences now in real earnest, but the student who has since the year commenced made it a point of conscience to master every new flower found will have little difficulty in keeping abreast with the prodigality of April. In the course of a few hours' walk plenty of material may be collected to provide several nights' work. It should never be lost sight of, however, that the number of species to be found in a district which can be covered in such a short time is necessarily very limited. He who aspires to become a good all-round—not to say an accomplished—field botanist must be content to spend every minute of his leisure time among the objects of his study. One whole day spent "on tramp" will soon convince the observant plant-hunter of the necessity for traversing long distances in order to get variety of species. It is true that the average pharmaceutical student has few whole days to spend in the fields; but if once the idea that plant-hunting is a relaxation gets the upper hand, it is wonderful how much time can be devoted to "play," which not only acts as a physical tonic, but is of direct value as a mental training.

The delightful "abandon" of a week or fortnight spent in tramping an unknown district with spud and vasculum requires to be tried in order to be appreciated. The best book for such excursions is Hayward's 'Botanist's Pocket-Book;' 'Hooker,' 'Bentham,' or 'Babington' may be used to confirm at home.

Among flowering trees one of the most conspicuous of the month is the willow, although in many districts it reached this stage during the last week in March, as a result of the sudden rise in temperature which characterized that time. The number of species and varieties of the genus *Salix* is puzzling even to the experienced botanist, and it is unwise for the beginner to devote much time to their study. The characteristic features of the order may be studied readily in the common osier (*Salix purpurea*) or any of its varieties. Unlike the catkin-bearers we have already considered the willows are *diœcious*, the male and female flowers being on different trees. The flowers are destitute of calyx and corolla, but are each protected by a hairy bract. The stamens vary in number from two to five, and often have their filaments connate or joined at the base. The male catkins are here again the most showy, and attract large numbers of bees which combine with the wind in effecting cross-fertilization. In the osier the flowers appear before the leaves, and the wind has therefore every chance to effect fertilization, but in some of the other species flowers and leaves appear about the same time. Male trees are generally more plentiful than female, and their flowering branches do service as palms on "Palm Sunday."

The smell characteristic of garlic is fast becoming prevalent in moist woods. A slight search will soon reveal the origin of the odour to be the broad-leaved garlic or Ramsons (*Allium ursinum*), a plant belonging to the order *Liliaceæ*. The parallel venation of the ovate-lanceolate leaves shows at once the class to which it belongs, and this is confirmed by the threes and multiples of three which characterize the parts of the flower from the six-partite perianth to the three-celled ovary. The perianth is *petaloid* and the inflorescence an umbel. If the plant be dug up it will be found that its underground stem is a bulb, just as in its near relation the onion. The *spathe* which protects the unexpanded umbels should also be noted. There are several other species of *Allium* indigenous, but they all flower later, so that there is no difficulty in identifying Ramsons. A pretty little plant, closely resembling *A. ursinum* in many points of structure, may possibly be dropped upon by the fortunate wanderer. *Gagea lutea*, the yellow Star of Bethlehem, is as pretty as it is rare, and is always regarded as a "find" even by experienced collectors. Before leaving *Allium* and *Gagea*, the superior ovary characteristic of the lily order should be noted and compared with the inferior ovary of the daffodil. A very interesting plant belonging to this order is still to be found in flower. The Butcher's broom (*Ruscus aculeatus*) is quite as rare as the yellow *Gagea*, and is remarkable from the fact that the true leaves take the form of minute scales, from the axils of which spring leaf-like branches (*cladodes*) bearing the minute green flowers. Dry pastures are beginning to look brown in places with the modest little flowers of the field rush (*Luzula campestris*), a plant belonging to the rush order (*Juncaceæ*), but distinguished from the true rushes by the very hairy character of its leaves and by its one-celled—although three-seeded—ovary, this organ in the true rushes (*Juncus*) having three cells, each provided with many seeds. If the flower be examined closely its near relationship to the lilies will at once become evident. The perianth segments, although brown and *scarious*, are the same in number as their more showy representatives in *Allium*, and the same holds good for the stamens. The rushes may, in fact, be regarded as degraded lilies, the attractive colours characteristic of the latter being in the rushes unnecessary, as they have not yet dispensed with the wind as a fertilizing agent. In the field rush it will be found that the style comes to maturity before the stamens (*proterogynous*), a simple yet effective device for the prevention of self-fertilization. The early spring orchis (*Orchis mascula*) is just beginning to put forth its little spikes of reddish purple flowers and should be compared with the description of the order given last year (*Pharm. Journ.*, xx., p. 22). The only other orchid it is likely to be confounded with is O. *maculata*, but this does not flower till later, and has its tubercules divided in a palmate manner, those of the early spring orchid being simply ovate.

One of the most interesting of monocotyledons is now in good condition for purposes of study. The "cuckoo-pint," "wake-robin," or "lords and ladies," is known to country children everywhere, especially when it has developed its clusters of red, highly acrid berries. *Arum maculatum* shares with the sweet flag the order *Aroideæ*, and possesses in a well-marked degree all the features of the order. The most noticeable feature is the inflorescence, which is a *spadix* or fleshy spike enclosed in a typical spathe. The glossy green leaves vary from the *sagittate*, or arrow-shaped form, to *hastate* or halberd-shaped; the underground portions of the stem are good examples of the *corm*, and are therefore of special pharmaceutic interest. The generic name of the plant is said to be derived from an ancient Hebrew word meaning fire—applied because of the hot and acrid nature of the plant. The specific name means spotted, and refers to the blotches frequently met with on the leaves. By far the most interesting part of the *Arum* is the reproductive system, with its elaborate method of securing cross-fertilization. At the base of the spadix will be found a cluster of female flowers, and above these a row of the same in an abortive or undeveloped condition; next comes a ring of fully-developed stamens, which are in their turn surmounted by a ring of hair-like rudimentary stamens. If an arum spathe be opened after a few days of fine weather it will be found to have a number of prisoners at its base in the form of small flies. If the spathe in question had not been disturbed the flies would have been held in durance vile until the time had arrived when to allow them to escape would be of advantage to their gaoler, a condition of things which soon becomes evident if the development of the flowers be carefully watched. The fleshy-looking apex of the spadix peeping out from its glossy green envelope, acts in conjunction with the disagreeable smell of the inflorescence as an irresistible attraction to the insects, which creep down it till they reach the ring of abortive stamens; these are pushed aside, but as they point downwards and reach outwards almost to the constricted neck of the spathe, the insect's return is effectually prevented. At this stage the perfect anthers have not yet burst, but the stigmas, being ripe, receive from the insect any pollen which it may have brought from another plant in a more advanced condition. The stigmas then wither, but in so doing secrete a drop of honey as a solace for their prisoner. The anthers now burst and dust him with pollen, and immediately afterwards the abortive stamens which closed the mouth of the cage wither also, and the insect is free to carry its burden of pollen to some other plant where, under favourable conditions, the process will be repeated with mutual advantage to prisoner and keeper, the former always getting its drop of honey and the latter its import of fresh pollen.

Celandine, dog's mercury and ground ivy are now in the full flush of life. The black branches of the sloe are lighted up by the snow-like blossom; violets abound on every sheltered bank; marshes look bright with the flaunting yellow of the marsh marigold, and the delicate pink and white of the cuckoo flower. Descriptions of these will be found in the articles of last summer (*Pharm. Journ.*, xix., 949, 1009). Moist rocks and walls, especially in the neighbourhood of waterfalls, are all aglow with the brilliant green and yellow of the golden saxifrage (*Chrysosplenium oppositifolium*). A remarkable example this of the effect of combination in enabling flowers, in themselves inconspicuous, to make a great show. The plant belongs to the order *Saxifrageæ*, and its tiny flowers are destitute of corolla. The green—sometimes yellowish—calyx is *gamosepalous*, with four lobes, and is adherent to the ovary. The ovary is inferior and one-celled, but is provided with two styles, while on its upper surface it bears a honey-secreting *disk*. On the margin of this disk are situated the eight stamens. The inflorescence is a *cyme*—the typical form of *definite* inflorescence—the order of expansion of the flowers being *centrifugal*, that is, from the centre towards the circumference. The leaves are reniform or kidney-shaped, the radical ones being larger than those on the stem; they are opposite and *decussate* (each pair at right angles to the pair above and below it). There are several interesting members of the saxifrage order now in condition for examination. The flowering currant is a conspicuous ornament in gardens and the gooseberry is frequently found wild in the north. *Ribes Grossularia*, the wild gooseberry, is a shrub with palmately cleft leaves, and is remarkable from the fact of the stipules taking the form of *spines*. They will be found at the base of the leaf-stalks, and are generally three pronged, although sometimes simple. The flowers are solitary and have short peduncles springing from the axils of the leaves; about half way up the peduncle two or three minute bracts will be noticed. The ovary is inferior and covered with hairs, each hair being surmounted by a red gland. The calyx springs from the top of the ovary and is gamosepalous, with five reddish-green reflexed lobes. The petals are white, erect, and much smaller than the calyx lobes. The five stamens are inserted on the calyx tube (*perigynous*) and the bases of the filaments in common with the throat of the calyx and the styles are clothed with hairs.

The delicate, half-starved looking flowers of the barren strawberry are doing their best to monopolize dry banks and fertile wall-tops; *Potentilla Fragariastrum* is the name given to it from its resemblance to the true strawberry (*Fragaria vesca*). The order *Rosaceæ*, to which the strawberries belong, closely resembles the saxifrage order, but may readily be distinguished from it by its *indefinite* stamens, although this feature is not always to be depended on, as we shall see when considering some of the later flowering members of the order. The barren strawberry is the earliest flowering species of a most interesting genus, some of the other members of which will form a lesson for another month. The main distinction between it and its more favoured relative lies in the nature of the fruit. In the specimen before us this consists of a number of *achenes* on a *dry receptacle*, while in the true strawberry the receptacle is *fleshy*, forming the edible portion of the fruit. When not in fruit the absence of runners and the less sunken character of the veins on the upper surface of the leaves is generally depended on as a means of distinguishing the barren from the true strawberry.

As the two plants are now to be found in flower side by side, an excellent lesson in systematic botany will be afforded by a practical study of their characteristics.

Damp hedgerows in many districts should now furnish an abundance of an interesting little plant whose flowers somewhat resemble in general appearance those of the golden saxifrage. *Adoxa Moschatellina*, the moschatel, is so small and slender that it requires to be looked for with care. It belongs to the same order as the elder (*Caprifoliaceæ*), and different as the two plants appear to be when looked at superficially, an examination of the flowers soon reveals many points of resemblance. The flowers are arranged in fives at the ends of the peduncles, four being lateral, and the fifth terminal. It should be noted that in the terminal flowers the calyx and corolla are generally four lobed, while in the lateral the lobes are generally five. The stamens number eight in the terminal and ten in the lateral flowers, and are inserted in pairs on the corolla-tube. Inconspicuous as *Adoxa* is its cross-fertilization mechanism is as effective as it is simple. Its musky smell allures insects, and thus makes up for the want of showiness in the flowers. Honey is secreted at the base of the stamens; the anthers of the lateral flowers, when they are ripe, turn outwards, while those of the terminal turn upwards, thus producing the most favourable conditions for the transference of pollen to another plant. The leaves of the moschatel are ternate, and like many of the early plants already noticed it is provided with a creeping underground stem or rhizome.

Another group of plants with thickened rootstocks is fast becoming one of the most prominent features of fields and banks. The order *Primulaceæ* includes many of the prettiest and most interesting of our native wild flowers. Many of these flower later in the season and their consideration must therefore be left until then. The genus *Primula*, however, is far from being the least interesting of the order, and at least two of its species—the primrose (*P. vulgaris*), and the cowslip (*P. veris*)—will not require to be sought for far. The oxlip (*P. elatior*), a species intermediate between these is to be found in some of the South-eastern counties, but is far from common. The structural feature of greatest interest in the order is the *free central* placentation, which may be well seen by making a longitudinal section of the ovary of either of the species just mentioned. The primrose and the cowslip are so well known that it will be needless to refer to their points of difference. It may be well to note, however, that in the primrose the inflorescence consists of a *sessile umbel*, while in the cowslip the umbels are on long stalks. The corolla of the primrose is a good example of the *hypocrateriform* or salver shaped form (with a long tube and a limb at right angles to it). The stamens are on the corolla (*epipetalous*), and it will be noticed that they are sometimes at its base and sometimes at its mouth. It will be noticed also that in these flowers which have their stamens low down in the corolla tube the style is long, and the knobbed stigma is seen peeping out from the throat of the corolla, while the flowers which have the stamens at the apex of the corolla tube have very short styles, and the stigma cannot be seen without slitting up the corolla. Plants which have two forms of flowers are known as *dimorphic*, and the term *hetero-styled* is sometimes used to describe the different forms occurring in the primulas. Darwin devoted a considerable amount of study to the differences in constitution accompanying the dimorphism of the flowers in question. In the course of an elaborate research ('Forms of Flowers,' 1888, p. 14) he found among other differences that the pollen grains of the short-styled variety were much larger than those of the long-styled, and that long-styled flowers when fertilized by the pollen of the short-styled were more fertile than when fertilized by the pollen of flowers of their own form (*legitimate union*). A little consideration will show that legitimate union is that most likely to take place in a state of nature, because exactly that part of an insect's body which comes in contact with the anthers at the top of the tube would come in contact with the stigma in the same position, and so with the anthers at the bottom of the tube and the short style.

A ramble along the banks of a river should now furnish an abundance of an interesting composite, the butter-bur (*Petasites vulgaris*). Like the coltsfoot the flowers appear before the leaves and spring from a thickened rhizome. The *orbicular-cordate* leaves, when the season is well advanced, sometimes measure as much as three feet across and are frequently from their resemblance to rhubarb leaves known as "wild rhubarb." The fleshy awkward looking purplish-white inflorescence cannot be mistaken. An examination of the flowers will show them to be all tubular with the characteristic composite structure. In some of the flowers the stamens are only in a half-developed condition, while in others the pistil is the same; this suppression of the essential organs is also accompanied by slight differences in the florets, the female being more slender and having smaller teeth than the male.

The anemones are making their annual show in the woods (*Pharm. Journ.*, xix., p. 1009), and remind one more than anything else of the ephemeral nature of "pretty" flowers. They have scarcely been gathered an hour when they begin to look flaccid and lifeless. It will be found as a general rule that the more showy a flower is the more precarious is its tenure of life, an idea which is well expressed in the following lines by Oliver Wendell Holmes, where a comparison is instituted between the tulip and the elm:

> "See the proud tulip's flaunting cup,
> That flames in glory for an hour,
> Behold it withering,—then look up—
> How meek the forest monarch's flower!"

SUPPOSITORIES.*

BY F. A. HOCKING AND E. BROOKE.

About 1864, when suppositories first became official in the Pharmacopœias, they were presented for use in a very primitive manner in respect to size, shape and base.

The size varied from 8 grains upwards to 40 or 60 grains or more; even single batches presented a variety with regard to weight, demonstrated by a set which came under the notice of Mr. Brady about 1867, no two of which were uniform. But with the publication of the 1867 B.P. a definite size of 15 grains became the recognized rule. By a 15 grain suppository is meant one occupying the same space as 15 grains of water.

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* Read at a meeting of the School of Pharmacy Students' Association, February 27.

Acknowledging this to be a great improvement, a still further convenience might be gained by the introduction of a second recognized size of 30 grains in cases where a large amount of a medicament leaves but a small margin of base with which it is to be incorporated. Suppositories containing 10 grains of tannin, nitrate of bismuth or oxide of zinc, which are not unusual doses, may serve as illustrations. These quantities certainly require an increase in the amount of base, and consequently in the size of the suppository.

Exception may be taken to augmenting the size of the suppository, on the ground that the extra amount of base would be objectionable, for sanitary reasons. This objection is disposed of by the fact that the amount of fat in a 30 grain suppository containing 10 grains of tannin amounts only to 20 grains, about 5¼ grains more than in a 15 grain suppository containing ¼ grain of morphia; hence the difficulty resolves itself into a question of 5 grains, an amount which cannot be of any considerable consequence. One method of getting over the difficulty is to fuse by their bases two suppositories, each containing 5 grains of tannin, but this we do not think satisfactory.

A lack of uniformity also existed with regard to shape. At first it took the form of a sphere, this being abandoned for a cone, but owing to want of proper moulds the suppository had at times by no means an elegant appearance, especially when it had been fashioned by the hand. This was remedied by the introduction by Mr. Brady of a suitable mould, the form being similar to that now in use. In no case does regard seem to have been paid to the shape most conducive to its retention in the body, for if such had been the case, we think that the shape would be that of a cylinder rounded at either end, or, still better, that of an oval. In the case of a conical suppository there is a tendency to expulsion by the involuntary action of the muscles.

The mould suggested by Mr. Brady, and now in common use, is of gun-metal, plated to prevent corrosion and to present a smoother surface; the shape is too familiar to need description. If there be any preference it should be given to a mould, the halves of which are secured by a screw in the centre of its side, or to one connected by a hinge along its whole length, rather than to one of which the sides are clamped together at the ends: in the latter case, a tendency to gape after continual use makes its appearance, leaving an unsightly mark on the suppository.

Slight modifications in the ordinary mould have been made from time to time; one consisted in the substitution of a circular for an oblong mould, which alteration was said to have given satisfaction.

In another case each section was furnished with a handle, giving the instrument the appearance of a bullet mould; this, being found a drawback rather than an improvement, was soon abandoned.

In Remington's 'Pharmacy' there is an illustration showing an alteration in the division of the mould, the division being horizontal instead of perpendicular. How far this is an improvement we are unable to say. A mould on an entirely different principle was invented but little used. It consisted of a disc perforated with holes after the manner of a test-tube rack, for the reception of thimble-shaped cones, these being prevented from slipping through by an external rim. The disc, the cones having been inserted and filled, was placed on ice or some freezing mixture.

The next four ingenious contrivances we shall describe were devised and kindly lent by Mr. A. W. Gerrard. The first two are on the same principle, one being a pessary and the other a bougie mould.

Each consists of a brass cylinder having a smooth internal surface, on one end of which a cap forming the receptacle for the apex of the pessary is screwed. The cylinder and cap, which, be it noted, forms the base of the instrument, having been joined, the mass is poured in, and when set the cap is unscrewed and the pessary gently released by pressure of the thumb.

The third also consists of a cylinder having an aperture in its base, through which passes a moveable rod of brass having one end enlarged and concave for the reception of the apex of the pessary; this rod, having been placed in position, the mould is placed in some convenient position, such as a test-tube rack, the mass poured in and allowed to set. The pessary is released by gently pushing the rod upwards.

The fourth mould, being intended for a hollow suppository, presents some difference in its construction. Like the last, it is in two parts, one of which is a hollow cone of metal with an open base and a channel at the apex for the admission of the melted mass.

The second part is a plate of metal having affixed a brass rod, pointed at the unattached end, and kept in position by two small pegs fitting into two cavities in the side of the cone, and of such a size as to leave a uniform space between it and the sides and apex of the cone when inserted therein.

The mould being ready the fat is poured in at the apical channel, and when set the two parts are separated, the suppository being usually left in the cone; the medicament having been placed in the cavity, the suppository is sealed up by more of the fat, a finish being given by drawing a warm knife sharply over the stopper thus formed.

Suppositories are sometimes required of a size for which the ordinary 15 grain mould is unsuitable; in such cases recourse must be had to extemporaneous moulds, some ideas for which, suggested by various writers, may not be out of place here.

A piece of clay flattened out, and holes formed by a piece of wood, conical at one end, forms a fairly good mould, but suppositories thus formed require trimming.

Hard paraffin may be treated and used in the same manner.

Paper fashioned into cones, and placed in sand or other convenient material, forms a very ready and convenient device. Lead foil may be substituted for paper with advantage. A small test tube, filed through at the bottom and imbedded in sand, is another method, the suppository being expelled by a glass rod.

For making a hollow gelatine suppository the same method may be adopted as is used for gelatine capsules, which is as follows. A glass tube with an oval bulb at one end is dipped into the liquid gelatine mass, taken out, cooled, and the process repeated several times until a sufficient coating has been obtained. The suppository is released by sharply drawing a knife round the neck of the bulb, and drawing off the coating; it may then be treated as described in connection with the hollow cocoa butter suppository.

A piece of glass tubing with one end widened to form a funnel and the other end inserted in sand forms a convenient bougie mould from which the bougie may be expelled by a glass rod, and the end rounded by the fingers.

Other methods will doubtless suggest themselves to the mind of the ingenious pharmacist.

In the choice of a base several requirements must be borne in mind.

The suppository should melt at the temperature of the body, about 98° F., and at the same time it should be firm and rigid, so as to permit of its being handled without detriment to its shape. A minor but still important point must not be forgotten, namely, in regard to the time the base will remain without becoming rancid, and also its behaviour towards active drugs with which it may be incorporated.

Several fats have at various times been suggested as fulfilling the above named conditions.

Among the first will be found that of the 1864 B.P., consisting of a mixture of ¾ lard and ¼ wax. This fulfilled only one condition, the low melting point of the mixture; in other respects it was as unsuitable as it possibly could be, being rather soft and very liable to become rancid. Further, the suppositories, when made, were directed to be dipped in a still softer mixture of 3 parts wax and 8 of lard, but for what reason it is impossible to say.

An improvement on this, with regard to rigidity as well as melting point, was suggested by Mr. Brady in 1867 in the use of cocoa nut stearin, but its tendency to become rancid in a short time and its being affected by some chemicals prevented its extended use. To overcome the first drawback Mr. Brady suggested the addition of oil of pimento as a preservative agent, but this base does not seem to have been used to any extent. In the 1867 B.P., however, a decided improvement was made, by the use of a mixture of benzoated lard, wax, and oil of theobroma. This base possesses some considerable advantages: its low melting point, rigidity and better keeping qualities, which probably arise from two causes, first the preservative action of the benzoin in the lard, and secondly from the agreeably aromatic constituent in the oil of theobroma, to which is supposed to be due, at least, in part, its preservative properties. Moreover, the active drug can be incorporated with the benzoated lard, whilst the wax and oil of theobroma are being melted together, and on mixing, the lard will tend to lessen the temperature and thus cause saving of time. Another property this mass possesses is that no lubricant for the mould is required, as when heated the mass expands slightly, and therefore on cooling the suppositories become smaller, thus allowing their easy expulsion from the mould.

A base suggested by Mr. Martindale some years ago consists of a mixture of stearic and oleic acids in equal proportions, for which he claims the following five advantages:—

(1) The mass has a low melting point.

(2) The suppositories do not adhere to the mould, owing to the considerable expansion of the fatty acids on heating, and their contraction on cooling.

(3) When alkaloids are required to be administered they may be given in a soluble form as oleates, being in this form more easily absorbed by the skin.

(4) The suppositories are rendered firm, but not brittle, by the partial crystallization of the stearic acid.

(5) The proportions of stearic and oleic acids may be varied to suit the variations of temperature in summer and winter.

This base is, we consider, an excellent substitute for cacao butter, and superior to it; it gives a beautifully white, partly transparent mass, rigid, but not brittle, and in every way recommends itself.

Cacao butter itself possesses several important advantages which recommend it as a desirable base; among them are its rigidity, non-brittleness, keeping properties and low melting point. But an addition of some other fatty body harder than itself would be a desirable improvement; to that end we have incorporated with it other fatty bodies possessing a greater degree of hardness, at the same time bearing in mind that the melting point must not be appreciably raised. A mixture of five-sixths of cacao butter and one-sixth of hard paraffin was satisfactory with regard to firmness, but its high melting point prevents its use. A mixture of wax and oil of theobroma in the same proportions gave a good mass, but its melting point, slightly over 100° F., might prevent its use.

A third mixture of spermaceti and oil of theobroma in like proportions, a mixture, we believe, used by large makers, is suitable in every way, and of the three is to be recommended.

Mr. Holmes kindly furnished us with several fats selected by us to work upon, with a view of their becoming suitable bases for suppositories.

The first of these is kokum butter, a fat obtained from *Garcinia indica*, natural order Guttiferæ, imported from Bombay for use in pomatums, according to Professor Redwood. It is obtained from the seeds, and is known also as concrete oil of mangosteen, and is a beautiful white fat, with a faint, but not unpleasant smell, firm, not brittle, of unusual purity, melting at 98° F., showing no tendency to become rancid, although the specimen we used has been in the Museum of the Pharmaceutical Society for some time. It is therefore in every way a most desirable base for suppositories; in fact, from what we can gather, it is the best, with the exception, perhaps, of the oleic and stearic acids base. According to the Pharmacopœia of India it is actually used there as a base for suppositories and as a substitute for spermaceti. It contains myristic in addition to stearic and oleic acids (Dymock, 'Mat. Med. W. India,' 1st ed., p. 64, 65).

Minjak Tangkawang, an account of which will be found in the *Pharmaceutical Journal* (Vol. 15, pp. 407 and 410, and Vol. 17, p. 901), is too hard and brittle for use alone; but mixed with ⅙ part of olive oil it melts at a temperature of about 90° F. and forms a fairly suitable base.

Surang oil, stated to be the product of *Hopea Maranto*, and probably other species, produced in Borneo, is a grey, tolerably hard fat, but having a melting point of 105° F. is unsuitable for suppositories.

A myrtle wax, the product of *Myrica cordifolia*, natural order Myricaceæ, and obtained from the berries by boiling, is hard, of a greyish colour, melting at about 120° F. (Brannt), and therefore is unsuitable for a suppository base when used alone; but mixed with ¼ lard it gives a melting point of about 100° F., though it seems to possess no special recommendation for a suppository base.

Chinese vegetable tallow is a product of the seeds of *Stillingia sebifera*, natural order Euphorbiaceæ, and is used in England in the manufacture of candles (Brannt), but owing to its brittleness and high melting point, from 104° F. to 112° F., it is rendered unsuitable for suppositories.

Shea butter, from seeds of the butter tree, *Bassia Parkii*, a sapotaceous plant of Africa, is a desirable base in respect to the melting point, which is 84° F., but its mealy nature prevents its adoption as a suppository base.

We shall briefly consider some other bases. The first consists of glycerine two parts and soap one part. Suppositories freshly made with this have a very presentable appearance, but are perfectly useless after a few hours, owing to deliquescence, which may be partially but not wholly obviated by the addition of a small quantity of water.

The second is the gelatine base of the 'Extra Pharmacopœia,' made by immersing 1 oz. of gelatine in water for a few seconds, allowing it to stand for half an hour, then adding glycerine 4 ozs., and driving off water over a water bath. Another method is to wash away any adhering dirt from the gelatine, then adding to the washed gelatine about twice its bulk of water, allowing it to stand for twelve hours, at the end of which time it will have absorbed the water and become soft. Add the glycerine and evaporate as before.

Great care must be taken to drive off all the water, as otherwise on keeping the suppositories will shrink. Some bougies which came under our notice had shrunk after a few weeks to about ⅔ their original size.

This base is especially convenient in cases of extracts and chemical compounds, but is unsuitable for potassium bromide and iodide, with which it remains liquid, and also for tannin, with which it forms a leathery compound.

The general method for dispensing suppositories with the above base, is to melt it over a water bath and stir in the medicament until diffused or dissolved.

The third is the soap and starch base, in favour of which nothing can be said, as it is not affected for a considerable time by the temperature of the body.

No definite rule can be given in dispensing suppositories with fatty bases applicable to every case, but it may be mentioned that the fat should be shredded previous to melting, as less heat is required and time is saved, no more heat being applied than a water bath will furnish. A high temperature tends to make the fats become rancid more quickly than otherwise would be the case. The drugs should be incorporated and the mass poured into the mould in the state of a thick cream; if this latter point be attended to it is not at all necessary, at least in ordinary dispensing, to cool the moulds by artificial means, although several writers lay considerable stress on this, some even going so far as to invent elaborate freezing apparatus. The moulds will usually require to be covered with some lubricant, the best being linimentum saponis in the case of fatty bases and oil of almonds in case of a gelatine base. The base of the 1867 B.P. and that of Mr. Martindale require no lubricant, for reasons already stated.

Having considered the base in detail, the next point is to indicate the best methods of dispensing in individual cases.

Such substances as lead acetate, alum, atropine and boric acid, may be treated as follows:—If a fatty base be ordered the drug should be incorporated with a small amount of the melted base, and when the major portion begins to cool, mix and pour into the mould. If a gelatine base be ordered it should be melted over a water-bath or carefully over a naked flame, the drug dissolved in it, or intimately mixed with it if insoluble, and poured into the mould as before.

Tannin is incompatible with the gelatine base, as already stated, and in using the cocoa butter care must be taken not to overheat, otherwise the tannin will not mix.

Bismuth nitrate and zinc oxide, or any other bulky or heavy substance, should be rubbed down with half the melted base and mixed with the remainder of base on the point of solidification, and then poured into the mould.

Vaseline has been suggested to bring iodoform into a miscible state, but this is quite unnecessary, as the method suggested for lead acetate is applicable in this case. Care should be taken to avoid decomposition of iodoform by overheating.

Ointment of mercury suppositories should be dispensed as follows:—The ointment having been weighed out, should be placed on a slab, the oil of theobroma just melted and cooled to such a degree that on adding the ointment of mercury the mass becomes of such a consistence as to be just capable of being poured into a mould.

Extracts should be brought into a workable state by rectified spirit in case of spirituous extracts, and water in case of watery extracts. Then the fat is melted and the whole thoroughly mixed portion by portion with the extract on a slab. As soon as a homogeneous mass has been formed, transfer it to a porcelain dish, and just remelt and pour into the mould at once. Very presentable suppositories are thus obtained. No difficulty is experienced in using the gelatine base with extracts.

In making acetate of lead and opium suppositories the medicaments should be mixed with two separate portions of the fat; that containing opium should be added to the bulk of fat, and then that containing lead acetate.

If this condition be not observed meconate of lead will be formed, and though this action probably occurs in the body, it is not desirable, from a pharmacist's point of view, that it should occur in the suppositories.

Chloral hydrate presents a difficulty with oil of theobroma, as if the oil be melted with it the mass will remain liquid even when quite cold. The cocoa butter should therefore be shredded and worked up in a mortar with the chloral; the mass rolled out, pressed into moulds or fashioned with the fingers. This difficulty is not experienced with kokum butter, which may be melted and then incorporated with the drug. Chloral hydrate is also incompatible with gelatine, with which it gives a liquid mass.

When iodine is ordered with the gelatine base iodide of potassium ensures its incorporation.

It has been suggested that chemists should incorporate the alkaloids in the form of oleates, but though this would no doubt be of advantage, it is a point rather for the wholesale manufacturer than for the dispensing chemist.

Volatile oils, when ordered, should be added just previously to pouring into the mould.

We conclude this paper with directions for making beef peptone suppositories.

Take of best isinglass, 80 gr., beef peptone 220 gr. Put the ingredients with about 2 drachms of water into a porcelain dish and heat over a water-bath until the isinglass is dissolved, adding water from time to time to supply the place of that lost by evaporation; continue the application of the heat until the ingredients are thoroughly mixed and the mass assumes a semi-gelatinous consistence, then pour into the mould and let stand for a few minutes. Care must be taken to avoid air bubbles.

Cocoa butter may be substituted for isinglass.

These quantities are for half a dozen 60 grain suppositories.

We beg to express our thanks to Mr. A. W. Gerrard for the loan of moulds and for various suggestions, Mr. Holmes for the various fats and suggestions, and Mr. Ince for use of his laboratory and literary corrections.

BARK OF QUINA MORADA.[*]

(*Pogonopus febrifugus, Benth.-Hook.*).

BY P. N. ARATA AND F. CANZONERI.

The authors have examined a specimen of bark found in Bolivia and in the north of the Argentine Republic, commonly known as "Cascarilla," or "Quina morada," and credited with many of the therapeutic characteristics of the true cinchona bark. For a variety of reasons the authors consider it to belong to the *Pogonopus febrifugus, Benth.-Hook.* In appearance the bark is irregular on the outside and scaly within; the colour varies from yellowish-white to reddish, and is a dirty white on freshly exposed surfaces; it is soft and spongy to the touch, a little lighter than water, has a slightly bitter taste, scarcely any odour, and burns very readily, leaving a white ash. It imparts a bluish fluorescence to water with which it has been boiled, and a yellowish-blue fluorescence to alcohol.

Two substances were extracted from this bark, namely, a blue fluorescent substance, moradin, and an alkaloid, moradeine.

To isolate these, the powdered bark is extracted with alcohol, the extract treated with an alcoholic solution of lead acetate, filtered, freed from lead, and concentrated, when a crystalline deposit of moradin is obtained. The mother liquor is then treated with potash and ether, the ethereal extract treated with hydrogen chloride, and the precipitate of moradeine hydrochloride purified by again treating it with soda, water, etc.

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[*] *Gazzetta*, xviii., 409-421. Reprinted from the *Journ. Chem. Soc.*, April.

Moradin contains no nitrogen, and its formula is either $C_{21}H_{18}O_8$ or $C_{16}H_{14}O_6$. The former agrees better with the composition of the acetyl-derivative triacetylmoradin.

Moradin crystallizes in slender, colourless needles, or in large, anhydrous prisms, and melts at 201–202°. It has the characters of an acid, but none of its salts could be isolated. Alkalis increase, and acids (except acetic) diminish the fluorescence of its solutions. Ferric chloride gives a green coloration, and, after a time, a green precipitate; gold chloride gives a blue coloration and green precipitate. It is dissolved by concentrated sulphuric acid, forming a yellow solution, from which it is re-precipitated unchanged on adding water. Although not a glucoside, it reduces Fehling's solution when heated with it; it also reduces silver nitrate and basic lead nitrate. Potassium permanganate in alkaline solution and ferric chloride in alcoholic solution oxidize it to quinone. The action of nitric acid is characteristic; the concentrated acid has no action in the cold, but forms oxalic acid on heating; on boiling with very dilute (4 per cent.) acid quinhydrone and quinone are successively formed. Its reactions place it in the class of oxyhydroquinones, since it gives as products of decomposition a di- or trihydroxybenzoic acid which colours ferric salts green, a polyvalent phenol, probably hydroxyquinol, and quinone. It is probable that two of the oxygen atoms are contained in the same way as in hydroxycoumarin (umbelliferon).

Triacetylmoradin crystallizes from its alcoholic solution in white, shining prisms which melt at 177 to 178°. It is not fluorescent, and has no acid properties. It is insoluble in alkalis in the cold, and decomposes when warmed with them.

Moradeine crystallizes in opaque, colourless prisms, very soluble in alcohol, ether, chloroform, etc., but only slightly in water. It melts at 199–200°, and exhibits the general reactions of an alkaloid, forming a well-crystallized platinochloride and aurochloride, etc.

THE INDIAN GRASS OILS.*

BY F. D. DODGE.

The Indian grass oils are at least five in number, namely, oils of citronella, lemon-grass, Indian or Turkish geranium, ginger-grass, and vetivert or cus-cus. They are derived from various tropical grasses of the genus *Andropogon*, but there is some confusion as to the particular species from which the individual oils are obtained.

Citronella Oil.—The commercial varieties are often adulterated with kerosene. The pure oil is a clear, greenish-yellow liquid with a sharp burning taste and a strong aromatic odour. Its specific gravity at 16° is 0·8770, at 26·5° 0·8750. It distils between 200° and 240°, leaving 10 per cent. of a thick oily residue, having a pungent odour. It gives most of the reactions of aldehydes, combining with hydrogen sulphites and with phenylhydrazine, although not with ammonia; it also reacts with acetic and benzoic chlorides, and gives a mirror with an ammoniacal silver solution. Two litres of the oil were distilled in a current of steam, and collected in fractions of 1100 c.c. and 400 c.c., the residue of 500 c.c. not being readily volatile. The first fraction (1100 c.c.) was treated with a solution of sodium hydrogen sulphite, the mixture being kept cool with ice and water. The liquid solidified to a white magma, and the sodium hydrogen sulphite compound was then pressed between flannel and washed with ether; the filtrate yielded 350 c.c. of residual oil. The sodium hydrogen sulphite compound was mixed with dry sodium carbonate and distilled in a current of steam; about 700 c.c. of aldehyde was thus obtained. This was shown by analyses and a vapour-density determination to have the formula $C_{10}H_{18}O$, and is thus isomeric with borneol and geraniol. The author names it *citronellic aldehyde*, and considers it to be β-methyl-δ-isobutylallylacetaldehyde, since this formula is most in accordance with its reactions. It unites with two atoms of bromine, and when reduced with sodium amalgam and acetic acid it yields *citronellyl alcohol*, $C_{10}H_{20}O$, boiling at 225°-230°; this decolorizes bromine solution, and has a pleasant odour of roses. It forms compounds with phenylhydrazine, with aniline and paratoluidine, and with acetic acid, but these products have not yet been isolated. It is dextrorotatory, and when oxidized, appears to yield fatty acids; with potassium permanganate, it yields a mixture of acids smelling strongly of ordinary valeric acid. When treated with phosphoric anhydride, some large, colourless plates (melting at 140°) were deposited, and two oils formed, one boiling at 175°, which was shown by analysis to be an impure terpene, and one boiling above 300°, which had a pleasant odour resembling the high-boiling fractions of citronella oil.

The 350 c.c. filtered from the sodium hydrogen sulphite compounds yielded (1.) 75 c.c. of a light oil, boiling at 177°, and having a pleasant, citrene-like odour; this was analysed and its vapour-density determined, the results indicating that it was an impure terpene; (2.) 120 c.c. of a thicker oil, of rose-like odour, boiling at 222—224°, and of specific gravity = 0·8741 at 26·5°, which appeared to be citronellyl alcohol; (3.) 100 c.c. boiling above 240°, dark brown, viscid, and having a peculiar odour.

The residual 500 c.c. of the original oil not readily volatile in steam was treated with sodium hydrogen sulphite, and yielded about 10 c.c. of citronellic aldehyde, and a residual 475 c.c., which when distilled behaved like the residue from the other sulphite precipitate, but yields a much larger amount of high boiling products that oxidize readily and are difficult to treat. Citronella oil therefore contains citronellic aldehyde and alcohol, together with a terpene and oils boiling above 240°. The study of these oils is to be continued.

NOTES ON ESSENTIAL OILS, ETC., FROM MESSRS. SCHIMMEL AND CO.'S APRIL REPORT.

ALMOND OIL, BITTER.—The increasing demand for essential oil of bitter almonds is said to have made it more difficult to purchase a pure article. In trying to obtain supplies Messrs. Schimmel have been frequently supplied with the artificial oil, mixtures of the artificial with the natural oil being the exception. The boiling point and specific gravity afford no assistance in distinguishing between the two kinds. This is best effected by taking advantage of the fact that the artificial oil is prepared from benzyl chloride and always retains a trace of chlorinated compounds. The process recommended is to saturate a piece of folded filter paper with the oil to be examined, and after placing it in a porcelain dish standing in a larger one, igniting it and covering it over with a large inverted beaker the sides of which have been wetted with water. The combustion gases become absorbed on the moist sides of the beaker, from which they are washed on to a filter with a little distilled water, and the filtrate when treated with solution of silver nitrate should give no turbidity, much less a precipitate of silver chloride. Genuine essential oil of bitter almonds, distilled in the ordinary way from almonds or peach kernels, never gives a chlorine reaction.

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* From the *American Chemical Journal*, xi. Reprinted from the *Journal of the Chemical Society*, March.

ALMOND OIL FROM PEACH KERNELS.—The export of peach and apricot kernels from Damascus for expression of the fixed oil, is said to have amounted in 1887 to 580,000 kilos, in 1888 to 500,000 kilos, and in 1889 to 575,000 kilos. Damascus is the principal locality of the production, where the cracking of the shells for the removal of the kernels is done partly by hand labour and partly by machinery.

AMMONIACUM RESIN OIL.—A distillate from the Persian ammoniacum resin of commerce. It is described as dark yellow in colour, smelling strongly of the raw material and very suggestive of angelica oil. The yield was 0·3 per cent., the oil having a sp. gr. of 0·891 at 15° and boiling between 250° and 290°.

ANGOSTURA BARK OIL.—Distillate from the bark of *Galipea Cusparia*. The yield is said to be considerably larger than stated in published works. From 100 kilos of angostura bark was obtained 1¼ kilos of pure oil of yellow colour and mild aromatic taste; Sp. gr. 0·956 at 15°.

BEECH-TAR OIL.—This oil has come into use recently in the treatment of lung diseases. The portion used generally is that distilling between 80° and 250°, sp. gr. 0·980; the greater part of this passes over between 150° and 250°, and consists to the extent of about one-third to one-half of phenols. It is thought the heavy oil, sp. gr. 1·053, is probably also capable of being used. It distils between 220° and 300° and contains about 66 per cent. of phenols.

CARAWAY OIL AND CARVOL. — Messrs. Schimmel state that the products brought into commerce under the name "carvol" are frequently caraway oil from which a portion of the carvene has been removed by fractional distillation. As a means of determining the purity of carvol they indicate its solubility in 50 per cent. alcohol. Pure carvol dissolves at 20° C. in the proportion of 1 part by weight in 16-17 parts by weight of 50 per cent. alcohol. A sample of carvol to which 2 per cent. of carvene had been added did not dissolve clear in 20 parts of 50 per cent. alcohol at 20° C. It should therefore be required that 1 part by weight of carvol should dissolve clear in 20 parts of 50 per cent. alcohol at 20° C. It is of importance to use alcohol of exactly this strength for the test, or at any rate not stronger, because with a higher concentration of the alcohol the solubility of carvene increases rapidly in a disproportionate degree.

CINNAMON LEAF OIL (Heavy)—From the Seychelles; distilled from unfermented leaves. This oil corresponds remarkably with the thin liquid cinnamon-root oil from Ceylon. Sp. gr. 1·060. It consists chiefly of eugenol.

COUMARIN.—In confirmation of the statement made by Mr. J. H. Maiden in this Journal (before, p. 80), the bark of *Ceratopetalum apetalum*, Don., an Australian Saxifragaceous tree, growing to the height of fifty feet, has been found to be rich in coumarin. In a resin taken from the same tree coumarin was still more abundant. Opportunity is taken to correct a mistake in the last *Berichte* as to the equivalent of coumarin in tonka beans. It is now stated that 1 oz. of coumarin is equal to 4 lbs. of tonka beans, the maximum of coumarin occurring in fine beans being 1½ per cent.

EUCALYPTOL (CINEOL).—Pure eucalyptol, according to Messrs. Schimmel, is characterized by a sp. gr. of 0·930, a constant boiling-point of 176°-177° and complete optical inactivity. It solidifies in a cooling mixture to long colourless needles. It is stated that some of the products passing under the name "eucalyptol" in commerce do not possess these characters and do not essentially differ from a well rectified eucalyptus oil. Such products are however not considered suitable for use in inhalations, as the lighter boiling portions contained in them cause great irritation to the respiratory organs.

JUNIPER BERRY OIL.—The peculiar juniper odour of this distillate is dependent upon a substance boiling at 180°, which is probably the acetic ether of a body allied to the terpenes in the oil. The higher-boiling portion consists of sesquiterpene.

KURO-MOJI OIL.—This oil (see *Pharm. Journ.*, [3], xix., 844) is said to have come rapidly into favour, the odour recalling that of lign-aloe oil, but being far more agreeable and aromatic. It is derived from a Lauraceous plant, *Lindera sericea*, Bl., named "kuro-moji," on account of the blackish colour of the bark; another variety is called "shiro-moji," because of its greyish white bark. In both kinds the white pith is surrounded by a greyish white silky looking wood, having an agreeable odour. This wood, which in transverse section shows delicate medullary rays, distinct annular rings, and very fine pores, is the bearer of the essential oil.

LEVISTICUM SEED OIL.—Distillate from the fruit of *Levisticum officinale*, the yield of oil being 1·1 per cent. Sp. gr. 0·935.

MUSK.—Referring to the "artificial musk" that has been recently introduced, Messrs. Schimmel express the opinion that in odour it differs very much from the finer qualities of natural musk, the place of which it is not capable of taking. But although in their opinion it will find a difficult entrance into perfumery for fine extracts, they think there is a wide field for it as a soap scent, and for ordinary perfumes. It is spoken of as an amorphous white powder, turning yellow when kept, readily soluble in strong spirit, less soluble in weaker spirit, from which it crystallizes out at a low temperature. The addition of ten drops of ammonia to a kilo of 1 per cent. solution is said to bring out the odour in a marked manner.

PEPPER OIL FROM LONG PEPPER.—Distillate from *Piper longum*. Yield about 1 per cent. of a thickish pale green oil, suggestive in odour rather of ginger. It is as mild to the taste as pepper oil; boils between 250°-300°; sp. gr. 0·861 at 15°.

PIMPINELLA OIL.—The oil distilled from the root of *Pimpinella saxifraga* has not yet been submitted to a close examination, but its sp. gr. has been ascertained to be 0·959 at 15°; it begins to boil at 240°, and the thermometer then rises to 300°. A portion of the oil passes over at a still higher temperature, but undergoes strong decomposition.

PRUNUS VIRGINIANA BARK OIL.—When the powdered bark of the North American "wild cherry" is stirred with warm water a volatile oil is formed, which resembles the oil of bitter almonds, consisting principally of benzaldehyd and containing a considerable quantity of hydrocyanic acid. From 79 kilos of bark was obtained 165 grams of oil having a sp. gr. of 1·050 at 15° C.

ROSEMARY OIL.—The following are the specific gravities observed in a series of the best commercial distillates:—Two French distillates, 0·881 and 0·883; one Spanish distillate, 0·892; seven Italian (Dalmatian) distillates ranged from 0·901 to 0·907. Two French oils having been submitted to distillation, in one instance 39 per cent. and in the other 46 per cent. passed over below 170°; whilst with two Italian oils in one case only 4·5 and in the other 13 per cent. passed over below 170°.

SAFROL.—This compound is stated to be coming more largely into use in Europe, especially for covering the odour of soaps made from badly smelling kinds of fat. A mixture of safrol with citronelle oil is said to answer very well for ordinary house soaps, and to be used by many makers instead of oil of mirbane.

STAR-ANISE OIL.—A statement is quoted from the circular of a firm in Hanoi to the effect that the source of all the star-anise oil in commerce is not China, as previously erroneously supposed, but the Langson Province in the French colony Tonquin, and the trade in the oil is now a French monopoly.

The Pharmaceutical Journal.

SATURDAY, APRIL 19, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE SALE OF MEDICATED WINES.

THE troublesome question as to the sale of so-called "medicated wines" formed the subject of discussion at the meeting of the Executive of the North British Branch of the Society last Wednesday, after the letter received by the President of the Society from the Inland Revenue Department had been read. That letter may be considered to have settled the matter from a strictly pharmaceutical point of view and to have left the pharmacist under no kind of difficulty in regard to the sale of wines that are really medicated and that are intended only for use as medicinal agents. But there can be little doubt that, outside these limits, there is a demand for "medicated wines" that are not incapable of being used as beverages, and it is in regard to the supply of articles of this description that the chemist is placed in some difficulty. Their sale requires a licence which is not at all compatible with the nature of the chemist's business, but he is frequently required to supply them by his customers, and it is said that they are in some instances prescribed by medical men. Some considerable difference of opinion was expressed by speakers at the Edinburgh meeting as to the uses to which the latter class of "medicated wines" are applied. On the one hand it was thought that such wines were wanted simply as alcoholic stimulants, while others took a contrary view; but, however that may be, it appears to have been very generally thought that chemists should not depart from the rules laid down by the Inland Revenue Department, and should not allow their business to degenerate by the sale of articles that more properly belong to the trade of the public house. Mr. WATT was especially emphatic in his expression of opinion to this effect. As he put it, the question before chemists is, whether they would become publicans or have nothing to do with the trade in wines that do not answer the requirements of the excise authorities in respect to their capability of being used as beverages. In his opinion their course is very plain, and it was his desire that there should be a unanimous recommendation that the drug trade should not lend itself to dealing in these questionable articles.

The report of the meeting received from Edinburgh does not furnish information as to the decision arrived at, or whether any resolution was adopted in conformity with the views expressed by Mr. WATT. Mr. GILMOUR, who was in the chair, observed that he would like it to be distinctly understood that the position taken by the Scotch Executive is that of thorough disapproval of medicated wines being sold as tippling articles. He believed that throughout Scotland the same view was held, and we are glad to find that such is the case. But at the same time it must not be overlooked that such a disposition on the part of the sellers of these articles does not altogether do away with the danger to be apprehended from their sale if they are used for the purpose of alcoholic stimulation. However free the seller may be from any inclination to promote illicit tippling by supplying the means for indulgence in it, there is some reason to believe that the use of "medicated wines" for such a purpose, whether knowingly or unconsciously, is increasing. For that reason chemists should be especially careful as to the character of the "medicated wines" they sell and as to the possible use to which they may be applied. For their own interest, and for the credit of the craft to which they belong, it is not sufficient to rely only on the integrity of their own intentions in supplying these articles. The example of the United States may serve as a warning of what may be the consequence of entering upon the dangerous practice of supplying alcoholic preparations under the guise of medicine. Altogether this matter is one involving great difficulties for the chemist, and requiring extreme care and discretion on his part. When doubtful preparations are ordered by medical men, it would probably be the best plan to deal with them exactly in the same way as other medicines, rather than supply them in the original bottles, the sale of which would render the seller liable to a penalty for infringement of the Licensing Act. In some cases such a proceeding may not be acceptable to the purchasers and then there appears to be no alternative but to decline to supply. In any case we consider, as already stated in previous articles on this subject, that it is highly undesirable that chemists should, for the sake of the trade in "medicated wines," have recourse to the plan of taking out a licence for their sale.

Though the provisions of the Food and Drugs Act are designed for the benefit of the public and the repression of practices by which articles of general consumption are reduced in quality it is remarkable that so little use is made of them and that in certain instances adulteration is still carried on without any interference. Coffee is an article that is generally subjected to such treatment, and what is sold under the specious title of "French Coffee" is often little more than a pretence. The vestry of St. George's, Hanover Square, has now taken up this matter and apparently intends to press it upon the attention of the superior Courts. At the instance of that body several summonses have been taken out against grocers, and they recently came on for hearing at the Westminster Police Court. In two of these cases the proportion of chicory in "French coffee" was not less than one-half, and in one of them it amounted to as much as eighty per cent. For the prosecution it was urged that although the article was in all instances sold with a label, declaring that it was a mixture of chicory and coffee, the admixture of such large proportions of chicory should be regarded as a fraudulent increase of bulk, and therefore as an offence under the Act. As a remedy for this misuse of the permission to sell mixtures, it was suggested that the actual proportion of admixture should be stated on the label. By that means the difficulty of deciding what might be called coffee and what should not be so called would be got over, and there would be some prevention of the sale of mixtures containing an unreasonable amount of chicory. The magistrate, however, decided that as the law stands it is not necessary to state the proportion of admixture, and he dismissed the summonses, though he expressed his regret that he had to do so. He also declined to grant a case for appeal, but said that if he was wrong the vestry could apply for a mandamus.

* * *

In reply to a suggestion that the London College of Physicians should relax the rule forbidding its members to dispense medicine, a correspondent of the *Lancet* points out that the fact of no member of the London College being allowed to "engage in trade" or "dispense medicine" puts the diploma in many respects above most of the degrees in medicine, and is one reason why many hospitals place the possessors of that diploma on a different footing from those holding that of the Edinburgh College. The diploma of the Dublin College is safeguarded in the same way, but a member of the Edinburgh College may, and in some cases does, keep an open surgery or even a penny dispensary. In conclusion, he adds, that what is wanting in the profession is less dispensing. Many of our readers will concur in this view, and agree in the wish that it were more generally acted upon by medical men.

* * *

A rather serious accident happened on the 8th inst. to Mr. J. Tocher, chemist and druggist, of Peterhead, through the bursting of a glass retort containing nitric acid and amylic alcohol, from which he was about to distil amyl nitrite. The liquid struck Mr. Tocher full in the face, and it was at first feared that death would have followed through asphyxia, but under medical care he soon rallied, and although his face has been badly burned he is now progressing favourably.

* * *

We understand that at the adjourned hearing of the applications of Edinburgh chemists for wine licences last Thursday the magistrates at the licensing court unanimously decided to refuse the licences.

* * *

Mr. W. T. Olive, Chemist and Druggist and a Member of the Pharmaceutical Society, has been elected Chairman of the Briton Ferry Local Board of Health.

Transactions of the Pharmaceutical Society.

MEETING OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, April 16, at 1 p.m. Mr. William Gilmour in the Chair. Present—Messrs. Boa, Gibson, Gilmour, Mackenzie, Stephenson and Thompson, Edinburgh; Fisher, Dunfermline; Hardie and Kerr, Dundee; Kinninmont and McAdam, Glasgow; Lawrence, Oban; Maben, Hawick; Nesbit, Portobello; Paterson and Strachan, Aberdeen; Storrar, Kirkcaldy; and Watt, Haddington.

An apology for absence was received from Mr. Daniel Frazer, Glasgow.

The minutes of last meeting were read and approved.

The report of the General Purposes Committee was read. The report included a letter received from the Inland Revenue, Excise Department, in reply to an inquiry by the President of the Society relative to the sale of medicated wines (see *Pharm. Journ.*, [3], vol. xx., page 628).

Mr. Gibson (Edinburgh) said he desired in reference to these letters to state that in his opinion, and he dared say a good many had the same opinion, that the public did not want medicine at all in their wines. High medicated wine, a wine charged with active ingredients, was not what was really wanted. What was wanted by some folks was a purely tippling wine. To put such a quantity of pepsin in wine was sufficient to destroy it as a beverage.

The Chairman: What do you propose?

Mr. Gibson said he did not think the Inland Revenue would ever allow the wine to be sold by chemists unless it was destroyed; and the only way to overcome the difficulty would be to take out a licence if it could be possible.

Mr. Mackenzie (Edinburgh): So that chemists may be tipple sellers.

Mr. Gibson: If they wish to sell.

Mr. Mackenzie: An honourable position.

Mr. Gibson: It depends upon how you look at it.

Mr. Paterson (Aberdeen) thought the position of chemists was clear enough now, and that under the Pharmacopœia they were entitled to sell without interference. They must just submit to the regulations that the Inland Revenue laid down, and in the meantime those who wished to sell wines not allowed under these regulations must take out a licence, or refuse to sell. They had, he thought, got fairly at the bottom of the matter now, and it was for each individual to choose the alternative, either not to sell, or take out a licence and sell according to the law.

Mr. Mackenzie said chemists had never been supposed, so far as he had known the trade north or south, to take the place of the wine merchant. They had never allied themselves with any such trade, and he hoped each of them would be slow to do so. By the letter read, and now before them, their position was clearly defined, and they ought to be satisfied.

Mr. Maben (Hawick) took exception to what Mr. Gibson had said as to people drinking pepsin and coca wine as tipples. That, he thought, was not the experience of any member present. It was not these wines, but the other wines, to which the Inland Revenue did not refer.

The Chairman: Which wines?

Mr. Maben: Coleman's wine; but they had no right to consider it at the present moment. It was simply pepsin and coca wine to which the Inland Revenue referred; and he would be sorry it should go to the public that people drank these wines as beverages or tipples. It was to the chemist's advantage to use them both unpalatable; and they must look to their character in seeing that these wines were destroyed as a tipple. He was extremely glad the Inland Revenue had laid down rules in that respect. If chemists degenerated in regard to these rules, then their profession was gone.

Mr. Gibson said his experience was quite different from that of Mr. Maben.

Mr. Watt (Haddington) said there was no doubt that this question was one which had come to be a very serious one. In that day's newspaper he saw two druggists in Aberdeenshire had taken out retail licences, and in Edinburgh there was to be a meeting of the magistrates on the following day, in reference to applications by several chemists in the city. Now he would like that this meeting should give an opinion so decided that there could be no doubt that they, as the Executive of the North British Branch of the Pharmaceutical Society, were decidedly against the trade being allowed to degenerate into a public house. He knew that there were medical men who very frequently ordered some of these preparations, such as Coleman's and Pearson's wines, and it would often be very awkward where they were used intentionally for medicinal purposes, and not as beverages, if chemists were not allowed to dispense them. But still the question before them was they must either become publicans or have nothing to do with the article. Their course was very plain, he thought; and he hoped they would unanimously agree to recommend that the drug trade should not enter upon the down grade, as was threatened in this matter.

Mr. Paterson remarked, as regarded Aberdeen, that none of the retail trade had applied for licences; it was only wholesale dealers.

Mr. Storrar (Kirkcaldy) said he was one of those who along with Mr. Paterson had raised this question at the Executive Board for the purpose of having a decided opinion expressed upon it. He had, he might say, applied for a licence, but after it was pointed out to him that the only licence that could be procured was an ordinary spirit licence, he of course retired from his application, for in common with every one present, he felt disgusted to bring the drug trade so low. But if they, as an Executive, gave a very strong opinion that these licences should not be granted, he thought they could go a little further. A number of doctors prescribed Coleman's and other wines as part of an ordinary prescription, and for that purpose he could get a licence to-morrow, if he liked, by going to the Inland Revenue and paying ten guineas. Then he would be under no supervision whatever. Therefore, if they, as an Executive, expressed an opinion that the magistrates should refuse to grant any other licences they should at the same time appeal to the Inland Revenue and request them not to give ten guinea licences without their being under the control of the magistrates. As to pepsin wine he might say that from his experience it was not used as a tipple, and he hoped it never would be. With regard to the strength of coca wine he had tried it, and he had found it a most abominable wine which never could be used as a beverage.

Mr. Mackenzie said the ten guineas was a good preventive.

Mr. Storrar: But it is easily overcome. The vendor of the wines will pay it for you. It is, however, not worth the chemist's while.

The Chairman said he would like it to be distinctly understood that the position taken up by this Executive, and he believed by the trade generally throughout Scotland, was that they thoroughly disapproved of these wines being sold as tipples.

Mr. Kerr (Dundee) desired to make one suggestion in regard to this question, and it was in reference to chemists who made preparations of their own, if they had any doubt about their being liable to the excise laws. They could easily get over the trouble by sending a sample of the wine or any other medicament they wished to make up to the Inland Revenue. The department would analyse it, and would say whether it was liable or not to duty or licence. That was the way to overcome the difficulty, and he had himself done it.

The report was then adopted.

The draft annual report to the Council was considered in committee, and on resuming it was unanimously adopted, on the motion of the Chairman.

The following resolution was unanimously agreed to:—

> "That the next election of Executive take place on Wednesday, June 18, and that the Chairman and Vice-Chairman be appointed scrutineers of the voting papers, with power to add to their number."

A letter was read from Mr. J. P. Thomson, Convener of the Edinburgh Chemists' Ball Committee, and the Assistant Secretary was instructed to reply that the matters referred to were outside the province of the Executive. A similar reply was ordered to be sent to a communication from Mr. F. L. Dewar.

The meeting then closed.

EVENING MEETING IN EDINBURGH.

The fourth meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, April 16, at 8.30. Mr. David Storrar, Kirkcaldy, Vice-Chairman, in the chair. Mr. Gilmour was not sufficiently recovered from his recent illness to attend a meeting in the evening.

The minutes having been read, Mr. James Mackenzie opened the adjourned discussion on Mr. Storrar's paper read at last meeting. A full report will appear in next week's Journal.

Pharmaceutical Society of Ireland.

APRIL PRELIMINARY EXAMINATIONS.

Messrs. Lowe, Tynan, Hardy, Martin (Murphy-Parke) and Macrae have passed the Preliminary examination. Seven failed to pass.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society, on Thursday, March 20, Dr. W. J. Russell, F.R.S., President, in the chair, the following lecture was delivered:—

THE EVIDENCE AFFORDED BY PETROGRAPHICAL RESEARCH OF THE OCCURRENCE OF CHEMICAL CHANGE UNDER GREAT PRESSURE.

BY PROFESSOR J. W. JUDD, F.R.S., F.G.S., ETC.

The materials constituting the deeper parts of the earth's crust must sustain great *statical* pressures, due to the weight of superincumbent rock-masses; some of these materials, too, have from time to time been subjected to enormous *dynamical* pressures resulting from the stresses which arise during mountain-making and other earth-movements. Hence it is found that the rocks and minerals which have at any time formed the deeper parts of the earth's crust show many striking evidences of the action of these pressures: among these may be mentioned the cavities filled with various supersaturated solutions, carbon dioxide and other materials. There are also remarkable indications of strain, distortion and fracture presented by the minerals when their optical properties are studied.

The question was discussed how far the phenomena observed by the geologist in his study of rocks under the microscope can be explained by the laws that have been experimentally determined by the physicist and chemist; and it was pointed out that the conclusions to which both the experiments of physicists and chemists and the observations of mineralogists and geologists point are as follows:—

1. In all those cases in which crystallization is accompanied by *contraction*, the tendency of pressure is to promote the change from an amorphous to a crystalline condition.

2. Crystallized minerals developed in a magma under pressure may lose their stability, and be dissolved by the same magma when the pressure is removed.

3. In all those cases in which solvent action is accompanied by *contraction*, dissolution is promoted by pressure.

4. Under great statical pressures the whole substance of solid bodies may be permeated by fluids (liquids and gases alike), and chemical action between these and the solids is thus greatly facilitated.

5. By the intimate admixture, under great statical pressures, of solids with fluids, the properties of the former are remarkably modified.

6. Mechanical stresses, which tend to overcome the attraction between the particles of a solid, promote chemical action at those parts of the mass which are in a condition of intense strain.

7. Pressure may supply the conditions required for the renewal of the growth of crystals, when their development has been arrested for an indefinite period, and even after they have suffered mechanical injuries.

8. When dissolution under pressure is going on in a crystalline substance, the action is controlled and modified by its molecular structure; this structure having been produced in the process of crystallization, or having been acquired by the crystal subsequently, owing to the action of mechanical and other forces upon it.

9. Under great pressures paramorphic changes take place in crystalline substances, without change in their chemical composition.

10. Both the dissolution of existing compounds and the formation of new crystallized minerals may result from pressure; and these two operations frequently going on together, pseudomorphs are produced, the action sometimes affecting great rock-masses.

11. When, as the result of *dynamical* pressures, the crystalline constituents of rocks are brought into close contact, chemical affinities come into play between them, and new mineral species result from the interactions. This operation is facilitated when, as the result of internal strains, differential movements are set up in a rock-mass, and rubbing or sliding contacts between the particles are brought about.

12. When internal strains and differential movements affect a mass in which the process of crystallization is going on, the forms and positions of the crystals may be modified. The structures known to geologists as "granulitic" and "foliated." which characterize the crystalline schists, have been produced in this way, as was shown by Scrope, Dana, Darwin, Sharpe and Naumann, and confirmed by many subsequent investigators.

In arriving at these conclusions recourse has been had only to proved causes of change, and hypothetical causes have been avoided. Some of them may seem insignificant, but, affecting, as they have done, vast masses of material during enormous periods of time, the results accomplished by such apparently insignificant causes have been very great.

Although *dynamical* pressures may be converted into heat, as shown by Mallet, or into chemical action, as argued by Sorby, no very distinct evidence of great effects having been produced by these methods has been discovered.

The following papers were also read:—

The Formation of Triazine-derivatives. By R. MELDOLA, F.R.S.

Contributions to the Knowledge of Mucic Acid. Part I., Hydromuconic Acid. By S. RUHEMANN, Ph.D.

The Molecular Weights of Metals when in Solution. By C. T. HEYCOCK, M.A., and F. H. NEVILLE, M.A. In a previous communication (these 'Proceedings,' 1889, p. 41) the authors have given a preliminary account of their observations on the effect of metals on the solidifying point of tin, and they subsequently described similar experiments using sodium as the solvent (*cf. Chem. Soc. Trans.*, 1889, 666). They now give the details of the investigation of solutions in tin. Tables of results are given, showing the effect of various proportions of the following metals:—Silver, gold, copper, nickel, sodium, palladium, magnesium, zinc, lead, cadmium, mercury, bismuth, calcium, indium, aluminium and antimony. Of all these metals, antimony alone behaves abnormally, producing a rise instead of a depression in the solidifying point. An example will illustrate the method of calculating the "atomic depression." In an experiment with silver, 4·3085 grams was dissolved in 400 grams of tin, *i.e.*, $\frac{4·3085}{108}$ of an atomic proportion; and therefore there was present per 100 atomic proportions of tin $\frac{4·3085 \times 118 \times 100}{108 \times 400} = 1·177$ atomic proportions of silver. The observed solidifying point of the tin was 231·68°, and of the solution 228·29°, a depression of $231·68 - 228·29 = 3·39°$; hence the atomic depression was $\frac{3·39}{0·177} = 2·875$. In the majority of cases the atomic depression is a number not far removed from 3. If Raoult's generalization be true, that the depression produced by a molecular proportion of any substance in the solidifying point of the same solvent is the same whatever the substance, it would therefore seem probable that the molecules of most metals are of the same type, M_n, where n is the number of atoms in the molecule; and if it be supposed that the molecules of, say, zinc, when dissolved in tin, are monatomic, as in the gaseous state, it would follow that n is unity in the case of many other metals. The theoretical depression calculated from Van't Hoff's formula is 3, and a similar value may be deduced from a formula suggested by Professor J. J. Thomson. In the case of aluminium, the atomic depression is so nearly half the average value that it seems probable that the molecule is diatomic. Indium resembles aluminium in producing an abnormally low depression; and it is noteworthy that the value for mercury is distinctly low; in fact, the data recorded show that there are many interesting points of difference to be noted between the various metals.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at 103, Great Russell Street, W.C., on Thursday, March 20, Mr. T. A. Ellwood, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the President called upon Mr. Millard to read the following paper:—

ANTIPYRIN AND ITS INCOMPATIBLES.

BY E. J. MILLARD AND A. CAMPBELL STARK,

Pharmaceutical Chemists.

In view of the increased employment of antipyrin in medicine, and its now established value as a therapeutic agent, we have thought that a systematic inquiry into its properties, from a pharmaceutical standpoint, would be of utility and interest.

From time to time the discovery of new incompatibles has been announced in the *Pharmaceutical Journal* and other journals; but, as far as we know, no systematic work has hitherto been done on the subject in this direction.

The chemical characters of antipyrin have been fully described by its discoverer, Knorr, and also by Gay and Fortuné (*Journal de Pharmacie*, June 15, 1888).[*] We have therefore confined ourselves almost entirely to the question of its incompatibility with the drugs most likely to be prescribed with it.

The methods we employed for ascertaining the compatibility of any drug with antipyrin were as follows:—

1. About 2 drachms of a strong solution of the drug, or of its official liquid preparation, were placed in a test tube, and to this was added half a drachm to a drachm of an aqueous solution of antipyrin, of the uniform strength of 10 grains to the drachm. The mixture was then well agitated and set aside for some hours. If no precipitation or change of colour occurred, the substance was considered compatible with antipyrin. The solution of antipyrin was always carefully poured down the side of the tube, and any separation or apparent change at the point of contact of the two liquids carefully noted before agitating.

2. In the case of substances insoluble in water, solutions were made in rectified or proof spirit and tested with a similar alcoholic solution of antipyrin of the same strength as before (10 grains to the drachm). The spirituous solutions were also used to test liquid preparations incompatible with water.

3. Insoluble substances were very intimately mixed with an equal weight of antipyrin in a mortar, and exposed in an open vessel to light and air for a week or longer. Any change of colour or condition was then carefully noted and in some cases the mixture extracted with water and the solution tested in various ways.

We have examined, by one or more of these methods, the whole of the drugs, etc., of the Pharmacopœia that are at all likely to be dispensed with antipyrin, for their incompatibility with that body; together with many other unofficial drugs or their preparations in common use.

The great bulk of our results have been necessarily of a negative character and these, of course, we do not here insert.

The following is a complete list of the drugs and their preparations which we have found to be incompatible with antipyrin. Some of them have been previously announced by others, but we have in all cases verified the statements already made concerning them, and in some have studied further the nature of the reactions that take place.

Acid. carbolic., precipitated with strong solution.
Acid. hydrocyan. dil., yellow coloration.
Acid. nitric. dil., faint yellow coloration.
Acid. tannic., white insoluble precipitate.
Alumen (ammonia), deep yellow coloration, fading and precipitating.
Amyl nitrite (acid), green coloration.
Arsen. iodid., precipitates.
Chloral hydras, precipitates in strong solution, no apparent action in dilute.
Cupri sulphas, solution turns green.
Dec. cinchonæ, precipitates.
Ext. cinch. liq., precipitates.
Ferri sulph., brownish-yellow colour, deposits on standing, and solution turns red.
Glycerin. acid. carbolici, precipitates.
Glycerin. acid. tannici, precipitates.
Hydrarg. perchlor., precipitates, soluble in excess of water.
Inf. catechu conc., precipitates.
Inf. cinch. acid., precipitates.
Inf. rosæ acid., precipitates.
Inf. uvæ ursi, precipitates.
Liq. arsenii et hydrarg. iod., precipitates.
Liq. ferri perchlor. }
Liq. ferri pernit. } Blood-red coloration.
Liq. ferri persulph. }
Liq. potass. permang., reduction quickly takes place.
Sodii salicylas (solid), liquefies.
Spirit. ætheris nit. (acid), green coloration.
Syrup. ferri iodid., reddish-brown coloration.
Tinct. catechu, precipitates.
Tinct. cinchonæ, precipitates.
Tinct. cinch. co., precipitates.
Tinct. ferri perchlor., red coloration.
Tinct. gallæ, precipitates.
Tinct. gum rubri, precipitates.
Tinct. hamamelid., precipitates.
Tinct. iodi, precipitates, soluble in excess of water.
Tinct. kino, precipitates.
Tinct. laricis, precipitates.
Tinct. rhei, precipitates.

Remarks on the foregoing list:—

Dilute Acids.—With dilute acids, no apparent change takes place, as with sulphuric, hydrochloric, nitric and phosphoric acids, antipyrin forms soluble compounds (Gay and Fortuné). This is well shown by dissolving antipyrin in excess of any of the above dilute acids. The solution then gives with ferric chloride a yellow coloration (or none at all) instead of the usual blood-red coloration, one of the tests for antipyrin.

The reaction said to occur[*] when strong nitric or sulphuric acid is added to an alcoholic solution of antipyrin we have not been able to obtain. Another statement we are unable to entirely confirm is regarding the behaviour of antipyrin with phosphoric acid. We find that boiling concentrated phosphoric acid, to which has been added a few crystals of antipyrin, gives only a faint straw coloration, whereas it has been claimed that it immediately blackens and yields an aromatic odour. This latter reaction, however, we have been able to obtain when using phosphoric anhydride, and the aromatic odour closely resembles that of salol.

Nitrites and Nitrous Acid.—The green coloration sometimes produced when antipyrin is mixed with spirit of nitrous ether has been frequently commented upon. The subject has been exhaustively worked out by Drs. Wood and Marshall (*Therapeutic Gazette*, Feb. 15, 1889). The green coloration is due to the formation of the compound, isonitroso-antipyrin, a body having the empirical formula of $C_{11}H_{11}N_3O_2$ (that is antipyrin having an atom of hydrogen replaced by NO). By the action of acids upon this body a small quantity of cyanogen is produced, and it is stated that unpleasant symptoms have been traced to a mixture of antipyrin and spirit of nitrous ether. According to the authors named, however, the compound itself is inert and the cyanogen formed from it, by the acids of the stomach, is produced in too small a quantity to be dangerous.

Isonitroso-antipyrin is only formed in the presence of free nitrous acid; a neutral spirit of nitrous ether may therefore be safely dispensed with antipyrin. But it should be remembered that ethyl nitrite is itself speedily decomposed by water with the formation of free nitrous acid. We would therefore recommend that the occasional practice of prescribing the two together should be discontinued. The same remarks apply to commercial amyl nitrite. We exhibit samples of isonitroso-antipyrin prepared by us by the action of nitrous anhydride upon a strong solution of antipyrin, and also of the same recrystallized from alcohol, the substance being but slightly soluble in water. The reaction of antipyrin with nitrous acid forms a convenient and reliable test for the presence of either, as has been pointed out by one of us.*

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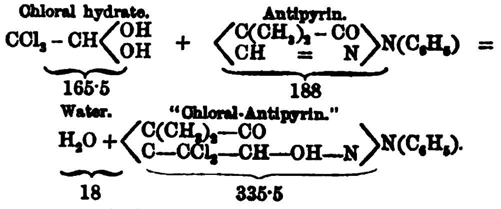
[*] *Pharm. Journ.*, [3], xviii., p. 1066.

[*] *Pharm. Journ.*, [3], xix., p. 248.

Tinctures.—We found that no precipitation in any case took place with tinctures if a spirituous solution of antipyrin were employed, or if the salt were added to the tincture. The addition of water precipitated the antipyrin compound. In connection with the precipitation with astringent preparations it should be borne in mind that antipyrin behaves with reagents exactly as an alkaloid, and is therefore precipitated by tannic acid and its congeners. The same observation applies to the astringent decoctions and infusions.

Chloral Hydrate.—The fact that chloral hydrate and antipyrin react with each other was pointed out some time ago by M. Blainville, and the reaction has since been studied by Herr Reuter.† According to this chemist the reaction occurs in accordance with the following equation:—



$$\underbrace{CCl_3-CH\left\langle\begin{array}{l}OH\\OH\end{array}\right.}_{165\cdot5}\;+\;\underbrace{\left\langle\begin{array}{l}C(CH_3)_2-CO\\CH\;=\;N\end{array}\right\rangle N(C_6H_5)}_{188}\;=$$

$$\underbrace{H_2O}_{18}+\underbrace{\left\langle\begin{array}{l}C(CH_3)_2-CO\\C-CCl_3-CH-OH-N\end{array}\right\rangle N(C_6H_5)}_{335\cdot5}.$$

Chloral hydrate. Antipyrin. Water. "Chloral-Antipyrin."

The chemical name of chloral-antipyrin is tri-chloraldehyde-phenyl-dimethyl-pyrazol.

From the above equation it will be seen that theoretically 10 grains of chloral hydrate combine with 11·353 grains of antipyrin.

From a number of experiments we are of opinion that this compound of antipyrin and chloral is not appreciably formed unless concentrated solutions are employed. The following details of four experiments will explain the reasons of our opinion.

Experiment 1.—A molecular weight, of chloral hydrate, in grains, was dissolved in 6 fluid ounces of water and mixed with a molecular weight of antipyrin, in grains, previously dissolved in the same quantity of water. No separation or decomposition was apparent and antipyrin was discovered present in the free state. It was found necessary to concentrate the solution to about the bulk of 6 drachms, before combination took place. An oily yellow liquid then remained, which, on standing, solidified to a mass of crystals. The sample of chloral-antipyrin we exhibit has been prepared by one of us in this manner, and agrees in the main with the characters given by Herr Reuter.

Experiment 2.—10 grains of antipyrin and 10 grains of chloral hydrate were each dissolved in a drachm of water; no separation took place on mixing the two liquids and antipyrin was found to be present in the free state.

Experiment 3.—10 grains of antipyrin and 10 grains of chloral hydrate were dissolved in one drachm of water, the solution speedily became milky and the oily compound separated out. The supernatant liquid still gave evidence of the presence of free antipyrin.

Experiment 4.—Five grains of antipyrin and 10 grains of chloral hydrate were dissolved in one drachm of water. On the compound separating, the supernatant liquid showed that antipyrin was present in the free state.

It will be seen that in the last experiment the chloral hydrate was considerably in excess of the quantity necessary to combine with the amount of antipyrin used, but although the mixture was allowed to stand some time a considerable proportion of the antipyri remained uncombined.

We conclude, therefore, that the reaction is not complete in aqueous solutions, and does not appreciably take place if dilute solutions of the two bodies be employed. As the chloral-antipyrin is, according to Her Reuter, physiologically inert, the question of its formation under the ordinary conditions likely to occur in pharmacy appears to us to be of some importance.

Mercuric Chloride.—When a solution of antipyrin is added to a solution of mercuric chloride a white precipitate occurs, soluble in excess of water. By employing concentrated solutions of the two substances we have prepared a quantity of the compound of mercury and antipyrin. The specimen we exhibit is slightly soluble in cold, more so in hot water. It is soluble in alcohol, sparingly a if at all, in ether, chloroform and petroleum ether. We have been unable to crystallize it. The compound is, we believe, partially decomposed by water, the supernatant liquid from the precipitation of the compound giving at first no indication of the presence of free antipyrin (the mercuric chloride solution was purposely employed in large excess). On standing some time, however, it gave the nitrous acid reaction characteristic of antipyrin.

The mercury still exists in the compound, even after a considerable space of time, in the mercuric state and we have been unable to find any calomel present.

Ferric chloride produces with a solution of this compound a brick-red precipitate, soluble on heating and reprecipitated on cooling.

The most remarkable character of this body is its extremely low melting point. This we find to b nearly 73° C. The m.p. of mercuric chloride is 2 C., whilst that of antipyrin is 110° C. The compound turns slightly yellow upon fusing, but appears to otherwise to remain chemically unaltered.

Calomel.—As antipyrin seemed to us occasionally act as an oxidizing agent we thought it worth while investigate its action with calomel. For this pur the following mixtures were made and exposed to fused sunlight for a month.

1 Calomel, 4 grams; antipyrin, 4 grams; mately mixed and placed in an open vessel.

2 Calomel, 2 grams; antipyrin, 2 grams; hy chloric acid, 5 c.c. and water 50 c.c.

3. Calomel, 2 grams; antipyrin, 2 grams; w 50 c.c.

Blank experiments containing the same propor of calomel water and acid, and calomel and water, made to experiments 2 and 3.

On examination at the end of a month, No. turned distinctly yellow, the others remained una in appearance. We were unable to find any me chloride present in any of them.

Thus we are able to confirm, except in one part the experiments described in the *Druggists' Cir* Jan., 1889.

The reducing powers of antipyrin are well sh boiling mixture No. 1 (see above) with water, wh calomel speedily turns grey.

Sodium Salicylate.—The fact that sodium sali and antipyrin react when in powder has been times pointed out.* No reaction appears to tak in solution.

Our experiments were as follows:—

Antipyrin, 2 grams, intimately mixed with s salicylate, 2 grams, and the mixture divided int parts.

a. Exposed in an open vessel in a dry place.

b. Exposed in an open vessel in a damp place.

c. Enclosed in a well-corked bottle.

At the end of three days (*a*) had undergone parent change, but on the fourth day partial liq tion had taken place, and in a week the mixture had become an oily liquid.

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* *Pharm. Journ.*, [3], xix., pp. 949, 988.

† *Apoth. Zeitung*, Nos. 8 and 23, 1890.

* *Pharm. Journ.*, [3], xix., pp 863, 930.

(*b*) began to liquefy on the second day, and in three days had become completely liquid.

(*c*) is still quite dry and unchanged.

The oily liquid, we found, had a neutral or feebly alkaline reaction; on diluting with water, however, the solution became distinctly acid. This change is prettily shown by smearing a piece of blue litmus paper with some of the oily liquid, and placing the paper in a vessel of water; as the compound on the paper dissolves in the water the paper slowly turns red. On treating the oily liquid with water and extracting with ether we obtained a distinctly acid ethereal solution, giving on evaporation the reactions of salicylic acid. Hence we conclude that that body is present in the free state after the addition of water to the mixture. In these experiments were used three different samples of salicylate of sodium. Two were artificial, and the remaining one natural. The same result was obtained with all three. Two of these, a natural and artificial sample, were previously ascertained to be neutral; the third was acid.

Salicylic acid itself mixed with antipyrin and exposed in the same manner; no change resulted.

Iodine.—When solution of iodine in iodide of potassium is added to a solution of antipyrin a precipitate is formed which disappears upon agitating the liquid, leaving a colourless solution, until a definite quantity of iodine is added, when the precipitate remains permanent.

A recent writer, M. Manseau, has suggested utilizing the reaction as a means of estimating the purity of a sample of antipyrin.* Decinormal solution of iodine is employed, and the end of the reaction being indicated by the production of a permanent precipitate. We have examined this method and find that the production of a permanent precipitate depends upon the degree of dilution of the antipyrin solution, and is practically valueless as an indication of the termination of the reaction.

For example:—

One gram antipyrin dissolved in 200 c.c. of water required 7·2 c.c. $\frac{N}{10}$ iodine solution.

One gram antipyrin dissolved in 100 c.c. of water required 3·9 c.c. $\frac{N}{10}$ iodine solution.

More concordant results were obtained by the use of starch solution as an indicator, but even with this the degree of dilution appears to be an important factor in producing reliable results. The following process has yielded us the most consistent results:—

Take 0·5 gram antipyrin and dissolve in 200 c.c. of distilled water, solution of starch is then added and the decinormal solution of iodine run in, drop by drop, until a distinct blue coloration is produced that does not disappear on vigorously shaking or stirring the mixture.

0·5 gram antipyrin required 3·8 c.c. $\frac{N}{10}$ iodine solution.

One gram antipyrin required 7·5 c.c. $\frac{N}{10}$ iodine solution.

0·5 gram of a sample of suspected antipyrin, from an unknown source kindly supplied us by a member of the Association, required 3·8 c.c. $\frac{N}{10}$ iodine solution.

We find it advisable to use rather more starch solution than is usual in conducting estimations with iodine, as the antipyrin solution, towards the end of the reaction, assumes a greyish colour and tends to hide the blue colour if that be faint. The solution must also be well stirred or shaken upon each addition of iodine, the absorption towards the end taking place slowly.

We do not, of course, suggest this process as a very reliable one for the estimation of the purity of a sample of antipyrin, although it may prove useful taken in conjunction with other tests. The question of the purity of antipyrin will probably become of more considerable importance on the expiration of the present patent, and it is to be hoped that a wholly satisfactory process will before long be devised.

It is now decided, we believe, that antipyrin is to occupy a position in the forthcoming Addendum to the British Pharmacopœia. The following we would respectfully suggest as a pharmacopœial description of antipyrin.

"A neutral substance prepared from chinoline.

"*Characters and Tests.*—In white granular crystals, odourless and with slight bitter taste. When completely dried it fuses at 110° C. Soluble in its own weight of water at ordinary temperature and in half its own weight of boiling water. The aqueous solution is neutral. Freely soluble in rectified spirit and in chloroform, sparingly soluble in ether. If to a solution of antipyrin a little nitrous acid be added a green coloration or precipitate is produced."

The antipyrin used in this country is almost exclusively that manufactured by Knorr. Both this and the analgesin of the French makers appear to be of uniform purity, but complaints have not been wanting, from the continent, of inferior preparations. We have not ourselves been able to meet with a sample which seemed to us impure.

In conclusion, we venture to express the hope that the compilation of all the incompatibles of antipyrin into one paper, many of which have been discovered by us, may be of use to the members of this Association and others who are called to dispense this increasingly popular medicine.

The following is a list of references to antipyrin not already quoted:—Antipyrin and quinine (*Apotheker Zeitung*, April 10, 1890), antipyrin and sodium salicylate (*Bulletin Com.*, April 30, 1889), antipyrin and cinchona (*Bulletin Com.*, June, 1889), antipyrin and ether (*Journ. Pharm. et Chimie*, August 15, 1888), antipyrin, bismuth, salicylate and naphthol (*Bull. Com.*, November, 1889).

The President (Mr. T. A. Ellwood) said the paper communicated by the authors was one of considerable interest, especially to those actively engaged in the dispensing of prescriptions. Antipyrin was comparatively a new drug, and yet in a few years it had by its therapeutic properties forced itself into common and extensive use, now ranking with the most frequently prescribed drugs, and as Sir Edward Sieveking said, it would necessarily hold its position until a preparation of either equal or superior virtues was discovered by foreigner or Englishman to supply its place. A concise table of its incompatibilities must be useful to a dispenser, at all times for reference; for when he had to use chemicals of such a complex nature they must expect there would be numerous decompositions taking place, some of which would probably be of such a nature as to render administration attended with some danger. In referring to incompatibilities it was not enough to simply consider whether a precipitate was formed, but also if a chemical change was produced, altering the properties of the mixture prescribed. The incompatibles pointed out by the authors seemed to be chiefly embraced in the following classes:—(1) Halogens or haloid derivatives, where in all probability the halogen enters into chemical combination with the antipyrin or displaces some of its hydrogen. (2) Tannins, or astringents. As had been stated, antipyrin was incompatible with all the preparations containing cinchona, though from the fact of its not having been mentioned he took it for granted it was compatible with the cinchona alkaloids. (3) Salts of the aromatic acids, in which case it might be that the action was antagonistic without forming any special chemical combination. (4) Nitrites, the reaction products with which might need a further study as to whether any of them possessed poisonous properties. Some time ago one of the authors had pointed out in the *Pharmaceutical Journal* a test for antipyrin, which by printer's error was printed "nitrate" instead of "nitrite," and although corrected the following week, it was to be regretted that the mistake had reappeared in the 'Year Book of Pharmacy,' and only that month in the Journal of the Chemical Society.

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* *Pharm. Journ.*, [3], xx., p. 162.

Mr. Seccombe said all dispensers would be much indebted to the authors for the information which they had brought together in their paper. He had seen it stated that the addition of a neutral solution of ammonia acetate to spirit of nitrous ether, previous to mixing with a solution of antipyrin, prevented the formation of isonitroso-antipyrin; according to his experience, however, this addition simply retarded the reaction and did not prevent it.

Mr. W. G. Blackham said that as a rule he believed antipyrin was prescribed alone. The exceptions however were sufficiently numerous to render the paper most useful at the dispensing counter. One medical man of his acquaintance prescribed antipyrin with every drug in the Pharmacopœia; some extraordinary combinations were the natural result of this heterogeneous prescribing.

Mr. E. Richards congratulated the authors on their paper, and deprecated the way in which the market was flooded with such patented preparations. Every chemist was now obliged to keep a "cupboard of curiosities," or, in other words, of certain patented compounds, of which some unfortunate patient had been induced to try one dose, but would never attempt a second. An eminent physician had remarked at the Association's dinner that medical practitioners would continue to order those new remedies of foreign manufacture until English chemists improved upon them; but that physician forgot that these inventions and discoveries by foreigners are patented in this country, simply to prevent the articles patented from ever being manufactured here or improved upon. There was never any accompanying information as to their compatibles or incompatibles. How could medical men intelligently combine such substances with other drugs? A glance at the advertisements of these compounds in the medical press would lead one to think the British Pharmacopœia was a book not to dispense from, but to dispense with, and physicians were altogether unnecessary in the face of these existing foreign remedies. The question therefore arises in one's mind are these artificial products equal to the natural? a question which at the present moment had a direct bearing on the salicylates. From irrefutable personal evidence he was convinced of the marked superiority of natural salicylic acid and salicylates, as compared with the artificial.

Mr. W. Lloyd Williams thought that in a paper which treated of antipyrin and its incompatibles they might have heard a little more of the chemistry of antipyrin. He did not notice that any reference had been made to the incompatibility of butyl-chloral hydrate and antipyrin, when mixed in strong solution. If these two substances were placed in a mortar with a little hot water an oily liquid separated, but if they were dissolved separately and fairly well diluted before mixing this precipitation did not occur.

Mr. Millard, in reply, said there was no doubt that the disturbing element with the cinchona preparations was cinchotannic acid. Chlorine and bromine yielded precipitates with antipyrin, as did iodine. With regard to the test recommended for antipyrin, viz., the nitrous acid test, they were compelled to prefer it to the ferric chloride reaction given as the distinctive test in the "Extra Pharmacopœia," and elsewhere, because sulphocyanides, acetates, meconic acid, etc., acted in a similar manner with that reagent; whereas the nitrous acid test was delicate and absolutely distinctive. As far as he was aware, the incompatibles were inert, and in the case of chloral antipyrin, Herr Reuter had stated that it had none of the properties of either antipyrin or chloral. Very little progress would be made if Mr. Richards's suggestions were adopted. He believed that most of these antipyretics were only steps on the way towards making artificial quinine. At least it was well known that the discovery of chinoline was hailed by many as the first step towards preparing quinine synthetically. It was useless to blink at the fact that antipyrin had firmly established itself in medical favour, and a glance at the space devoted to it in Squire's 'Companion' or Martindale's 'Extra Pharmacopœia' would confirm his statement. With regard to natural products he would like to draw Mr. Richard's attention to Professor Charteris' letter, which appeared in a trade journal recently, in which the Professor admitted that samples of Schering's artificial acid and salicylate of sodium were as absolutely pure as the natural productions. He wished to express his regret that his colleague, Mr. Stark, was unable to be present that evening, owing to serious indisposition.

ROYAL INSTITUTION.

FOAM.

On Friday, March 28, a lecture on foam was delivered by Lord Rayleigh. At the outset it was shown by many illustrations that in order to foam a liquid must be essentially impure or dirty; a pure liquid will not produce a froth, as was shown in the cases of alcohol, water, glacial acetic acid, etc., while mixtures of these with one another produce more or less persistent foams. Some substances, however, impart the property of frothing to a remarkable degree, three parts in a hundred thousand of gelatine being very perceptible, while soap and saponin possess the property to a still greater extent. The frothing of sea water is due, not to the salts in solution, as a solution of these in pure water does not foam, but to organic matter dissolved out of the seaweeds. The cause of foam is evidently the persistence of liquid films which inclose bubbles of air or gas, and the lecturer explained how this depended on surface tension. The existence of surface tension was shown by taking a film of soap solution with a loop of silk thread immersed in it, and puncturing the film inside the loop; the loop, which before was irregularly flattened, immediately became circular, showing that the remaining film was trying to contract into the smallest possible area. It was also shown how the surface tension could be measured by means of the height to which the liquid was raised by capillarity between two glass plates very close together, and in this way it was demonstrated how much it was lowered by oil, and still more by soap. The effects of surface tension were also shown by the energetic movements of small pieces of camphor thrown on the surface of clean water; the camphor in dissolving greatly diminished the surface tension on one side or another of the particle, the consequence being the rapid motion of the particles. A similar effect was produced by Professor Dewar with pieces of charcoal coated with paraffin except at one side; ether was introduced from a pipette at the uncoated portion, and when the lump was thrown on to water, the ether dissolving out on one side only diminished the surface tension on that side and propulsion ensued. A very slight film of oil or grease is sufficient to stop these movements, even dipping the finger into the water being sufficient if the surface is not very large. The lecturer had made measurements of the thickness of the oil film requisite and found that a film of 1½ to 2 micro-millimetres (millionths of a millimetre) would stop the movements. The thickness was obtained by dropping a very minute weighed quantity of oil on to a large surface of water of known area; to show that the oil immediately spreads all over the surface the lecturer sprinkled a little sulphur on a large tray of water and then let fall a drop of oil on the middle, when all the sulphur was at once carried to the edges. In connection with the surface tension of oil and water surfaces the lecturer alluded to the explanation often given in text-books of the equilibrium of a lens of oil floating on water, which is generally incorrectly stated. It is generally said that there are three surfaces whose tensions form a triangle representing the position of equilibrium, viz., the oil and water surface, the oil and air surface, and the water and air surface. As a matter of fact, there can never be such equilibrium, for the tension of the water-air surface always exceeds the sum of the other two, and what actually happens is that a thin film of oil spreads over the water-air surface before a lens of oil can form. Another mis-statement often met with is that the tension is equal at all parts of a liquid film, such as a soap bubble, but if this were so there would be nothing to counteract gravity, and the particles in the upper part of the film would fall at the rate of 16 feet in the first second. That they do not do so when foam is produced shows that there must be a difference of tension in the upper and lower parts of the film, and this explains why a pure liquid will not froth. When the liquid is not pure, however, the contamination may run off more quickly from the upper part of the film and so produce the difference of tension necessary to support the upper part against the action of gravity.

NORTH KENSINGTON CHEMISTS' ASSOCIATION.

A meeting of this Association was held at the Leinster Hotel, on Tuesday evening, April 15, at 9 p.m. Present: Messrs. Allen, Bowles, Edwardes, Garner, Gulliver, Hyslop, Long, Runden, Smith, and Urwick.

The clauses of the Pharmacy Bill were discussed *seriatim*.

Clause 1 was approved of.

Clause 2, 6 for, 2 against.

Clause 3 approved of, with the addition that no apprentice should be received who had not passed Preliminary or equivalent.

Clauses 4 and 5 approved unanimously.

Clause 6 was thought to be apparently in conflict with the conditions required from candidates for the Minor, who are required to present a certificate of having been practically engaged in the translation and dispensing prescriptions.

Clauses 7, 8 and 9 were approved unanimously.

A very pleasant evening was spent.

Provincial Transactions.

MEETING IN EDINBURGH.

On Wednesday afternoon, a meeting was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, to consider the candidature of Mr. David Storrar, of Kirkcaldy, for a seat on the Council. Mr. Watt took the chair.

Mr. Mackenzie said they knew that their friend Mr. Storrar had been nominated, and was standing for election as a member of the Pharmaceutical Council. Whatever his chance of success might be, it would depend very much upon the action of his fellow countrymen. He would suggest that it would be well they should do something in Scotland to show that they were in earnest. They should issue post-cards to all the members of the Society throughout Scotland, asking their support, and impressing upon them the desirability of their exercising their prerogative of voting on this occasion. Mr. Evans, a Welsh member, got in last year, and it was entirely due to the exertions put forth by his supporters.

Mr. Strachan, Aberdeen, said there was no doubt that in his locality Mr. Storrar would receive great support.

Mr. Watt said he needed not to tell them what pleasure it had given him when he knew that Mr. Storrar had acceded to the request of a number of chemists there, that he should be nominated for the Council. Scotland, he held, should have two representatives. It was entitled to it numerically, as he had told the Council already. What made him think more seriously of having another representative was that from causes over which he had no control he was prevented from being in London for two months, much to his regret, for subjects came up on which he was desirous to express his opinion. There was no doubt that at his time of life, and with the immense amount of public work which he had to do at present, it was absolutely necessary that the chemists of Scotland should have another representative there. He felt that very strongly; and they were quite aware that he could not now submit to such constant travelling, and therefore it would be quite a relief to him if there was another Scottish representative on the Council. He trusted everyone would use his efforts to promote Mr. Storrar's return. However, Mr. Storrar must take his chance along with the others in a fair election for the Council, and he trusted that very careful and considerate attention to the various candidates would be given by all the members. He would not touch upon certain subjects on which he would like to speak, but he would say there was no doubt that this election was a crisis in the Pharmaceutical Society. There were points involved and subjects which deserved attention in connection with it which to him were of paramount importance both to the Society and the trade generally; and he trusted everyone would give that due attention and care in the selection of candidates that he had no doubt Scotchmen would do. He quite approved of the proposal of Mr. Mackenzie that they should send post-cards out, especially to the Scottish members.

Mr. Mackenzie: Every member.

Mr. Watts: Very well; I go the whole hog, and I have no doubt that as I said to them in London, if Mr. Storrar is elected he will be an acquisition to the Council and an honour to Scotland.

Mr. Paterson heartily endorsed all that had been said about doing their utmost to return Mr. Storrar. At the same time it seemed talking rather loosely to speak about issuing a post-card. What they ought to do was to form a committee to promote Mr. Storrar's return. Then they could consider details and do their utmost to promote the object which they were all anxious to carry into effect.

Mr. Maben said his intention was to vote for Mr. Storrar alone, and score out every other name. He had done that for two years, and he had no cause to regret it. He was in a very doubtful position as to whom he should vote for; they were entirely in the dark. They knew there were a number of dark horses in the field, but if they did not make a better statement and policy than they had done,—their intended policy,—people would still be in the dark. Members ought to have a statement of policy, and if they agreed with it, then let them support that candidate to the best of their ability. A man ought to make a deliberate statement and not merely say he was there to turn out another man.

Mr. Mackenzie said it had been considered *infra dig.* in the inner circle to issue such a statement, and those who had done so had forfeited the support of a large number of the upper ten of pharmacy. They did not like in London to issue any manifesto, and that was one of the reasons why members of the trade did not vote.

Mr. Watt remarked, in answer to Mr. Maben, as he was not a candidate he had no special policy to issue, but he had no doubt that a number of those standing would issue a manifesto.

Mr. Maben: I hope so.

Mr. Watt said he had nothing to do with any of the candidates standing except Mr. Storrar. Of course, they were all conversant with the journals, and the opinions expressed there, but he was informed there would be expressions of opinion by most of the candidates there. By these they would be able to form an opinion personally. With reference to the issuing of opinions, he was asked by one of the trade journals to give his opinion, and as it was the only thing he possessed, he was delighted that everyone should know it. He made no hesitation of expressing his sentiments, whether in a journal or in the Council. He was very strongly in favour of everything being open and honest and not in the dark. Whatever opinions a man possessed and held he ought to avow them openly and stand by them.

Mr. Storrar said this expression of feeling was quite unexpected and all the more gratefully received. He was much pleased that they should be so favourable to his candidature. It was only right that he should say he was an unwilling candidate. He was persuaded to this rather against his wishes, because it was not a very convenient thing for a chemist to be away from home so much; but he might say that if by chance he were elected to the Council he would do his duty. It would be infinitely better if they had a representative from Edinburgh or Glasgow or a big centre, but failing this he was quite willing to give his services to the Scottish members and represent them to the best of his ability. He agreed much with what Mr. Maben had said that candidates should declare to a certain extent the policy they held. He could only consent to go into the Council if he were permitted to side with Mr. Watt when he was right and oppose him when he was wrong.

Mr. Watt: That is the man for me.

Mr. Storrar, continuing, said his impression was that the future policy of the Pharmaceutical Society depended greatly upon what was done during the next one or two years. The issue was whether they were successful in inducing outside members of the trade to join the Society. The Society was formed for the purpose of protecting trade interests and the helping on of pharmaceutical education. That was quite natural; but still, unfortunately, the Council, at any rate, had drifted away from this matter of protection of trade interests. That, he thought, was a pity, and it was due to that fact that both its income and members had been reduced of recent years. The Society represented something like a fifth or a sixth of the whole trade in Great Britain.

Mr. Maben: A third.

Mr. Storrar: I did not think it was quite so much as that. His first policy would be to endeavour by every means in his power to enlarge the Society by taking in the associates and outside chemists; induce them to come and act with them. He would even go the length of saying that they should get legislative powers to have associates in business elected members of the Society. Until that was done legislation, if there was to be legislation, should not be attempted. In conclusion, he would say he, if elected, would take up an independent position, as he believed Mr. Watt had taken up. If he had been aware of having to make such a statement he would have been better prepared.

Mr. Mackenzie: We will take your past history as sufficient.

After some further conversation a committee was appointed to secure Mr. Storrar's return.

The meeting then separated.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth meeting of the twelfth session was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, April 9, at 9.15 p.m., Mr. A. Russell Bennet in the chair.

The minutes of the last meeting having been read and approved the following communications were read:—

NOTE ON PIL. COLOCYNTH. CO., B.P.

BY PETER BOA.

Mr. Boa said it was a general experience that these pills, when made according to the Pharmacopœia, sometimes "pitted" and became unsightly. This was due, he believed, to the resin of scammony, which underwent a sort of shrinkage, and what was required as an excipient appeared to be something to counteract that. Soap suited pretty well, but so much had to be used that the strength of the mass was altered. In experimenting with excipients he had only tried such as would not at all, or to a very small extent alter the strength of the mass. Two methods of making he had found good. One of these consisted in using kaolin, instead of sulphate of potash, and massing with water, as directed by the Pharmacopœia. The kaolin when damped with water returned to its original condition of clay, which "set" in the pills and prevented "pitting." Some hyper-finical chemists objected to kaolin, but he did not see any harm in it himself. A greater number probably would question the utility of the sulphate of potash.

The other method depended on the use of tragacanth. Two grains of tragacanth, three drops of glycerine, and water a sufficiency, were the quantities for a dozen of pills. Neither method would alter the strength of the pills nor retard their solubility; while either of them very much improved their appearance.

NOTE ON OFFICIAL IRON SALTS.

BY DONALD MCEWAN.

The author in his introduction gave a most interesting description of the Scottish method of obtaining iron ore, the extraction of the metal and the manufacture of the commercial varieties of iron and steel. The note was intended to supply what was felt to be a desideratum by medical practitioners. In prescribing iron in its various forms the prescriber desired to know how much metallic iron was present in each dose of the medicine. There was a want of readily available data from which this could be ascertained, and the following table was the result of an investigation intended to supply the requisite information. He had not had time to go exhaustively into the subject, but might be able to make a more detailed communication at some future time.

	Dose.	Amount of Iron in Dose. Grains.
Ferri carb. sacch. . .	5 to 30 grs.	0·8 to 4·8
Ferri ammon. cit. . .	5 to 10 „	1·05 to 2·1
Ferri peroxid. hydrat.	5 to 30 „	3·2 to 19·2
Ferri sulphas. . . .	1 to 5 „	0·2 to 1·0
„ „ exsiccat.	½ to 3 „	0·16 to 1·0
Ferrum redactum . .	1 to 5 „	0·5 to 2·5
„ tartaratum .	5 to 10 „	1·05 to 2·1
Liq. ferri acet. . . .	5 to 30 mims.	0·08 to 0·5
„ „ perchlor . .	10 to 30 „	0·5 to 1·5
„ „ pernit. . .	10 to 40 „	0·3 to 1·2
Syr. ferri iodid . . .	30 to 60 „	0·38 to 0·77
Ferri phosphas . . .	5 to 10 grs.	0·75 to 1·5

Mr. William Duncan communicated a description of the Minor examination of New South Wales received from a correspondent, and compared it generally with the Minor examination as conducted in Great Britain.

Mr. John Findlay communicated a note on the preparation and properties of metaldehyde, illustrated by chemical equations and drawings of the apparatus employed. Metaldehyde, he explained, was a polymeric modification of ordinary aldehyde C_2H_4O, and was prepared by passing SO_2 through ordinary aldehyde and cooling to 0° C., when metaldehyde separated in crystals melting at 112° to 115° C. It sublimed unchanged at 120° C., but when heated to 200° C. in a sealed tube it was reconverted into ordinary aldehyde.

The reading of the papers was followed by a discussion, taken part in by Messrs. Bennet, Boa, Cumming, Duncan, Findlay, Henry, Hill, Lunan and McEwan, and on the motion of the Chairman votes of thanks were awarded to the authors.

It was agreed that the annual business meeting should take place on May 7, and Messrs. Cowie and Leys were appointed to audit the accounts. The "Ainslie" pharmacy prize and others will be presented at this meeting.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The annual business meeting of this Association was held on Friday evening, April 11, Mr. Curtiss in the chair.

The minutes of last meeting having been read and approved of the Secretary read his report on the work of the session.

The report showed that the past session had been most successful, that the papers read had been of a high standard and that the attendance of members most encouraging. The Treasurer's report showed a considerable balance in favour of the Association.

The following were elected office-bearers for session 1890–91:—Honorary President, Mr. Jas. Clark, Ph.C.; President, Mr. Geo. Cowie, Ph.C.; Vice-President, Mr. McWilliam; Secretary, Mr. Falconer; Treasurer, Mr. McDonald; members of Committee, Messrs. Cran, Gray, A. Milne, A. G. Milne, A. M. Milne, Sangster and Spence.

Votes of thanks having been passed to the retiring office-bearers the meeting broke up.

Review.

COMPANION TO THE LATEST EDITION OF THE BRITISH PHARMACOPŒIA. By PETER SQUIRE. Fifteenth Edition. Revised by PETER WYATT SQUIRE, F.L.S., F.C.S., and ALFRED HERBERT SQUIRE.*

In the current number of an American contemporary editorial regret is expressed that a "convenient and useful commentary" upon the United States Pharmacopœia "has to a great extent overshadowed the thing commented on; the commentator has been mistaken for the authority and the authority itself wholly lost sight of." Although affairs have not yet come to this undesirable stage in this country, it is probably correct to say that at least one book is consulted by both prescribers and dispensers more frequently than the British Pharmacopœia, and that is Squire's 'Companion.' Rather more than a quarter of a century has passed since the issue of the first edition of the 'Companion' by the late Mr. Peter Squire, and the acceptance with which it was received has hardly wavered since, whether in respect to the successive editions brought out by the original author or those issued under the supervision of his sons. The present edition—the fifteenth—still presents all the characteristic features of the first, though it has increased now to three times the original bulk. The increase has been to some extent due to continued introduction of information about non-official drugs and preparations, this work being thoroughly and systematically done and inclusive of almost the latest of the German immigrants. Then there has been a constant accretion of practical notes on solubilities, compatibilities and similar points, such as can only be the outcome of large current experience in dispensing and pharmacy. In addition this edition is marked by numerous additions to the therapeutic notes. It may, in fact, be safely predicted that Squire's 'Companion' will not fail to hold its place on the pharmacist's bookshelf as long as it is kept up to its present degree of excellence.

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* London: J. and A. Churchill. 1890. Demy 8vo., Pp. ii.-xl., 1-620. 10*s*. 6*d*.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

CHEMISTS' TRADE INTERESTS.

Sir,—There has, I believe, been much enlightenment produced during the last year by discussion and correspondence with regard to what is feasible in the cry for trade protection, and the process will be further helped if all who have views will think them out and produce them. It they be but a revelation of our own blindness it is something gained that it should be revealed.

A Pharmacy Bill has been launched, but is in harbour again. All its points are open to discussion, and if we will now thresh out our differences, and be prepared to give and take, it may be so remodelled that when next it puts to sea a favouring wind, a long pull, and a pull altogether, may prosper its voyage.

What is it we want in the way of trade protection? Our titles are protected, so that none may use them except those who pass through the portals of examination; but the one disappointing feature in the times is that companies have been allowed to filch what we have considered our birthright, personal qualification. But when we remember how that personal qualification has been abused in sheltering under its wing unqualified managers, we are not in a logically strong position, for common sense will pronounce that an establishment will be more safely conducted with a qualified manager on the spot, under absentee unqualified principals, than by an absent qualified principal working through an unqualified manager. Our position, therefore, if not lost, has been weakened by ourselves, and will perhaps only be regained as pharmacy progresses, becomes more scientific, and as the pharmacist develops a keener sense of his personal responsibilities.

As for the cry of discontent against the Council, does it not proceed from those smarting under a loss of trade through inevitable competition and whose judgment is too personal and local to view the whole question with fairness?

For instance, a correspondent in this week's Journal speaks of our conforming to the law, and passing examinations for the public benefit. Surely this is an inversion. Does the child who attends the Board School conform to the law for the public benefit only and thereby render it compulsory on the public to find him occupation as well as education? When we enter this calling and elect to pass the necessary examinations, it is our own benefit we have in view. If we mistake the nature of the prize, or fail to impress the public that it is for their benefit also, the failure is in us, and the public of England is not a body to be forced if it cannot be won. And even if we could by Legislature restrict the sale of all drugs to qualified men, it would only offer a more fertile field for gentlemen from the Principality and others to extend their cutting establishments, and the next logically defensive step we should have to beg from Parliament would be a compulsory schedule of prices to protect us from ourselves.

But, considering the capital we invest, are we not in a better position than the small tradesman pure and simple? Where is the well-to-do family provision merchant of twenty years ago? Has he not been severely crippled and almost annihilated by the stores and formation of large companies? Whereas the pharmacist, where he commends himself personally, is by his skill, his production of specialities, and his resources in manufacture able to command good profits, so that though his returns be small, he has a chance to survive.

Will not one of the natural laws that will work for us be the greater disinclination to seize upon every vacant corner to establish a pharmacy, and larger concerns be the order of the day, with scope for partnerships, or, good positions for senior assistants, and so diminish those narrowing and confining lives which single handed pharmacies entail?

Looked at all round, I think in the personal element only have we hope for the future, and to a compulsory sound training and education to foster and develop it, and with it that sense of *esprit de corps* which keeps in mind that the title we bear, we owe it to the body corporate to bear worthily.

If then we are so to depend upon ourselves, for what reason, some may say, should we subscribe to the Pharmaceutical Society? As this letter is somewhat long, I will, sir, if you will allow me, contribute my ideas on the claims of the Society, with some few remarks on the Council, in your next issue.

28, *Tulse Hill*. **WM. WARREN.**

POISONOUS PATENTS.

Sir,—An opportunity now offers to bring the matter of the sale of patents containing poison by unqualified persons to an issue.

Let the Council depute someone to purchase from an unqualified man one of these patents. Have it analysed, and on proof of its containing one of the scheduled poisons, have the seller prosecuted.

This course would not only stop the sale of such preparations by the unqualified man, but also cause the proprietors to see to the labelling of their medicines.

I think it the duty of the Council to take the matter up, as hitherto a very large portion of that public for whose protection the Pharmacy Act was framed has been without protection. I mean the retail chemist.

ALPHA.

PEROXIDE OF HYDROGEN.

Sir,—With your permission I should like to make some few comments upon the paper by Mr. D. B. Dott which appeared in your issue of the 12th inst.

Mr. Dott states that it was first observed by Schönbein that peroxide of hydrogen results from the oxidation of essential oils in the presence of moisture. That is incorrect, for while he certainly observed that some chemical substance was formed which liberated iodine from potassic iodide, I was the first to demonstrate the active substance to be peroxide of hydrogen; as also to isolate that substance as produced in the process in question.

I have no wish to enter into a discussion with Mr. Dott concerning the valency of oxygen, but his remarks upon this subject and the constitution of peroxide of hydrogen do not lead me to depart in any measure from the views expressed in my paper as referred to by him.

As to the methods for determining the strength of solutions of peroxide of hydrogen, Mr. Dott appears to have overlooked my own contributions to this subject, which have appeared in the *Journal of the Chemical Society* for 1880, page 802, and in the *Analyst* for 1888, page 62. He will find that I have made an investigation of the different methods, and have established the superior value of that method which employs an acidified solution of potassic iodide. My observations on that method have been confirmed by several other chemists.

In concluding, it may be interesting to mention that a steady stream of oxygen may be readily obtained in the laboratory by allowing a solution of ten volumes peroxide of hydrogen to slowly drip into another vessel containing a strong solution of permanganate of potas acidified with dilute sulphuric acid. When large quantities of oxygen are wanted it is best to place some crystals of the permanganate in the solution as well.

C. T. KINGZETT.

WOMEN AS PHARMACISTS.

Sir,—A friend has shown to me an article which appeared in the *Daily Telegraph*, of April 9, in which th writer seems to have quite suddenly awoke to what h considers a new danger for the male sex, in the admissi of women after due examination to the rank of pharmaceutical chemists, with, of course, the right to mind the own business if they are able to get any. Amidst th froth of words which go to make up this style o writing there are some observations that are too o overlooked by those who write to urge women to ta up chemistry as a business. It is by these quite overlooked that very few women could, even if they had th means to pay the premium, get admission into a house o business where there was any real knowledge to be obtained, there being many causes as well as prejudices t account for this, to anyone who thinks seriously of th matter.

The writer of the article seems to have taken his notion o women engaged in minding their business from those muc to be pitied young and necessarily good looking, but n necessarily highly educated women, who have to get the living by handing unneeded refreshments and keeping pleasant face to the silly men (?) who are continuall hovering about them; this, at least, is all I can gather o his ideas as found in the paper.

A LADY PHARMACEUTICAL CHEMIST.

STERCULIA GUM.

Sir,—With reference to Mr. E. M. Holmes's letter on th above subject in your issue of January 11, I beg to inform you that gums from Australian species of *Stercul* develop an odour of acetic acid on keeping.

I had hitherto failed to detect this odour in the gu mentioned, although I had looked for it, and I attribut my failure to detect it to the fact that every one of m bottles had been constantly opened during the past tw years, and the acid had become dissipated as soon a formed. Immediately after reading Mr. Holmes's lette I opened every bottle in the Museum containing Australia Sterculia gum, and acetic acid was present in every instance. They had remained undisturbed for some month in well stoppered bottles. What is the cause of this formation of acetic acid, I have not yet inquired.

With reference to my paper, I would like to take thi opportunity of stating that, through the omission of asterisks, my remark, "the author believes in the genera accuracy of Giraud's figures, etc." (2nd column of p. 384), is not clear. Kindly allow me to explain that an asterisk should precede the word "the," and the correspondin asterisk should follow the "8-10 per cent." higher up. My remark applies to the "soluble gum" and not to th "ash."

Sydney. **J. H. MAIDEN.**

NOTICE.

Chemists' Assistants' Association.—At the meeting to be held on Thursday evening, the 24th April, a paper on "Gold Mining" will be read by Mr. C. W. Seccombe.

J. H. Smith.—We are unable to say whether the preparations supplied under the three names would be th same.

Bathonian.—The solution ought not to contain any sensible amount of free bromine.

W. J. S.—A mixture of 4 parts of sodium water glas and 1 part of syrup has recently been recommended for th purpose. The mixture can be thickened by the additio of more syrup.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Böttger, Newsholme, Ward, Knapp, Jacque.

THE CHEMISTRY AND COMMERCIAL POSSIBILITIES OF WATTLE GUM.

BY J. H. MAIDEN, F.L.S., F.C.S.

Curator of the Technological Museum, of New South Wales.

The subject acquires additional interest on account of the short supply of good gum arabic, and the categorical statement which has been more than once made that Australia might meet the demand. Although a common product, seen and known by everyone in the Colonies, it is singular that wattle gum has not hitherto formed the subject of systematic research. In the following pages I have treated the subject both from a botanical and chemical point of view, and have, I believe, included all published references to the subject. My researches and observations, conducted with exceptional facilities for thoroughly sifting the subject, have caused me to arrive at the conclusion that Europe and America must not look to Australia for any quantity of high class gum.

Wattle gum is the produce of various Australian species of Acacia, a genus which is very largely developed in that continent, comprising about 320 species, besides a large number of well marked varieties.

Gum has, however, only been recorded from comparatively few species, as by far the great majority have no local names, and where it has been collected at all it has usually been styled "wattle gum." The present paper includes all species known to the author as having yielded gum in Australia; several of the gums are now recorded or described for the first time. The specimens described are in the Technological Museum.

Speaking of Wattle gums in general, Bentley and Trimen, 'Medicinal Plants,' say, "It is found commonly in large tears or masses of a dark yellow or reddish-brown colour. This gum, which has a transparent appearance, being nearly free from cracks or fissures, is said to be readily soluble* in water, and to form a very adhesive mucilage. It is frequently contaminated with pieces of the astringent barks of the trees from which it is obtained, hence its solution, unless carefully prepared, will frequently contain some tannic acid." This is an objectionable constituent, as it affects the mordants in calico printing.

"Best selected Turkey gum" is the ideal gum of the group to which Wattle gum belongs, and if judging were to be by points, it would take the highest place as regards absence of colour, freedom from accidental impurities, ready solubility, and adhesiveness of its mucilage. The Australian gums seen by the author for the most part fall far behind this high standard, although specimens of those from *A. homalophylla*, *A. pendula*, *A. sentis*, and *Flindersia maculosa* compare with it very favourably. As far as his experiments go, those samples obtained from the interior (comparable in its aridity to the Soudan and other noted gum-producing countries), are completely soluble in water, and make good mucilages, while those obtained east of the Dividing Range, *i.e.*, in well watered districts, in which vegetation is comparatively luxuriant, are more or less insoluble, portions, at least, merely swelling up in water, like cherry gum. In other words (speaking of the Eastern colonies, in the absence of detailed knowledge of the western one), the coast Wattle gums contain metarabin, while the interior ones do not. And when it is borne in mind that the yield of gum in the interior is insignificant as compared with that of the coast country, it becomes apparent how hazardous is any generalization that Australian gums are readily soluble in water.

I do not think there is much commercial future before Australian gum, on account of the high price of labour, except in the few localities where gum is very abundant and of high quality, and because the natural gum-yielding trees have been largely destroyed for their tan-bark and for firewood.

Wattle gum exudes chiefly during the summer season from fissures and accidental injuries to the bark. After careful observation, I have formed the opinion that, as a very general rule, it is a pathological product. I came to this conclusion long before I was aware of Trécul's observations, that Acacias and the Rosaceæ yield their gums most abundantly when sickly, and in an abnormal state caused by a fulness of sap in the young tissues.

Wattle gum of various species is largely eaten by the blacks, and, by those of the interior at least, especially with fish. This fact is well-known in the Colonies, and I give a few quotations from explorers on the subject. Following is Captain Sturt's account of the occurrence and use of Wattle gum by some natives of Central Australia:—"Among other things we found a number of bark troughs filled with the gum of the mimosa, and vast quantities of gum made into cakes upon the ground. From this it would appear that these unfortunate creatures were reduced to the last extremity, and being unable to procure any other nourishment, had been obliged to collect this mucilaginous food" ('Two Expeditions into the Interior of South Australia,' etc., 1828-31, i., 118). Captain Sturt was not then aware that the natives by no means look upon Wattle gum as starvation food.

Captain J. Lort Stokes ('Discoveries in Australia') gives "Minnung" as the name of a Western Australian Acacia whose gum is "very abundant," and eaten by the natives.

Captain (now Sir George) Grey gives the following account of the use of Wattle gum (? *A. microbotrya*) by the natives of Western Australia:—

"The gum of the mimosa is a favourite article of food amongst the natives . . . . *Kwon-nat* is the kind of gum which most abounds, and is considered the nicest article of food. It is a species of gum tragacanth (*sic*). In the summer months the Acacias, growing in swampy plains, are literally loaded with this gum, and the natives assemble in numbers to partake of this favourite esculent. As but few places afford a sufficient supply of food to support a large assemblage of persons, these Kwon-nat grounds are generally the spots at which their annual barter-meetings are held, and during these fun, frolic and quarrelling of every description prevail" ('Journal of Two Expeditions,' etc., ii., 260, 294). Captain Grey also makes the interesting statement (p. 298) that some of these Kwonnat grounds appear to be visited by numerous families by acknowledged right at the period when the gum is in season, although not allowed there at any other time. This hereditary ownership is very rare amongst the aboriginals, although it is exercized in the well-known instance of the *Araucaria Bidwilli*, of Queensland.

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* Perhaps this statement has arisen from the following:—"Generally speaking, the Victorian acacia gums are somewhat less soluble than the gum arabic of commerce, but, on the other hand, they appear to yield a more adhesive mucilage, which is less liable to splinter and crack when dry" (*Report on Indig. Veget. Subst.*, Victorian Exhibition, 1861). This statement gives an exaggerated idea of the value of Victorian gums, and of Australian ones generally.

Small boys eat the more insoluble gums, particularly when made into a jelly and sweetened (see *A. decurrens*).

Wattle gum is considered useful in diarrhœa (in such cases a little astringency would of course be an advantage rather than a drawback) and piles. It is also said to be employed in veterinary practice in the country for wounds and raw shoulders in horses.

I have been shown a statement by "a good practical man" that Wattle gum dissolved in benzole "makes an excellent carriage vanish." Perhaps here will be a convenient opportunity to point out that Wattle gum is quite insoluble in that liquid, to say nothing of the ridiculous suggestion to use a true gum for a varnish, and to protest against the reckless statements which are made in regard to our little known raw products.

It would appear that some species, which in their native habitats yield gums more or less insoluble, produce more soluble products when grown in some other countries. The question is a wide one, and well worthy of being followed up, for it would be of the highest commercial importance if it could be shown that free-yielders of inferior metarabic gum would in other soil and climate develop a tendency to the formation of arabic gum (see *A. dealbata*, *A. decurrens*).

Some notes by Dr. Hopff on an Australian Wattle gum as compared with gum arabic will be found in *Pharm. Journ.*, vii., 588. The experiments have no conclusiveness, and the source of the Wattle gum is not given, for it was probably unobtainable.

I have divided the Wattle gums experimented upon into three provisional groups. I could make sagacious guesses as to the groups into which many other Wattle gums are likely to fall, but prefer to confine myself to the record of facts. The classification of the future will probably be into arabin and metarabin groups, in which case my groups II. and III. will simply require to be united. The samples chosen for analysis were picked ones in all cases.

GROUP I. (ARABIN GROUP.)

Acacia homalophylla.
Acacia pendula.
Acacia sentis.

They are readily and entirely soluble in cold water, like Turkey gum arabic, for which they form an excellent substitute. Arabin is their characteristic and main constituent. Following are analyses:—

	Arabin.	Metarabin.	Moisture.	Ash.	Total.
A. homalophylla. .	79·84	—	16·83	2·86	99·53
A. pendula var. *glabrata*	79·5	—	17·51	2·39	99·40
A. sentis	76·97	—	17·88	4·59	99·44

Acacia homalophylla, A. Cunn.; 'B.Fl.,' ii., 383. The common "gidgee," found in South America, Victoria, and New South Wales. This tree yields gum copiously throughout the summer season.

My sample outwardly resembles, in a striking manner, common pine resin or "rosin." Its fracture is conchoidal and very lustrous. From its resemblance to "rosin," its colour is a drawback, but it is remarkably bright and clean, and as it is so freely soluble, and so adhesive, it would well pay to export, could it be obtained in sufficiently large quantities. It dissolves entirely in cold water, forming a very pale yellow, almost perfectly transparent liquid.

Mr. Edward Palmer ('Proc. Roy. Soc., New South Wales,' 1883, 94), states that gum of this species is eaten by the blacks of Northern Queensland, but there is apparently some confusion in the locality, as I am not aware that this species extends to that colony.

Acacia pendula, A. Cunn., var. *Glabrata*, F. v. M.

Perhaps co-extensive in geographical distribution with the normal species. *A.* "*Yarran.*" Sample obtained from between the Lachlan and Darling Rivers, New South Wales.

There is a marked difference between the new and the old gum of this sample. The new gum is in rounded pieces, and very similar in appearance and usual size to Senegal gum, and Aden gum arabic. The gum which remains long on the trees becomes filled with minute fractures which cross each other nearly at right angles. The fissures which radiate from the centre of a lump cause the lump to break into sub-triangular or conical pieces, but as disintegration proceeds, these pieces are broken down into small angular fragments. It is worthy of notice that the colour of the lumps varies in depth from the centre outwards, and the bands of colour are usually fairly well defined. The difference in colour is dependent upon the extent to which the fissuring has proceeded. As fissuring (the result of weathering) is most evident on the outside of a lump, and as the process of repeated reflection of light makes the part affected lighter in colour, though more opaque, the colour of the gum increases in depth as the central portions of a lump are reached. A common tint for the outside (or basal portion) of a conical piece is amber, that of the inside (or apical portion) "rosin brown." I have described these appearances at some length, because they are commonly seen in the "dry country" gums.

Like other Wattle gums, this would require selecting for the market, but some portions are of very high class. It dissolves entirely in cold water, forming a perfectly clear solution, almost colourless, with the exception of a brownish tint.

Acacia sentis, F. v. M., 'B. Fl,' ii., 360.—Found in all the colonies, except Tasmania; "prickly wattle." Sample obtained from Whittabranah, Tibooburra, New South Wales.

The trees of this species in the above neighbourhood are for the most part very small, and gum is found on them very sparingly. Much of it is of a rich amber colour when freshly exuded, and quite different in appearance from any other Wattle gum I have seen up to the present. Other portions are nearly as pale as selected Turkey gum arabic, while a small portion is of a dainty sulphur-yellow colour. It is sparkling and clean-looking, and would be a very acceptable article of commerce could it be obtained in quantity. This gum presents more points of resemblance to the preceding than to any other gum yet examined by me. It is very easily reducible to a powder, partly on account of its somewhat vesicular nature. It dissolves in cold water readily and completely, forming a solution of a pale yellowish-brown or amber colour.

(*To be concluded.*)

THE GENDER OF PHARMACOPŒIAL NOUNS, IN AS, ĀTIS; IS, ĪTIS.

BY JOSEPH INCE.

I wish to draw attention to the nomenclature of the class of latinized titles as above described.

Following the London Pharmacopœia, nouns in as, ātis are made feminine; in Great Britain, names in is, ītis are also made feminine in accordance with Pereira.

We find therefore these official titles in the B.P.:—

Calcii Carbonas Præcipitata.
Ferri Carbonas Saccharata.
Ferri Sulphas Exsiccata.
Ferri Sulphas Granulata.
Magnesii Carbonas Ponderosa.
Potassii Tartras Acida.
Sodii Carbonas Exsiccata.

The adjective is made to agree with a substantive in the feminine.

This choice of the feminine in preference to the masculine is an anomaly in European pharmacy.

British synonyms have naturally been constructed on the same principle.

The following, being synonyms, are excluded from discussion so far as any suggested alteration is concerned:—

Calcis Carbonas Præcipitata.
Potassæ Prussias Flava.
Potassæ Tartras Acida.
Sodæ Carbonas Exsiccata.

A synonym in the sense of this paper is a name formerly in use and still sanctioned, so long as it is meant to indicate a substance or preparation identical with that indicated in official nomenclature.

To effect any alteration would be to vitiate the title.

By the kind intervention of Emeritus Professor Redwood I was entrusted with the editorship of the last edition of Pereira's 'Selecta è Præscriptis.'

The Latin text, including nomenclature, was arranged and modernized, and the work generally brought up to date.

But the gender (feminine) of the above class of words, as contained in the Vocabulary, was left unchanged, a note being appended expressive of dissent. This was done first in deference to Pereira's own opinion; secondly because this nomenclature is still official; lastly because the examination prospects of a student would not be injured by conforming to authorized instructions.

The passage relative to the subject quoted from Bostock's 'Remarks' (p. 177) reads thus:—"If it be admitted that these words lengthen the increment they then come under Lilly's second special rule, that 'nouns increasing long in the genitive are feminine.' If we are to be guided by the standard of classical authority, the London College is certainly correct." This paragraph has probably determined all subsequent British practice.

The Pharmacopœia of the United States in their Revision of 1860, published 1864, adopted the feminine gender for this class of words, and an amended list was tabulated, from which the following is an abstract:—

TABLE V.

Names of the Pharmacopœia of 1850.	New Names, 1860.
Argenti nitras fusus.	Argenti nitras fusa.
Calcis carbonas præcipitatus.	Calcis carbonas præcipitata.
Hydrargyri sulphas flavus.	Hydrargyri sulphas flava.
Sodæ carbonas exsiccatus.	Sodæ carbonas exsiccata.
Zinci carbonas præcipitatus.	Zinci carbonas præcipitata.

The alteration was thus notified:—

"The changes in the Latin official names are given in the fifth table. The gender of the names of salts is changed from masculine to feminine as conforming with the best latinity. This has given rise to slight changes in several names, consisting in making the adjectives agree with the gender adopted."

The Pharmacopœia of the United States, sanctioned 1870, published 1873, retained this nomenclature, and we find accordingly—

Ferri sulphas exsiccata.
Sodii carbonas exsiccata.

Thus two official publications, both written in English, namely the British Pharmacopœia, and the American Pharmacopœia of a certain date, have a private nomenclature of their own. The sequel will show that America has repented and that Great Britain stands alone.

I have searched in vain amongst official titles and synonyms alike, for any authority other than English for a confirmation of this nomenclature. A few illustrations to the contrary selected from an indefinite number are subjoined:—

Pharmacopœa Austriaca.
1869. Vienna.

Acetas ammoniæ solutus.
Bicarbonas natricus.
Carbonas ferri saccharatus.
Carbonas sodæ acidulus.
Nitras argenti fusus.

In the Ph. Austriaca, 1889, Editio septima, the use of nouns in *as* disappeared, the nomenclature became entirely neuter.

Codex Medicamentarius. Paris, 1866 [old].

Acetas ammonicus aquâ solutus.
Arsenis potassicus aquâ solutus.
Benzoas sodicus.
Carbonas potassicus.
Citras ammonico-ferricus.
Sulfas ferrosus,

and so throughout.

Codex Medicamentarius, Paris, 1884, [new].

Bisulfis sodicus.
Chloras potassicus.
Hypochloris calcicus.
Salicylas quinicus,

and so throughout.

Observe the French translation of these chemical nouns; le sulfate, and le sulfite.

The gender of the second term is contrary to the genius of the French language and yet has been adopted in chemical nomenclature. Compare la cucurbite; la marmite; also the construction of feminine adjectives in *ite*.

Pharmacopœa Danica.
Sanctioned, 1868, published, 1869.

Solutio nitratis hydrargyrosi.
Solutio sub acetatis ferrici.
Sulphas chinicus.
Sulphas cupricus.
Sulphas ferrosus siccatus.
Supercarbonas ammonicus,

and so throughout.

Farmacopea Oficial Española.
Sexta edicion, 1884, Madrid.

Hydras potassicus.
Phosphas sodicus.

Pharmacopœa Neerlandica.
Editio altera. 1871.

Carbonas Lithicus.
Citras ferricus.
Hypochloris calcicus.
Hypophosphis natricus.
Nitris æthylicus cum alcohole.

Pharmacopœa Nederlandica.
Edition Tertia. 1889.

These are official titles, not synonyms.

Carbonas magnesicus.
Hypophosphis calcicus.
Hypophosphis natricus.
Nitris œthylicus cum spiritu.
Sulfas ferrosus exsiccatus.
Sulfophenylas zincicus.

Pharmacopœa Norwegica
Editio altera, 1870.

Biboras natricus.
Lactas ferrosus.
Liquor Arseniitis Kalici.
Solutio Arseniitis Kalici.
(sine Spiritu Lavandulæ.) Ph.N. Edit. I.

Pharmacopœa Suesica.
Editio septima, 1869.

Nitras strychnicus.
Solutio Hypochloritis calcici.
Solutio Hypochloritis natrici.
Subnitras Bismuthicus,

and so throughout.

The Greek Pharmacopœia, ‘Ελληνικὴ, Φαρμακοποιία Ἐν Ἀθήναις, 1868, in its Latin translation, makes all words in *as* masculine; and so does the Pharmacopœa Helvetica, Ed. Altera., 1872. These illustrations are taken from varied sources, old and new, and point to one conclusion.

Now take the—

Pharmacopœa Belgica, Brussels, 1885.
Editio secunda.

It is written in the vernacular, a Latin translation being appended to the French text, similar to the Greek Pharmacopœia. Neither Belgium nor Greece were committed to an arbitrary Latin nomenclature.

We find this:—Nomenclaturam in pharmacopœâ anni 1854 usitatam resumpsimus. That is chemical nouns ending in *as* are made masculine.

Let us now go back to official American pharmacy; not further into remote antiquity than to the last published volume of the Proceedings of the American Pharmaceutical Association, 1889; and to the sixth and last Decennial Revision of the United States Pharmacopœia, 1880.

Vol. 37, p. 89, paragraph 6, Pharmacopœial Nomenclature. "The gender of the Latin nouns of salts in *as* and *is* has been changed back to the masculine gender, it having been shown that the alteration to the feminine gender made in the Revision of 1860, was based on error." [Ext. from U.S. Ph.] The comment on the paragraph by Professor Oscar Oldberg is as follows:—(p. 90) "Inasmuch as these titles or terms are not Latin nouns at all, but simply technical titles constructed from words derived from different languages, and arbitrarily given a Latinic form, why should we hesitate to adopt whatever gender we please for them? Let them stand as masculine." I quote another sentence of Professor Oldberg written ten years ago. ['Proceedings of Amer. Pharm. Assoc.,' 1880, Vol. 28, p. 392.]

"Harmony with the rest of the civilized world is desirable so far as attainable without sacrifice of clearness and correctness, and without too violent changes." May I also be permitted to reprint my own editorial note. ['Selecta è Præscriptis Pereira,' p. 178.]

NOTE ON THE GENDER OF LATINIZED CHEMICAL NAMES.

"Great Britain stands alone in considering chemical names ending in as, ătis; is, ĭtis, as feminine. In Continental practice they are masculine, and it is an open question whether, there being no classical authority but only the law of custom, British pharmacists should not conform to this arrangement."—[ED.]

INCOMPATIBILITY IN PRESCRIPTIONS.*

BY JOSEPH W. ENGLAND, PH.G.

Incompatibility in a prescription has been defined as that condition in which there exists either "a chemical decomposition, a pharmaceutical dissociation, or a therapeutical opposition" of its constituents. The term is thus susceptible of three meanings. A prescription is chemically incompatible, where chemical change results. It is pharmaceutically incompatible where there is violation of correct pharmaceutical procedure, and there is therapeutical incompatibility where there is antagonism in physiological action. Now, accepting these definitions, a prescription may be chemically incompatible and yet be just what the physician wants. It may be pharmaceutically incompatible and yet be desirable for the same reason. But it is never compatible where there is a change of chemical composition and pharmaceutical character resulting in the formation of new products having totally different therapeutical effects than those obviously intended. And this view—the intended therapeutical action of the prescription—is the "keystone of the arch" and the best rule for the pharmacist to follow.

Every new prescription is largely a law unto itself until tried. Expertness in pharmaceutical manipulation, of which prescription work is the highest type, is a matter of individual ability which can be acquired only in the largest and best measure by personal experience. The subject of incompatibles is not a formidable one, if there primarily exists a clear knowledge of the chemical or pharmaceutical properties of the substances used, so that any deviation from the right standard may be detected, but here is the puzzling question: How are we to know but that, in the event of some chemical or pharmaceutical change, the physician does not mean just such a change, and nothing else?

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* From the *American Journal of Pharmacy*, January.

At first glance it seems strange, but there are some most successful physicians who, every now and then, write, pharmaceutically and chemically, the most incompatible prescriptions. Yet they have success. And their happy results can only be due to the formation of certain new products or an alteration in pharmaceutical character of old ones. It does not follow that all prescriptions thus written are of the highest therapeutical value. Far from it. The tendency of the times is steadily in the direction of greater simplicity in prescription writing.

It is to be regretted that the physician seems to depend in large measure upon the pharmacist for detecting any chemical or pharmaceutical incompatibility, and that the pharmacist depends, solely and alone, upon the physician for recognizing any therapeutical incompatibility. A physician with his many duties cannot be expected to have at his command the vast detail of pharmaceutical facts, nor can the pharmacist be considered negligent in not possessing an extended acquaintance with the application of drugs in medicine; but it is clear that some elementary knowledge as to how drugs act and for what purposes they may be employed would be of great practical value to the pharmacist in affording him a clear idea of the therapeutical intent of the prescriber, and the ability to detect any deviation through a chemical or pharmaceutical error. An argument for therapeutical knowledge is not a step in the direction of counterprescribing. It is only a plea for broader education—for elementary therapeutics on distinctly pharmaceutical lines. With therapeutics, pure and simple, the pharmacist has nothing whatever to do. That is solely the province of the physician. Medicine and pharmacy are making rapid scientific progress, not in the same way, though co-labourers in the same cause, but upon certain definite lines of work and study, yearly becoming more distinct and widely separated, rendering each the more dependent on the other.

Concerning special instances of incompatibility, the writer, some time ago, devised a set of "notes," and they have been found of such good service, though doubtless much of the subject matter has been duplicated in the personal experiences of others, that he feels impelled to present them in their entirety.

An important feature about which there seems to be some difficulty in remembering is the solubilities and insolubilities of inorganic compounds. To make such knowledge readily accessible, a modified table was framed, based almost wholly upon Professor Attfield's "Statement of the Solubilities and Insolubilities of Salts," which expresses, directly or by inference, nearly five hundred soluble and insoluble compounds of the following inorganic basylous radicals: aluminium, ammonium, antimony, barium, bismuth, cadmium, calcium, chromium, cobalt, copper, ferric, ferrous, gold, lead, lithium, magnesium, manganese, mercuric, mercurous, nickel, potassium, silver, sodium, stannic, stannous, strontium and zinc.

In using this table, it is only needful to remember the well-known chemical law: that when a solution of a compound is brought in contact with a solution of another compound, and, by an interchange of radicals, an insoluble compound is rendered possible, that compound will be precipitated.

Acetates are soluble.

Arseniates are insoluble, except those of the alkali metals.

Arsenites are insoluble, except those of the alkali metals.

Bromides are soluble, except mercurous and silver; those of antimony and bismuth are decomposed by water to form oxysalts.

Carbonates are insoluble, except those of the alkali metals.

Chlorides are soluble, except those of lead (*s*)[*], mercurous and silver.

Citrates are soluble, except those of manganese, mercurous, silver and strontium, aluminium (*s*), barium (*s*), bismuth (*s*), cadmium (*s*), calcium (*s*), lead (*s*), zinc (*s*).

Cyanides are insoluble, except the mercuric and those of the alkaline metals and earths.

Hydrates are insoluble, except those of barium, strontium, calcium (*s*) and lead (*s*), and the alkali metals.

Iodides are soluble, except those of antimony, bismuth, gold, lead (*s*), mercuric, mercurous, platinum (*s*) and silver.

Nitrates are soluble.

Oxalates are insoluble, except those of antimony (*s*), chromium, ferric (*s*), ferrous (*s*), stannic, and the alkali metals.

Oxides are insoluble, except those of barium, strontium, calcium (*s*), and the alkaline metals.

Phosphates (ortho) are soluble, except those of the alkali metals.

Sulphates are soluble, except those of barium, strontium, calcium (*s*), antimony, lead, mercurous (*s*) and silver (*s*).

Sulphides are insoluble, except those of barium, calcium (*s*), strontium, and the alkali metals.

Sulphites are soluble, except those of aluminium, antimony, barium, bismuth, calcium (*s*), cobalt (*s*), copper, ferrous (*s*), lead, manganese (*s*), nickel (*s*), silver, stannous, strontium and zinc (*s*).

Tartrates are soluble, except those of antimony, barium, bismuth, cadmium (*s*), calcium (*s*), copper (*s*), ferrous (*s*), lead, manganese (*s*), mercuric, mercurous, nickel (*s*), silver, strontium (*s*), and zinc (*s*).

Acids decompose hydrates, carbonates and acid carbonates to form salts; the stronger acids, which are largely inorganic, set free the weaker acids, which are largely organic, or, brought in contact with alcohol or alcoholic solutions, form ethers; alkaline hydrates, carbonates and acid carbonates neutralize free acids, decompose some glucosides and precipitate all alkaloids, some of which precipitates are soluble in excess of the precipitant, or in alcohol, if that liquid be present in sufficient amount to dissolve them.

Oxidizing agents such as nitric, hydrochloric, nitrohydrochloric, picric and chromic acids, and potassium bichromate and permanganate, with readily oxidizable substances, such as carbohydrates, alcohols, ethers, sulphur, phosphorus, sulphides, and organic matter in general, form explosive compounds. Potassium permanganate, if ordered in pill form, can best be made with cacao butter and cosmoline in very small quantity, and enclosed in gelatin capsules. Silver nitrate is reduced by organic matter to oxide, with the exception, it is said, of opium and extract of hyoscyamus. A very good way of making pills of it is with cacao butter and cosmoline, etc., as mentioned above, under potassium permanganate; syrup of ferrous iodide and potassium chlorate form a poisonous compound, and potassium iodide and potassium chlorate form a mixture which yields the poisonous iodate on being taken internally.[†]

Iodine and the iodides yield precipitates with the alkaloids; bromides precipitate morphine and strychnine salts on standing, but a few drops of dilute hydrochloric acid added, after the addition of the alkaloid, prevents the change. Sodium biborate precipitates morphine and cocaine salts, but on the addition of a small quantity of boric acid, or with boric acid alone, precipitation does not take place. Mercuric chloride with acidulated solutions of the alkaloids forms crystalline double salts; potassium-mercuric iodide precipitates alkaloidal solutions. Solutions of quinine salts with those of the alkaline acetates, or with Basham's mixture, precipitate the sparingly soluble quinine acetate. Morphine solutions give the phenol reaction, if mixed with tincture of ferric chloride.

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[*] (*s*) means sparingly soluble.

[†] *Amer. Journ. Pharm.*, 1876, p. 277.

Glucosides are decomposed by free acids and precipitated by tannin; tannic and gallic acids precipitate alkaloids, albumen, gelatin and the majority of metallic salts, and yield inks with iron solutions.

Resinous tinctures and fluid extracts, prescribed with aqueous solutions, should always be emulsified with acacia; tinctures and fluid extracts made of stronger alcohol, mixed with those made of diluted alcohol, become turbid and precipitate, since the special solvent power of alcohol, or of water, for a substance diminishes in proportion to the quantity of the other liquid present. A "shake" label should always be used.

When for internal use, fixed and volatile oils and oleo-resins, and aqueous solutions, should always be emulsified, whether ordered or not. and, to better emulsify the volatile oils, they should have mixed with them, prior to emulsification, an equal volume of olive, almond or cottonseed oil.

Tincture of ferric chloride gelatinizes mucilage of acacia; free acids separate insoluble carminic acids from compound tincture of cardamom; free acids precipitate glycyrrhizin from fluid extract of liquorice.

Commercial spirit of nitrous ether liberates iodine from solutions of iodides, decomposes antipyrine solutions to form a green nitroderivative, and precipitates mucilage of acacia, but if it be well diluted with water it can usually be added last without precipitating. Tincture of guaiac and spirit of nitrous ether are stated to be pharmaceutically incompatible by Potter (although they are often prescribed together), likewise infusion of wild cherry with compound infusion of gentian, infusion of cinchona with compound infusion of gentian, and infusions with metallic salts generally.

Sodium salicylate in solution precipitates the sparingly soluble salicylic acid if mixed with acids, and yields, if dispensed in powders with potassium acetate, the very deliquescent potassium salicylate. Sodium salicylate in strong solution is decomposed by tincture of ferric chloride, but if well diluted first changes only into ferric salicylate. Sodium benzoate solution is decomposed by acids to yield the sparingly soluble benzoic acid.

Mercuric chloride is decomposed by solution of potassium arsenite, but if the alkaline solution has first added to it, in slight excess, diluted hydrochloric acid no precipitation will take place on the addition of the mercurial salt; pyrophosphate and phosphate of iron solutions precipitate with dilute phosphoric acid. The National Formulary recommends the usage of dilute metaphosphoric acid, in place of the officinal "ortho" variety, as yielding a permanently clear solution.

In conclusion, the writer would say that in these "notes" presented he has endeavored to give, not an exhaustive list of special incompatibles, but simply a general expression of those liable to occur in the everyday routine of prescription work.

What to do with an incompatible prescription is a question for individual judgment and cannot here be entered into. The usual practice, in the event that the prescription involves no serious change, is to accept the situation and dispense as written. On the other hand, where some serious change is liable to take place it is almost superfluous to state that it is the duty of the pharmacist to consult the physician before dispensing.

THE MANUFACTURE OF COMMERCIAL HYDROGEN DIOXIDE AND ITS APPLICATIONS.*

BY A. BOURGOUGNON.

Since Bloxam, in the last edition of his 'Chemistry, Inorganic and Organic,' (London, 1888, p. 55), makes the following statement: "This compound (H_2O_2). . . has no very important useful application in the arts," I have deemed it wise to state what has been and is now done in this country with this article. Bloxam's remark is perfectly true as far as pure hydrogen dioxide is concerned, but is, nevertheless, misleading. Solutions of hydrogen dioxide are now manufactured in a commercial way and chiefly applied to bleaching purposes.

My first experiments in manufacturing hydrogen dioxide were conducted in 1873 under very unfavourable circumstances; the barium dioxide which could be obtained in this city was of a very inferior quality and quoted as high as $1.50 per ounce. I followed the method of preparation described by Thenard in 1818, and all I could produce was employed by hair dealers in their trade.

In 1878 I manufactured hydrogen dioxide on a commercial scale, and the following is a description of the method I adopted for the preparation of this bleaching compound:

The first step, and a very important one, is the hydration of the barium dioxide.

Into a suitable vessel, an ordinary cylindrical stone pot, about half full of water, the powdered dioxide is slowly poured, the mixture being well stirred with a wooden spatula during this operation, and continued after its completion for about twenty minutes. Then the mixture is left alone and stirred every half hour, or oftener, for about ten minutes, until the hydration is completed. This operation requires from three to four hours; the barium dioxide forms then a thick, perfectly white and smooth, pasty mass, resembling white clay mixed with water.

While the hydration is progressing a mixture of water and hydrofluoric acid is made in a vessel lined with sheet lead and surrounded with ice or simply with water, in which lumps of ice are placed from time to time so as not to allow the acid mixture to rise above 10° C. during the operation.

All things being properly disposed, the hydrated barium dioxide is added in portions of 3 to 4 pounds at a time to the acid mixture, stirring all the time to mix the contents of the vessel thoroughly. All the barium is transferred to the acidulated water in about two hours and the agitation continued for four hours. If the operation has been well conducted, all the barium dioxide is transformed into fluoride, which falls to the bottom of the vessel. When this precipitate is well settled, the supernatant liquid is decanted into a vessel similar to the one used for its production, and also surrounded by ice water. The clear liquid contains an excess of acid and impurities derived from the materials employed, its colour is yellowish and it must be purified to insure its keeping properties.

The impurities which are to be removed are chiefly ferric oxide, alumina and manganese oxide. To the cold solution of impure hydrogen dioxide small quantities of hydrated barium dioxide are added at a time and well stirred. When the last traces of acid are saturated, the appearance of the liquid suddenly changes, from a bright yellow it turns to a greyish colour, the impurities are separated and collect at the surface of the liquid.

Without losing time the liquid is filtered through a cheese cloth stretched on a frame, and received in a vessel which contains a small quantity of sulphuric acid diluted with eight to ten times its volume of water (acid, 1 ounce; water, 8-10 ounces). This filtration must be quickly done. As long as the solution is alkaline there is great danger of decomposition and loss of oxygen. If the liquid is thrown upon the filter, the latter will be quickly clogged, the filtration stopped, and the hydrogen dioxide will rapidly decompose, emitting large bubbles of oxygen with a hissing noise; but as the precipitated impurities collect first on the top of the liquid, the solution is syphoned from below these impurities, the liquid filters quickly and satisfactorily. The filtered liquid is tested for barium, and sulphuric acid is added to it until all is removed. The liquid is left over night, the precipitate of barium sulphate settles, and the perfectly clear and colourless liquid is ready for the market.

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* From the *Journal of the American Chemical Society*. March.

All the precipitates are separated, by pressure, from the liquid they may contain, and the liquid so obtained is added to the water employed in the next operation.

I employed the following proportions:—

Barium dioxide.	60 pounds.
Hydrofluoric acid	25 „
Water	40 gallons,

and obtained nearly 40 gallons of hydrogen dioxide. The strength of the acid was about 33 per cent.

Commercial hydrogen dioxide can be produced at the following figures:—

60 lbs. barium dioxide at 25c. . .	$15 00
25 lbs. hydrofluoric acid at 18c. . .	4 50
Ice	50
	$20 00

or fifty cents per gallon for the materials used in the manufacture. The price of 18 cents per pound for hydrofluoric acid is high.

Other methods could be employed for manufacturing hydrogen dioxide. Before adopting hydrofluoric acid I used oxalic acid, but this is not to be recommended, not only on account of the price, but because some acid may be left in the solution.

The method recommended by Thomsen consists in dissolving the barium dioxide in dilute nitric acid, and when nearly all the acid is saturated, an excess of baryta water is added, hydrated barium dioxide is thrown down, is separated, washed and agitated with water containing one-third of its weight of sulphuric acid. In this process part of the barium can be recovered; during the treatment of the dioxide with hydrated nitric acid, a large amount of barium nitrate is separated from the liquid and this salt may be easily reconverted into barium dioxide. A stream of carbon dioxide conducted into water in which barium dioxide is added produces hydrogen dioxide, but the solution thus obtained, although very pure, is too weak for industrial applications.

The commercial solutions of hydrogen dioxide are said to contain about fifteen times their volume of useful or active oxygen. The test is made by adding to the solution sulphuric acid and potassium permanganate and measuring the volume of oxygen evolved. This method is incorrect. A small amount of oxalic acid would greatly increase the volume of gas liberated.

The first application of hydrogen dioxide on a large scale in the United States was due to the experiments made in 1878 by Professor R. Ogden Doremus in the bleaching of ostrich feathers. The process was kept secret for about a year and a half, after which it came into general use, and the manufacture of hydrogen dioxide then developed rapidly to its present extensive proportions.

Ostrich feathers are imported in bunches and are very dirty. They are strung and well washed with soap and warm water; they are afterwards rinsed until the wash water is clear and then partially dried. For the soap generally used I have substituted sodium silicate with very good results and a great saving of labour. When the feathers are clean they are immersed in the bleaching solution rendered alkaline with a slight excess of ammonia and abandoned to the action of nascent oxygen for about twelve hours, then well washed with soap or sodium silicate and warm water and rinsed, the last water containing starch, and they are beaten until dried. If one bath is not sufficient the operation is repeated. The feathers become *white*. Hair in commercial transactions is known as "human" and "Chinese." Chinese hair is bleached more extensively than human, because it is cheaper and its strength allows it to be submitted to such treatment without being too much injured. For bleaching human hair the same process is employed as for feathers. For Chinese hair the first step is to render it thinner; this is done by immersions in a solution of alkaline hypochlorites, or a solution of potassium chlorate and hydrochloric acid. When the hair is "refined" it is treated like human hair; but to obtain a perfect bleaching several baths are required, sometimes as many as twelve to fifteen, and yet the white is not pure; it retains a yellowish hue which does not entirely disappear by bluing.

The very white and silky looking hair which is seen in the stores is not human; it is obtained from the yak (*Poephagus grunniens*, Linn.), an animal native to the mountains of Thibet. Hydrogen dioxide is also employed to change the colour of dark hair to a lighter shade. Two or three applications make the hair turn red; if continued longer a light blonde is obtained.

It might happen that some persons would have recourse to these means to conceal their identity, but it will be very easy to discover if the hair has been discolored. After about a week the newly grown hair will be darker near the roots than in their other parts.

Several other materials are bleached with hydrogen dioxide, among them wood, ivory, whalebone, silk, etc.

Tusah or wild silk is very easily bleached. It is first boiled with soap water, rinsed and transferred to the bleaching bath. I have found that a solution of hydrogen dioxide, prepared in a very rudimentary way, is all that is necessary to bleach this kind of silk.

The hydrated barium dioxide is simply dissolved in dilute hydrochloric acid, and, without removing the impurities or the barium, the solution is ready to be employed after being made alkaline with ammonia. When the silk is removed from the bath it is well washed, and to the last rinsing some hydrochloric acid is added.

When hydrogen dioxide was discovered in 1818 by Thenard, it was thought that this new compound could be advantageously employed as a medicine. Experiments carefully conducted in England failed to sustain this claim; but, nevertheless, if hydrogen dioxide is worthless as a medicine, it is a powerful antiseptic. In September, 1888, I had the opportunity of witnessing this important property. A lady suffering from cancer had had one breast amputated. At the suggestion of Professor R. O. Doremus, hydrogen dioxide was selected as an antiseptic and the results were very favourable, the wound healed quickly without suppuration. In such cases, pure solutions must be employed; the commercial product contains free acids, and when vaporized in a room produces irritation of the throat and coughing.

In conclusion I will state that I do not believe that the manufacture of commercial hydrogen dioxide is susceptible of much development. Its chief application, the bleaching of ostrich and fancy feathers, is controlled by fashion; its use for changing the colour of live hair is rapidly decreasing, henna (*Lawsonia inermis*), which is less objectionable, being a substitute. The high price of production forbids its application for the bleaching of comparatively low priced products, and unless new applications are found and the price of manufacturing greatly reduced, the demand for hydrogen dioxide cannot be increased.

Nevertheless the preparation of hydrogen dioxide, on a comparatively large scale, is carried out in New York by the introduction of several improvements whereby as much as 200 gallons are obtained in one operation; the stirring of the working vats is done by steam power, and the qualities of the product, which are always uniform, are highly commended and appreciated by the trade.

THE PREPARATION OF CRYSTALLIZED EGG ALBUMEN.*

BY F. HOFMEISTER.

In the course of investigation upon the behaviour of albumenoid bodies towards saline solutions the author has repeatedly made observations indicating that the animal albumenoid substances which have not hitherto been obtained crystalline are not devoid of crystallizability. As the result of experiments directed especially to that object he reports that he has worked out a method for obtaining egg albumen in a crystalline condition.

Fresh white of egg, free from yolk, is beaten into a fine froth with a good whisk, and allowed to stand for twenty-four hours. The nearly clear thin liquid solution of white of egg that collects at the bottom is then poured off from the froth, and treated with a cold saturated neutral solution of ammonium sulphate, in order to separate globulin. The resulting precipitate is filtered off, and the perfectly clear liquid, containing saline matter, is left to evaporate at the ordinary temperature in a wide flat-bottomed dish. After some days there is deposited at the bottom a layer of a finely granular white, sometimes yellowish or reddish coloured precipitate, which under the microscope appears to be composed of tolerably large, transparent light refracting spheres or spheroid aggregates, without radiating or stratified structure (globulites). The thin membrane that covers the surface consists of the same form elements. When all increase of the precipitate upon further evaporation ceases to be perceptible, it is filtered off, and in this way almost the whole of the albumen is obtained in the form of a coarsely granular, pure white or slightly coloured mass, completely soluble in water, which can be pretty well freed from mother-liquor by pressure. In order to purify this further it is dissolved in a semisaturated solution of ammonium sulphate and again left to evaporate spontaneously, and the operation is repeated as long as the albumen separates in globulites.

Usually in the third or fourth separation, by microscopical examination, fine needles may be seen mixed with the globulites, and upon further standing these rapidly increase, partly at the expense of the globulites present. The needles appear sometimes isolated and sometimes in stellate groups. Frequently it is observed that the globulites, out of a crystalline nucleus contained in them, are gradually changed into a stellate group.

If when the beginning of crystallization becomes perceptible the shallow dish be covered with a glass plate, so as to moderate the evaporation, the greater part, or sometimes the entire mass of the albumen is obtained gradually in the form of needles or thin oblique-angled plates. Mostly, however, a portion of the albumen that has separated in globulites resists this change. Neither is the object obtained by repeated re-crystallization in the manner described, probably because the evaporation, even at the ordinary temperature, always goes on too rapidly, and especially too unequally. When this stage however has once been reached, a complete conversion into crystals is easily produced if the filtered and pressed precipitate, redissolved in a semisaturated solution of ammonium sulphate, be filled into a tube made of parchment paper, well closed at both ends, and laid in a dish containing a semisaturated solution of ammonium sulphate, so that it is everywhere surrounded by the liquid. The increase in concentration of the external liquid withdraws water very gradually and uniformly from the albumen solution contained in the tubes. If the albumen be already very pure it separates then directly in tables; or if there be first a formation of globulites these are soon completely replaced by needles or fine plates.

For the purpose of more rapid purification it would appear suitable on the one hand to filter off and remove the portion that separates in globulites, because in this way some difficultly soluble impurities are separated; and on the other hand in the crystallization not to allow the evaporation to go so far that the separation of crystalline ammonium sulphate begins, because, according to the author's experience, the portion last to separate possesses only a small disposition to crystallize. The separated crystalline mass can be advantageously freed from the mother liquor by washing it with a solution of ammonium sulphate of the same density as the liquor. In order to avoid loss, however, the washing should not be too prolonged.

The albumenoid body so prepared proved upon close examination to be identical with the purest egg albumen, as prepared by Starke. This was only what was to be expected, because in the preparation other white of egg substances of the character of albumen were not separated. The condition that white of egg—apart from the easily removed globulin—contains egg albumen as the single albumenoid body present in considerable quantity must be looked upon as very favourable to its crystallization.

Unfortunately the author did not succeed in bringing to crystallization a solution of the crystallized white of egg freed from salt by diffusion. This and the closely connected question whether the crystalline body prepared consisted simply of albumen or, what he considers to be less probable, a compound of it with ammonium sulphate, he has been compelled by circumstances to leave undetermined for a time.

EXAMINATION OF OIL OF CASSIA.*

BY H. GILBERT.

It is pointed out that oils of cassia and cinnamon may be highly adulterated with resin oils and still pass the tests of the German Pharmacopœia. With nitric acid, sp. gr. 1·45 at 15°, or with 1·50 acid at 6°, both the pure and impure oils give crystals without development of heat; however, with the 1·50 acid at 15° both react violently, with development of heat and without the formation of crystals; therefore, the P. G. test, as neither the sp. gr. nor the temperature of the acid is stated, may lead to the condemnation of a pure oil and *vice versâ*. By determining the "acid number," the adulteration can be detected, as the following numbers show:—

	Acid numbers.
Genuine oil of cassia (with 6 per cent. non-volatile residue)	13
Genuine oil of cassia after 40 hours' aëration	13
Genuine Ceylon oil of cinnamon (2 per cent. residue)	9
Genuine Ceylon oil of cinnamon (2½ per cent. residue)	10
Adulterated oil of cassia (28 per cent. residue)	47
Adulterated oil of cassia (prepared from pure oil of cassia by intermixing 20 per cent. of colophony)	40
Colophony, sp. gr. 1·08	150

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* *Zeitschrift für Physiologische Chemie*, vol. xiv., p. 651.

* *Chem. Zeit.*, xiii., 1406–1407. Reprinted from the *Journ. Chem. Soc.*, April.

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TRADE AND PROFESSION.

EVER since the time when the attempt was made, by the formation of the Pharmaceutical Society, to unite in one body all those engaged in the practice of pharmacy and the supply of medicinal drugs, the antagonism of the views held by those who regard this business merely as a trade and those who desire to cultivate and develope its more professional aspects has been a constant obstacle to progress and a frequent source of disputes that have been detrimental to the best interests of the body at large. It would be as absurd to deny that the trade element of the pharmacist's business is a very important one as it would be to pretend that pharmacy is strictly a profession. Every act of the pharmacist has connected with it more or less directly a corresponding trade transaction, and it is really one of the advantages attaching to this business that this is the case. But it is not the less important to bear in mind that this advantage can only be turned to practical account in proportion as the professional character of the pharmacist's work is respected and maintained by those engaged in the business. That was the leading idea of the founders of the Pharmaceutical Society, and that has ever since been the fundamental principle of all its work and all its endeavours. But its success has been only partial, for notwithstanding the fact that great improvement has been effected in the general position of pharmacy as a calling, by the establishment of a system of qualification on educational grounds for those engaged in its exercise, the original resolution passed at the formation of the Society has not yet been acted upon by the greater number of persons connected with the business. The chemists and druggists have not formed themselves into a Society, as it was resolved fifty years ago that they should do for their own interest. The trade is still as disunited as ever; the professional and trade elements are as antagonistic as ever. Within the period referred to Free Trade has become an accepted fact; but even that blessing has not been without alloy for chemists and druggists, since it has furnished increased opportunity for competition, which has materially damaged that portion of their business which is essentially of a trade character. All other trades have suffered in a similar manner, and even the professions that are practised under the protecting influence of stringent ethical codes have not altogether escaped the influence of the free trade sentiment. Free lances of all kinds are ready to undertake the duties either of the cure of souls or bodies, and lawyers are perhaps the only class exempt from such invasion. Perhaps their intimate acquaintance with the uncertainty of the law leads them to trust the protection of their interests less to legislation than to their own co-operation. However, it is not infrequent to find that the damage thus done to the trade of chemists and druggists is ascribed to the influence and action of the Pharmaceutical Society, and it is maintained by some that the professional drift of the Society has outbalanced its care for the conservation of trade interests.

The charge thus made against the Society does not come alone from those who prefer to remain outside its ranks, but it finds expression also among some members of the Society. As an illustration of this fact we may refer to the paper lately read by Mr. STORRAR at Edinburgh, in which he epitomizes the situation of affairs by the statement that the trade has been spoilt without being made a profession. Whether this statement is to be construed as a charge against the Society, or in the light of a partial confession of the error of its ways, it is one of some gravity, for Mr. STORRAR spoke not only as being a member of the Society, but also in a twofold capacity as an officer of the Society. His observations, therefore, carry more than ordinary weight, and it is desirable to consider how far they are well founded. Mr. STORRAR's argument is that the pharmacist's trade interest has been neglected, though he admits and acknowledges that the Society has elevated the position of the trade. Well, that is at least something in favour of trade interest, and we dispute his statement that the Society has done nothing more in the same direction. Take, in the first place, the fact of registration: a distinct trade advantage has been thus secured. Then the educational facilities furnished and promoted by the Society, largely at the cost of its members, ought to be viewed in the same light, since they would enable pharmacists worthily to take the position of competent dealers in drugs. But opposition has been offered to the attempt to improve educational training, and the examinations have been condemned as tending by their stringency to "keep persons out of the trade." This opinion has even found representation at the Council table, and it is a singular manifestation of the short-sighted policy of those who condemn and oppose the Society's action. Properly considered, the examinations conducted by the Society constitute the most efficient protection of trade interests presently possible. The conditions under which the business of pharmacy is carried on are such that only a certain number of persons can obtain adequate remuneration from it. There are at present on the Register upwards of fourteen thousand persons, and annually more than one thousand candidates present themselves for qualification. Out of that number more than one half are rejected, though Dr. STEVENSON states in his late report that no candidate is rejected except on quite sufficient grounds. These rejected candidates are persons who have been for at least three years practically engaged in the business by which they seek in future to earn their living on their own account. Each of them has produced a certificate to the effect that he has been that time engaged in the work of practical dispensing, but notwithstanding that and the time they have spent in the business they fail to obtain qualification. This is the result of the training which the trade now affords to pharmaceutical initiates. It is sad enough in regard to those who are rejected, but it is still more to be deplored in the interests of those who do pass the examinations as being properly qualified, for the result is that every person who succeeds in being placed on the Register is shadowed by at least one other individual who is shut out from that position just at the time of life when the idea that a man must live begins to take a definite practical form. The exclusion of those persons from registration is not, however, to be viewed only as a keeping of them out of the trade, but more properly as a means of protecting the trade interests of legally registered men.

We might extend the illustration of the mode in which the action of the Society tends to conserve the trade interests as well as promote the professional position of pharmacists, but space will not admit of our doing so. It will, however, be necessary to refer to the other side of the picture, and show how little the Society is supported in its efforts. If there be one thing more than another in which the pharmacist has an advantage over other persons in business, it is in the opportunity he has of asserting the value of his individuality in the conduct of his business. But so far from that being in any way the general practice, it is common to find the chemist's window made conspicuous by a brazen legend, signalizing the negation of his pharmaceutical functions. Such action is simply the outcome of the purely trading sentiment, and it is from those who lend themselves to it that the opposition to the Society's conduct of affairs proceeds. It is in such quarters that we may expect to hear the complaint that the Society has done nothing for trade interests. In Scotland, however, and most of all in Edinburgh, we should have imagined that more sound opinions prevailed. But even there the charge conveyed in Mr. STORRAR's paper seems to have met with a sympathetic response. Like the dropping of a pebble into water, his statement produced a widening ripple of complaint, until it was asserted that for the last ten years the Society has done nothing for the trade but offer bricks and mortar. It is not long since that we remember such an application of the Society's funds for the benefit of Scottish members was received with considerable jubilation and approval. But though eaten bread is soon forgotten, and bricks and mortar are no longer considered, the reproach cast upon the Society in this respect is one that could scarcely have come less graciously than from a Scotchman. For the rest, the discussion of Mr. STORRAR's paper suggested little that is likely to be of utility in solving the problem as to the future of pharmacy, or in advance of measures which have already been contemplated by the Council. Both the discussion and the paper itself appear rather to place in striking prominence the absence of unity among the trade, and also the improbability of unity being achieved. In this respect we are reminded of the opinion long since expressed by the late Mr. RADLEY, when a member of Council, to the effect that the time seemed to be approaching when there must be a separation of the incompatible elements of the trade into two classes, comprising on the one hand those who go for trade pure and simple, and on the other hand those who appreciate the professional side of pharmacy and desire to support the Society in developing it. By that means it might be possible, even with a reduction of the number belonging to the Society, to secure greater unity of action within a more limited range for the advantage of pharmacy and its followers. But as regards the essentially trade aspects of the business, it is doubtful whether such a segregation would be generally satisfactory. In spite of the prevalence of free trade doctrines, they meet with limitation whenever the public interest is likely to be affected, as in the case of publicans, and since the business of a chemist and druggist, when conducted on the strictest trade lines, may be deemed to involve danger to the public safety, it is probable that on the part of the Government it would be subjected to restriction in a similar way.

On another page will be found an advertisement including a first list of names of gentlemen who have signified their willingness to act as Stewards in connection with the annual dinner of the members of the Pharmaceutical Society and their friends next month. As no doubt there are many others who would be desirous of supporting the chairman on that occasion we take the opportunity to remind them that they should at once communicate their intention to the Honorary Secretary, Mr. Richard Bremridge, 17, Bloomsbury Square.

As a corollary to the "Budget" resolution to increase the duty on alcohol to the extent of 6*d*. per gallon of proof spirit strength, a second resolution raised the customs duty on perfumed spirit 9*d*. per gallon, and on liqueurs, cordials, etc., 8*d*. per gallon. In addition the customs duties on certain articles of which spirit is an ingredient have been increased and stand as follows :—chloroform, 3*s*. 1*d*. per lb. ; collodion, 25*s*. per gallon ; acetic ether, 1*s*. 10*d*. per lb. ; butyric ether, 15*s*. 8*d*. per gallon ; sulphuric ether, 26*s*. 2*d*. per gallon ; and ethyl iodide, 13*s*. 7*d*. per gallon.

* * *

Another "Budget" resolution provides that any excise licence hereafter granted to carry on a trade or business (except that of an appraiser, auctioneer or hawker) shall only authorize the licensee to carry on the trade or business mentioned therein "in one set of premises, to be specified in the licence." This would appear to apply to the Medicine Stamp Licence.

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From the statistics prefixed to the Medical Register for 1890, which has been just issued, it appears that the number of names added during the year 1889 by registration was 1305, being 657 in England, 444 in Scotland, and 204 in Ireland. On the other hand, there were 978 names removed, of which 564 were expunged on evidence of death. The total number of names on the Medical Register at the end of last year was 28,348, being 409 in excess of the number at the end of the previous year. The Dentists Register, on the contrary, again shows a decrease, the number of names in it at the close of 1889, being 4818, as against 4890 twelvemonths previously. Of these 1079 have been registered as licentiates in dental surgery in British and Irish colleges, 13 as bearing United States' qualifications, and 3726 as having been in practice as dentists at the time of the passing of the Dentists Act.

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In the *British Medical Journal* for the 12th inst. Dr. Luff records two cases of tin poisoning. The patients were admitted into the North-West London Hospital, suffering from symptoms of irritant poisoning, supervening one and a half or two hours after eating of tinned meat and tinned cherries. The residue of the meat was found to be free from poisonous ptomaines, but the acid juice of the cherries held a considerable quantity of a tin salt in solution. The acidity of the juice was due to malic acid and a little acid tartrate of potassium, and the malate of tin present was estimated as 3·2 grains in each fluid ounce of the juice. The surface of the tin was not corroded, but the solder was ; it is thought therefore that the tin and lead solder acted as a galvanic couple in the presence of the malic acid, the tin taking the *rôle* of the negative element and passing into solution. The tin salt, of which it is supposed the doses taken varied from 4 to 10 grains, appeared to act as an irritant and cardiac poison.

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We regret to have to record the death, on the 16th inst., at the age of 63 years, of Mrs. Augusta Jones, who was elected an Annuitant on the Benevolent Fund in 1888.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The fourth evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, April 16, at 8·30. Mr. David Storrar, Kirkcaldy, in the chair.

The minutes of last meeting having been read and approved, apologies for absence were intimated from Messrs. Gilmour and Thompson, Edinburgh ; Fraser and McAdam, Glasgow ; and Watt, Haddington.

The Chairman said he thought they would all agree in regretting the absence of Mr. Gilmour and the cause of his absence, and hope that he would soon be able to fill his wonted position among them. He would take this opportunity of thanking the Executive and the members generally for the honourable position in which they had placed him as Vice-Chairman, and he would endeavour to do what he could to meet with their acceptance. They were met to-night to discuss the paper on "The Future of Pharmacy" which he had the privilege of submitting to the Society at last meeting. He might suggest that the discussion should take a somewhat wider scope than his paper did. He did not say this to minimize their criticism of his views, rather he trusted they would express their opinion perfectly freely, and he might have a few words to say in reply at the close. He held that the proper position of the Pharmaceutical Society to take up was the protection of trade interests as well as the advancement of pharmaceutical education. It was reasonable that the Society should ask that some interest should be taken by the Council in these subjects, and he rather thought this had not been done of late years. It seemed to him that the trade was separated into two classes, the professional class and the trade class, and his view of the question was that no future action would be of any benefit to them unless they were unanimous in uniting these two interests in the Society. What they wanted to discover was how members of the Society could be brought more into unity with each other. He would now call upon Mr. Mackenzie to open the discussion.

Mr. Mackenzie said he had not taken into consideration in moving the adjournment at last meeting that he would have to open the discussion to-night. He felt that the subject was one deserving their best consideration, and it seemed to him at the time that the best thing to do was to adjourn. He regretted that comparatively few had seen it their duty to come forward that evening to show that they were interested in the subject and in the excellent paper submitted to them by Mr. Storrar. He regretted this, not only on their own account, but also because it would have strengthened the hands of their friend, and show what might be accomplished by even the humblest members of the trade in bringing about a change of opinion in the Council and the Society. He would go over some parts of Mr. Storrar's paper, as printed in the Journal. The subject was a very wide one. It was very nearly fifty years since pharmacy was put upon its trial as desiring to establish for itself a distinct place before the country. He alluded to the year 1841. Mr. Storrar had given the keynote of their difficulties in the following sentence :—"We have tried to run what is essentially a trade upon professional lines, and have, naturally enough, failed. If pharmacy is a trade it should be a *free* trade; if it be a profession, that is, if special education and special training is required by the State as a condition of its practice, then, like all other professions, it should be granted reasonable protection." That was their history in a condensed form.

There lay their difficulty, and it was for them to endeavour to put these two things together. If they were so incompatible as to be incapable of being united, or if it was to take another half century to secure that object, then it would be better to be quit of the professional element or run them separately. With regard to Mr. Storrar's second point, that in spite of all that had been done, and "admitting to the full the great advance which had been made in the status and practice of pharmacy, legislation is still required alike in the interests of the public and the pharmacist to put it on a different footing," that was an opinion with which they all agreed. It brought them face to face with a very serious difficulty which required consideration. From the time of Jacob Bell till now many efforts had been made, and much energy and money had been expended to effectually secure the position of pharmacy. They must admit that something had been attained, thanks to certain men who by legislation had done not a little to improve the trade. But still the enemy had found out the weak links in their armour, and was doing a great deal against legitimate pharmacy. They had either got too much legislation or too little, and the point was to discover wherein they could improve upon it. On that point Mr. Storrar's paper contained valuable information, throwing out suggestions for attaining their object, and also indicating the cause of their present position. They were all agreed that legislation was required, but to what extent or in what form was a very different matter. It would be different if they had united action and united interests, but that was a difficult thing to obtain. They were still going on the old lines; the professional and trade interests were as antagonistic as ever, and it was an admitted disadvantage that this to some extent destroyed their capacity as a successful trade. They did not blame the Council, or make mere denunciation of it a safety valve for suppressed indignation; but they held that the members throughout the country generally should take more interest in the election of the Council, and by doing so they could easily improve upon it, or at all events make it a more universally representative body. They had only some 4500 members out of a possible 14,000, and until they had a larger number on the register of the Society they would not be able to accomplish all that they desired. What, he would ask, might they not do if they had every member of the trade, or even a majority of them, connected with the Society? Then they might go forward unitedly and get what is wanted and bring about a state of things which would infinitely better their position. He would prefer that legislation should stand over till the membership had reached a point where they could have a much greater amount of individual opinion. He thought Mr. Fraser's idea of district representation was worthy of consideration. The districts could put forward suitable men to be representatives, and then the Council would be representative of the entire membership.

Mr. Maben (Hawick) said he would not have spoken, but he did not agree with all that Mr. Storrar and Mr. Mackenzie had said. He maintained there was nothing antagonistic between their calling as a profession and their business as a trade. There was no department of pharmacy, not even the selling of poison (for which alone the law compelled them to qualify themselves), that could not be conducted on business principles, like other tradesmen's businesses. Were they required to conduct analytical investigations that kept them in the laboratory for hours at a time, and away from the counter, Mr. Storrar's plea might have been accepted; but there was nothing, as far as their business was concerned at present, that could distinguish them from other tradesmen. He submitted that the mere fact that the State compelled them to pass an examination before they were admitted to the Register did not constitute a profession; but a great deal of false sentiment had arisen round this same compulsion, and they had accustomed themselves to the idea that they ought to receive not only a fair trade price for their goods and remuneration for their time, but a professional fee in addition. The trouble was that the public did not see it in the same light, and for his part he did not blame the public. Mr. Storrar's appeal to outsiders to "join hands with us inside the Society, and by so doing make it representative of the trade, and the Council representative of the Society," and thus "the future of pharmacy is secured," was re-echoed by a leading article in last week's *Pharmaceutical Journal.* That article, with more temper than taste, said:—"The Society owed nothing to those who persisted in remaining outside. So long as they continue in that position they constitute an obstacle to progress. Instead of asking what the Society had done for the trade, it would be more to the point to ask, what had the trade done for the Society?" Now that tone of writing was, to say the least, a mistake, an error in tactics. Conciliation was more likely to be of use than exasperating language like this. But was there any foundation either for Mr. Storrar's appeal or for the editorial article? He said, no. It was unfair to blame those outside for obstruction. No doubt it *was* true that the Council was non-representative of the trade, but how had this come about? He would tell them. Mr. Storrar pleaded for consolidation, so did the editor, and so said they all; but why was it the Society was not stronger than it was? Their young men came in, crowded in, he might say, year after year, and yet the Society got smaller and smaller. Surely there was something wrong, somewhere, and it was not pleading with outsiders to come in that was wanted, but to stop the leak, and keep those they had got. He had gone over the figures for the last ten years, and he found that no fewer than 2302 had dropped out in that period, and of these only 126 had been restored. Allow 391 for deaths (17 per cent.), which was a liberal allowance, they found that 1785 members and associates had turned their back on the Society in ten years. Why was this if it were not that they asked for bread and the Society gave them stone and lime, for the magnificent building in Bloomsbury Square was almost all they had to show for ten years work? Why, if these gentlemen had been kept in the Society it would to-day have numbered over 6200, which was probably three-fourths of the effective strength of pharmacy. It was not how to get in the outsiders—they came in fast enough—but how to prevent them going out once they were in. It seemed to him that a moderate amount of sagacity would long ere this have found out where, and the reason why the leak existed, and to have taken the proper means to remedy the defect. The best policy of the trade, he believed, was to support the Society and return men in sympathy with their own views. He was in favour of territorial representation, and as to the policy of the Society he would say consolidate, bring back their former members and get new ones if possible. Give associates the privilege of membership and introduce territorial representation. These things no doubt required an Act of Parliament. Be it so, get the Act. With no controversial matter it would pass without difficulty, and then having a representative body they could go for more serious legislation with some weight behind them; otherwise legislation was perfectly hopeless.

Mr. J. B. Stephenson said his difficulty in adding anything to the discussion was that he felt himself very much in agreement with Mr. Storrar. He was delighted with the paper as drawing a clear line of demarcation between the professional and trade aspect of their calling. The professional part as defined was really the only part they had to concern themselves about, because the trade part must find its own level, like any other trade. As to outsiders he was glad to see that Mr. Maben was so favourable to their being brought into the Society. The great hindrance at the present time was the fact that so many registered men could not become members of the Society. Perhaps the strongest point in the recent Bill was the proposal to widen the door of entrance to membership of the Society. That would be an inestimable advantage in securing that unity that they were all talking about. Legislation was hopeless if they found certain sections of the trade fighting against them. As to the question of protection he would say they did not so much wish themselves protected; their primary aim was the protection of the public. It was said there was no chance of passing a curriculum Bill if it was weighted with any other matters. But he thought it was putting the cart before the horse to push a curriculum Bill first. The Act of 1868 was now certainly a dead letter, and they should seek to get it corrected in some way so as to be made really operative. Stores and limited companies were driving a carriage and six through it and lowering the whole character of the trade. The new idea of putting the responsibility on the qualified servant was in his opinion absolutely unworkable in practice. They would need to be present every pay day to see who the responsible parties were. He had read Mr. Storrar's paper with great pleasure, and he would commend it to the careful perusal of all interested as a singularly moderate and judicious statement of their case.

Mr. Peter Boa said there was one point on which he felt very strongly, and that was the question of unity and the small number of those who subscribed to the Society. He could not understand why a man having a business, say in Edinburgh, did not subscribe to the Society. They got ample value for their subscription in the shape of the Journal and attendance at the Library, and if in the country, books were forwarded to them. He happened to know that even in this city certain men in business instead of paying their guinea as an associate paid the subscription of half a guinea for their apprentices. They got the Journal for that, but it was a species of economy he did not understand. Any means for making associates eligible for membership, would greatly improve the state of affairs. There were many men who were only associates, though at the head of large businesses. They were ineligible to be sent as representatives simply from this cause. This was a state of matters which he thought could and ought to be remedied. There was another point which occurred to him in this connection, and that was that those who did not subscribe had become quite ignorant of the Society's affairs, and the advantages to be derived from subscribing. Were some means taken to bring this under their notice there was little doubt they would see it to be their duty to become members at once. He could not suggest any better means to bring this about than that the Society should have some gentleman appointed to act as a canvassing agent on their behalf.

Mr. Lunan said he had found in going about, especially among country chemists, that there was a general opinion that the Society did nothing for them as a trade. He thought even the professional element in Bloomsbury Square must recognize the fact that in the conducting of the Journal it might be made more a trade medium. While saying this he thought great credit was due to those men who had worked the Society all these years. They had reason to congratulate themselves that the Council had taken charge of the professional element along with the trade. Otherwise they as chemists would have been mere tradesmen at the present day. The position they desired could only be attained by aiming at high training. There was no use asking for protection unless they were really entitled to it by qualification. They would get nothing as a monopoly or through the influence of members of Parliament. Everything now-a-days was thoroughly discussed and looked at in every light; therefore before they could be protected they must secure that all the members should be thoroughly educated in their business. The spirit in which Mr. Storrar treated the matter was most admirable and he thought those who studied the paper would find in it much of the abstract philosophy of pharmaceutical politics. His criticisms and suggestions were of a most catholic character.

Mr. Nesbit (Portobello) said even among those inside the Society there were a great many who seemed to take exceedingly little interest in its affairs. This was shown by the fact that both in London and Edinburgh only about one half of the voting papers annually issued were returned. If that was the case even among those inside they need not wonder that outsiders showed so little interest. He had no doubt they could obtain the protection they required, but they must in the first place show that they deserved recognition. He did not understand how so much lukewarmness should have been shown regarding the Bill recently proposed, and he thought the Council were too easily induced to withdraw it. If the matter were fairly put before the House of Commons he was sure it would be listened to with respect. What was wanted was that all men who dispensed medicines should be qualified, and the public should have some means of ascertaining that they were so. These limited companies were undoubtedly an evasion of the Act. If they looked at the Act they would find that the preamble provided that persons should, before commencing business, be duly examined. If this were shown to the House of Commons, and the point clearly pointed out to Members of Parliament, he had no doubt the House would insist upon this interpretation, or have the Act amended.

Mr. Storrar in reply said, in regard to Mr. Maben's remark as to the definition of professionalism, he might point out that he defined his meaning in the second clause of his paper. As to outsiders he could not wish to have the matter better put than it had been by Mr. Maben. He thought they were really at one. It matters little whether these outsiders had been connected with the Society or not. They were at present outsiders. There must be some cause to account for this leakage and for the fact that so large a proportion of the trade did not join the Society. Any one who could discover that cause, and suggest a remedy, would be doing good service. With the remarks of Mr. Boa, he sympathized very much, and he would be exceedingly sorry if anything he (Mr. Storrar) had said should be misunderstood as implying any want of thorough loyalty to the Society. He had endeavoured to criticize in a calm and temperate spirit, and in doing so they were exercising an undoubted right. Their discussion had been a little onesided and aimless, and he would have liked had more been said about the real evils of the trade. He thought the effect of past legislation had been to considerably hamper the trade without giving them any *quid pro quo*. That was the opinion he had formed after some consideration, and he saw no reason to change it. He thought it was a very reasonable thing to ask for some protection against the intrusion of those outsiders who were unqualified men. They must endeavour to get a better representation of the trade as a whole on the Society itself, and until that was done it was perfectly useless to seek for further legislation.

Mr. J. B. Stephenson moved a vote of thanks to Mr. Storrar for his conduct in the chair. He also said as this was the last meeting of the session he thought they should accord their best thanks to Mr. Gilmour for the efficient manner in which he had presided over their meetings during the session. They would also like to express their sympathy with him in his present illness, and their hope that he would soon be restored to complete health.

Mr. Nesbit (Portobello) seconded the motion, which was carried with acclamation.

Mr. Storrar acknowledged the vote, and said he would take an early opportunity of conveying their expression of sympathy and good wishes to Mr. Gilmour, whose absence they all so much regretted.

The meeting then closed.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society on Thursday April 3, Mr. Hugo Müller, F.R.S., Vice-President in the chair, the following papers were read:—

Note on the Hydrosulphides. By S. E. Linder and Harold Picton.

Researches on the Germination of some of the Gramineæ. Part I. By Horace T. Brown, F.R.S., and G. Harris Morris, Ph.D. This investigation was undertaken with the view of throwing some light upon the complex metabolic processes which take place during the germination of seeds. The authors during the progress of the inquiry have examined and experimented with the seeds of a great number of the grasses, but this, the first part of their paper, is confined almost entirely to a consideration of the changes which take place in *barley* during the early periods of its growth. The paper is divided into 21 sections, the heads of which are as follows:—(1) Introduction. (2) Structure of a grain of barley. (3) The visible changes which occur in the embryo and endosperm during germination. (4) The relation of the embryo to the endosperm. (5) Development of excised embryos upon foreign endosperms. (6) The endosperm to be regarded as a storehouse of *dead* reserve material; no residue of vitality recognizable in its cells. (7) Cultivation of excised embryos upon water. (8) Cultivation of excised embryos upon nutrient solutions. (9) Growth of excised embryos upon *starch*, and proof that an amylo-hydrolyst (diastase) is secreted by the growing embryo. (10) The secretion of diastase is localized in the "absorptive epithelium." (11) The secretion of diastase is increased by the presence of a small quantity of acid. (12) The secretion of diastase not stimulated by the presence of starch. (13) The secretion of diastase is inhibited by a readily assimilable carbohydrate. (14) The existence of a *cellulose-dissolving* enzyme (cyto-hydrolyst) in the germinating seeds of the grasses. (15) The cyto-hydrolyst, like diastase, is secreted by the "absorptive epithelium." (16) The two varieties of diastase, their genesis and distribution in the resting and germinating seed. (17) Distribution of diastase in the germinating seed. (18) The "mother substance" of the "diastase of secretion" is principally derived from the endosperm. (19) Action of "diastase of secretion" upon ungelatinized starch. (20) A consideration of the origin of the hydrolytic enzymes of germinated grain. (21) The form in which the reserve starch after transformation enters the growing embryo, and the metabolic changes which it there undergoes. In recording the visible changes which occur in the seed during germination, it is shown that a disintegration and dissolution of the cell-walls of the endosperm always precede any attack upon the cell contents. This breaking down of the cell-wall is shown in a subsequent portion of the paper to depend on the production during germination of a special cellulose-dissolving or "cyto-hydrolytic enzyme," which, like diastase, is soluble. The action of this enzyme on the cell-walls of some kinds of vegetable parenchyma is very energetic. The physiological importance of this cyto-hydrolyst is very great, for, owing to the non-diffusible nature of the amylo-hydrolytic enzyme, diastase, the previous breaking down of the cell-wall is a necessary prelude to the dissolution of the contained starch-granules. The authors show that the appearance of the cyto- and amylo-hydrolysts is due to a specialized secretory function of the layer of columnar epithelium which covers the outer surface of the scutellum. It has hitherto been considered that the function of this epithelium was exclusively that of an absorptive tissue; its absorptive as compared with its secretory functions are, however, of quite secondary importance. The natural food material, *starch*, does not appear to have any special power of stimulating the cells of the epithelium to increased secretion of a diastase, but the flow both of diastase and of the cyto-hydrolytic enzyme from these cells is affected in a very remarkable manner by the presence of certain carbohydrates. Providing the carbohydrate is one which is readily assimilable by the embryo, such as cane-sugar or maltose, secretion of ferment is checked or even entirely inhibited. No such inhibitory action is, however, produced by such substances as mannitol and milk-sugar, which are entirely without nutritive value. The authors' experiments in this direction point to the secretion of the amylo-hydrolytic and cyto-hydrolytic enzymes as being to some extent *starvation phenomena*. The power of secretion possessed by the epithelium is in some way or other so adapted to the requirements of the young plant as to be only exercised when the supply of tissue-forming carbon compounds begins to fail. The histological changes which take place in the cells of the epithelium during secretion are very similar to those which have been observed in certain secretory cells of the alimentary tract of animals, and in the secretory cells of some of the insectivorous plants. The authors confirm the important generalization of Sachs that the relation of the embryo to the endosperm is that of parasite to host, and they have availed themselves of this relation by cultivating the embryo upon suitable media after separating it from its endosperm, and in this way they have obtained information with regard to the secretory powers of the embryo, and the chemical modifications of its absorbed nutriment, which it would have been impossible to obtain by any other means. The results of cultivating excised embryos upon various nutrient solutions, more especially of the carbohydrates, are recorded, and it is shown that whilst cane-sugar, invert-sugar, dextrose, lævulose, maltose, raffinose, galactose, and glycerol have all more or less nutrient value, milk-sugar and mannitol do not in any way contribute to the growth of tissue in the young plant. Of all substances tried, cane-sugar has by far the greatest nutritive power. Maltose, although the natural food of the embryo when attached to its endosperm, is decidedly inferior in this respect to cane-sugar. This, at a later point in the paper, is shown to be due to the fact that maltose, directly it is absorbed by the growing embryo, becomes transformed into cane-sugar by the living cells, and in this form is passed from cell to cell. When cane-sugar is supplied ready formed to the young plantlet, there is manifestly a saving of energy to the living cell, which receives its nutriment in a form in which it is directly available for its requirements. An examination of the sugars produced during the germination, and of their mode of distribution in the grain, have convinced the authors that the transformed starch of the endosperm is absorbed by the embryo in the form of maltose, and that the seat of production of the cane-sugar which germinated grain contains is the tissues of the embryo itself. The authors are continuing their work upon the germination of the grasses, and are applying the methods described in this first part of their paper to an elucidation of the chemical changes which the other reserve materials, especially the proteids, undergo in their passage from the endosperm, and of the agencies which are at work in bringing about these transformations.

Mr. Thiselton Dyer said that chemists, perhaps, would hardly realize what delicacy of manipulation was required in carrying out experiments such as had been instituted by the authors of the paper; it was a fortunate circumstance that the morphology of the seed in grasses allows of anatomical separation of the elements. Botanists had already made some progress in localizing enzymes; thus Professor Marshall Ward had shown that the enzyme which effects the liberation of the colouring matter from the glucoside in Persian berries is dislocated in the raphe; and it had long been known that emulsin was not distributed throughout the bitter almond. After referring to the distinction between animals and plants, he said that the plant was similar to the seed, the bud corresponding to the embryo and the woody shoot to the endosperm. Baranetzky had shown that a diastase is omnipresent in plants; and there could be little doubt that it would be found that an enzyme capable of attacking cellulose was equally so.

Professor Marshall Ward pointed out that in the seeds of the Gramineæ, Cyperaceæ, and other families of plants there is a peculiar layer of cells, from one to three or more deep, surrounding the starchy endosperm, and distinguished from the latter by containing no starch but relatively large quantities of proteids. This layer belongs to the endosperm; but, as the seed ripens, the cells store special proteids instead of the starch-grains which predominate in the other endosperm cells. In the oat there is such a layer, one cell deep, and it has been shown that, during germination, the dissolution of the starch and the cell-walls of the starch-containing cells begins near the surface of this layer, which itself persists, and the cells of which take up food and undergo changes so like those of excreting cells, that it was concluded that they excrete the diastatic enzyme. Haberlandt declares that when starch-grains are placed in contact with a piece of this layer, kept moist and at proper temperatures, the grains even of the resistent potato-starch are corroded as on germination; whereas control experiments, where all conditions are the same, except the presence of the cells of the proteid layer, showed no such corrosion. Professor Ward then remarked that the authors' suggestion that more than one enzyme may be excreted according to the nutrition of the cells, and their proof that a cellulose-dissolving enzyme exists in barley, is borne out by various recent researches, and by Wortmann's observations on the behaviour of bacteria in a mixture of starch and proteids. Wortmann proved that so long as the bacteria were fed with proteids, they refused to excrete the diastatic enzyme which they produced in abundance when only carbohydrates are at their disposal. The speaker concluded by drawing attention to several other cases where such a proteid layer exists—*e.g.*, in the seeds of buckwheat and in the tubers of some potatoes—and remarked on the importance of clearing up this matter, and on the steps towards accomplishing that end attained by the excellent work of the authors of the present paper.

Professor Green said that in the case of the date stone also his observations led him to believe that the enzyme was independent of the endosperm, and that probably it was located in the epithelial layer. But in castor oil seeds not only the embryo but also the endosperm cells appeared to be possessed of vitality, the fatty matter in the latter undergoing change even when not subject to the action of the embryo; probably the enzyme was present in the form of an enzymogen, as extracts of the seeds were rendered active by acids.

Dr. Lauder Brunton said that it was highly remarkable that in a comparatively highly organized plant the condition of the embryo was so very similar to that of the embryo in animals: the embryo in both cases appeared to be purely parasitic. In the mammalian embryo proteids are taken up from without, and it is generally assumed that they are assimilated without undergoing much change, but this was by no means certain. Referring to the presence in malt of an enzyme capable of affecting cellulose, he said there was a form of indigestion in which people could not digest cellulose: was it possible to separate the enzyme in question in large quantities?

Dr. Armstrong remarked that many of the results brought forward were highly suggestive from a chemical point of view. The authors came to the conclusion that maltose, which on *a priori* grounds might be regarded as the natural nutriment of a plant, was inferior to cane-sugar, and that in the plant maltose was converted into cane-sugar. Dextrose, according to their observations, did not undergo conversion into cane-sugar, but it gave invert-sugar: that is to say, it became partially converted into lævulose, but these constituents of cane-sugar were apparently incapable of interacting. It was known from Emil Fischer's experiments that dextrose could be converted into lævulose, and that maltose was an etheric compound of the acetal type, formed from two molecules of dextrose, one of which acted as aldehyde, the other as alcohol; it was conceivable that if the "dextrose residue" in maltose underwent a change comparable with that which is involved in the conversion of dextrose into lævulose, a compound would be obtained which, if not identical with cane-sugar, would, perhaps, be easily convertible into cane-sugar by hydration and subsequent dehydration. It is scarcely probable that the keto-group—or its equivalent—of lævulose is preserved in cane-sugar, but if this group were to become $C(OH)_2$ and one of the hydroxyls were to be separated together with an atom of hydrogen of a hydroxyl group in the other dextrose residue, a more stable etheric compound might result, the properties of which, probably, would be such as are characteristic of cane-sugar. The authors had spoken of the maltose becoming incorporated with the protoplasm, from which the cane-sugar was then elaborated; perhaps the effect was comparable with that exercised by phenylhydrazine in effecting the conversion of dextrose into lævulose through the agency of the osazone. Dr. Armstrong then took exception to the terms amylolytic, proteolytic, etc., as applied to so-called ferments, pointing out that, whereas the terms electrolysis and hydrolysis implied splitting up *by means of* electricity and water, amylolytic was intended to suggest the splitting up of starch, proteolytic the splitting of proteids. He suggested several expressions less open to objection.

Mr. Heron, referring to the authors' conclusion that maltose was not resolved into dextrose during germination, asked how, if this were the case, it was possible to account for the presence of dextrose in malt; he was of opinion that maize diastase did hydrolyse maltose.

Mr. Horace Brown said that although, as Mr. Thiselton Dyer had pointed out, diastase was ubiquitous in plants, that developed during germination appeared to differ in important particulars from ordinary diastase. He had been unsuccessful in isolating an enzyme capable of attacking cellulose from the date stone. Their experiments did not favour the conclusion that the cellulose layer had any marked diastatic power. He might point out that Professor Marshall Ward had been led to a conclusion similar to their own in the case of the cyto-hydrolytic enzyme which he had studied, viz., that its secretion was a starvation phenomenon. All their experiments to determine whether the ferment existed in the endosperm as a zymogen had been futile. In preparing the cyto-hydrolytic enzyme from malt, it was necessary to use air-dried malt, as it was destroyed by heating. In his experience there was no marked excess of dextrose in malt.

The formation of indene-derivatives from dibromalphanaphthol.—By R. Meldola, F.R.S., and F. Hughes.

The Action of Chlorhydric Acid on Manganese Dioxide. Manganese Tetrachloride.—By H. M. Vernon.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of this Association on Thursday, March 17, a paper on "The Method of Growth in the Increase of Thickness of Stems," by Mr. Joseph F. Burnett, was read. The paper was fully illustrated by a number of photographic lantern slides.

The author introduced his subject by referring to the difference in structure of a fibro-vascular bundle closed and open, illustrating the closed bundle by a section from *Canna*, and the open by one from *Begonia*. The thickening of a normal dicotyledonous stem was shown by diagrams and by a section from a species of Bauhinia, in which the projection of the xylem of four bundles into the pith had caused it to assume the form of a maltese cross. It was also illustrated by sections from the stem of a scarlet runner, taken at different stages of growth. Sections of *Platanus* showed the secondary medullary rays traversing the xylem, and gave an opportunity for describing the formation of an annual ring. The thickening in normal dicotyledonous roots was then referred to, the illustrations used being sections from the root of a scarlet runner at different stages, and senega root. The third section of the paper dealt with the thickening of the woody monocotyledones of the order Liliaceæ, including the genera *Yucca*, *Dracæna*, *Aloë*, *Aletris*, *Lomatophyllum* and *Beaucarnea*. The paper concluded with a discussion of some of the more important deviations from the usual type of growth of the monocotyledonous stem, illustrations being given of seven kinds of abnormalities.

The President (Mr. T. A. Ellwood) said the paper was interesting to all those who studied the science of botany. Mr. Burnett's treatment of the subject had been conceived upon a liberal basis, and he had done it ample justice. The lantern slides with which Mr. Burnett had so profusely and artistically illustrated his remarks were the highest testimony to his histological and photographical skill. Without question, this was the way to study botany; one might spend day and days over book descriptions, and not derive a tithe of the benefit that would follow an hour or two's section cutting and the use of the microscope. He looked forward to the time when the microscopical examination of drugs would be as general as the analytical examination of chemicals.

Mr. F. Ashley Rogers said systematic botany was valuable, and rightly held a high position, but it did not embrace the whole of the science, and agreeable as its companionship might be in a country walk, the pharmacist ought to remember that it is a most necessary duty for him to cultivate the use of the microscope in his business. By its means the examination of powdered drugs was facilitated, for no matter how minute were the particles, the individual cell-structure of the drug was preserved and furnished a clue to its identification.

The discussion was continued by Mr. E. Richards and Mr. W. Lloyd-Williams.

Mr. Burnett, in the course of his reply, thanked the members of the Association for the cordial manner in which they had received his paper. He would not attempt to conceal the fact that it was the outcome of a good deal of labour, but he felt quite repaid by their appreciation of his trouble. It would interest many of them to know that he had decided to illustrate his paper by means of photographed slides and a lantern, after reading the paper which was delivered before the Association by Mr. Swan on "Photo-micography" in October last.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A lecture was given in connection with the above Society on Monday evening by Mr. B. W. Winder, F.C.S., F.R.M.S., on "The Microscopical Adulterations and Diseases of Food." The President, Mr. A. R. Fox, occupied the chair.

After briefly describing the different juices secreted by the body during the process of digestion, and explaining their actions on the various kinds of food, the lecturer drew attention to some of the adulterations usually met with in ordinary everyday foods and explained fully the manner usually employed for the detection of such adulterants. The foods described were coffee, flour, mustard, pepper, etc. The lecturer strongly impressed on those present the desirability in important cases of confirming the microscopical examination by chemical reaction. The remainder of the lecture was devoted to the description of some of the diseases food is liable to, and the effects of such food on the human system. A description was given of the life history of some of the parasites caused by eating such impure meats, the *Trichina spiralis* and the *Tænia mediocanellata* being the specimens selected. The *Trichina*, the lecturer said, was but seldom met with in this country, but still at times even bad epidemics have been caused by it. Although one of the smallest of internal parasites it is, perhaps, one of the most deadly, on account of the rapidity of its genesis and immigration, which is unequalled by any other parasite, 48 hours sufficing for its conversion from its embryo state to that of the mature adult worm. Neither the *Trichina* nor the *Tænia*, however, need be feared if the meat is properly cooked, neither of these preserving its vitality over 170° heat. In conclusion the lecturer stated that a man should, in selecting his diet, choose one in accordance with the work the body had to do, and not attempt to persuade himself because a ploughman working in the open air can digest hard-boiled eggs and salt pork that he could do the same in a confined office without exercise under altogether different circumstances.

The lecture was illustrated by microscopic photographs of the various articles described in their pure state and together with their adulterants and diseases. A hearty vote of thanks was accorded to the lecturer.

After the lecture Mr. J. Humphrey announced that Dr. Collier had presented to the Society an Herbarium which he had collected some twenty-seven years ago. The collection, which is in a good state of preservation, is composed of about 500 specimens, and is very typical of the flora of the neighbourhood of Sheffield.

Dr. Collier suggested that an annual prise should be offered for the best herbarium, to be competed for by the students in the Society's school. Mr. Newsholme, with his usual generosity, quickly responded to the suggestion and offered a prize of the value of a guinea for the best herbarium collected between the months of May and October of this year and in future years.

Dr. Collier and Mr. Newsholme were heartily thanked for their gift and the meeting closed.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The first annual conversazione of the Society was held on Friday, the 18th inst., in the Temperance Hall, Hordman Street, when there was a large gathering of members and their friends, about 200 being present.

Mr. W. P. Evans had been announced to preside, but owing to ill health was unable to do so. Mr. Conroy kindly consented to fill his place.

There were arranged around the room a number of exhibits kindly lent by the following firms:—Messrs. J. H. and S. Johnson, two cases of metals and fine chemicals; Messrs. Symes and Co., electrical and chemical apparatus; Messrs. Evans, Sons and Co., case of materia medica specimens and lime fruits and lime fruit juice in different stages of preparation; Messrs. Summer and Co., fluid extracts, perfumes, etc.; Messrs. Burroughs, Wellcome and Co., showed specimens of their different preparations. Messrs. John Moss and Co., materia medica specimens and a pen and ink sketch of Galen. There were also a number of microscopes shown by members, which added greatly to the interest of the meeting.

Mr. Conroy in his address said he understood that this was the first conversazione the Society had held, and he must congratulate the members upon the number of ladies and gentlemen they had succeeded in bringing together. Meetings of this kind did much to make life enjoyable, and removed them from the cares and worries of business. He thought that the President (Mr. H. Wyatt, jun.), the officers and the Council of the Society deserved a word of praise for the way in which they had conducted the affairs of the Society. Their esteemed Hon. Secretary (Mr. Frank Walker) had handed to him a list of the papers that had been read during the past session, which he considered would be a credit to any Society in the United Kingdom. A hint had been given him to the effect that a rumour was abroad that some little antagonism existed between this and the older Society, the Liverpool Chemists' Association. As a past President of the old Society, as one of the Vice-Presidents, and as a member of its Council, he assured them that there was not a shadow of foundation for any such rumour. On the contrary the old Society admired the spirit in which this Society was conducted, and he trusted that this feeling would always exist between them.

During the evening songs and violin and pianoforte solos were contributed by several ladies and gentlemen.

This conversazione brings the second session to a close; it has been a most successful one both as regards attendance and the quality of the papers read.

Parliamentary and Law Proceedings.

Prosecutions for the Sale of Paregoric devoid of Opium.

On Monday, at the West Riding Police Court, Dewsbury, Mr. Henry Dixon, of Birkenshaw, and Mr. Thomas Brown, of Birstall, were summoned under the Sale of Food and Drugs Act, for selling paregoric which was said to be deficient in the material drug, opium. In the case of Mr. Brown, the Bench acquitted him of any intention to defraud, and fined him 1*s.* and costs. In Mr. Dixon's case, Mr. Hines, who defended, it was understood, at the instance of the wholesale dealer, contended that there was no offence in law. The mixture was purposely made without opium, because many parents objected to the use of that drug. Defendant was fined 1*s.* and costs. Mr. Hines asked the Bench to state a case, but they refused.

At the West Riding Police Court, at Wakefield, Alathen Holdsworth, grocer and postmistress, Stanley, and Henry Peter Newsome, grocer, etc., Rothwell, were charged with having sold paregoric not of the nature demanded by the purchaser. It was shown that Holdsworth's paregoric was wholly destitute of opium, and the analyst's certificate of Newsome's sample stated that it consisted chiefly of treacle, rhubarb, and oil of aniseed. Mrs. Holdsworth was fined 10*s.* and 17*s.* 4*d.* costs; Mr. Newsome, 10*s.* and 18*s.* 5*d.* costs.

On Tuesday, at the West Riding Police Court, Huddersfield, Godfrey Woodhead, general dealer, of Slaithwaite, was charged under the Food and Drugs Act with selling paregoric, which was not of the nature, substance, and quality of the drug demanded. Three ounces of the drug were purchased on the 7th ult., and a portion forwarded to the County Analyst, who certified that it was lacking in one or two of its proper ingredients, notably opium, and that thereby the medicinal value would be greatly diminished. For the defence it was urged that the mixture sold was a purely harmless concoction, not containing opium. Had it contained opium the defendant would have been liable under the Pharmacy Act. The name "paregoric," it was urged, was not a medicinal term, but was simply a name used by dealers, and a case dismissed at Otley only last week was quoted as being exactly similar to the present one.

The Bench considered the case proved, but believing that the defendant (who had rendered himself liable to a penalty of £20) had not offended intentionally, they imposed a fine of 20*s.* and costs.

At Pontefract, William Waites, grocer, Ackworth, was charged under the Food and Drugs Act, with having supplied as paregoric a mixture which contained no opium. The defendant labelled the liquor as paregoric without opium, but the Bench held that as opium was the essential ingredient of paregoric, they must convict, though they would only order the defendant to pay the costs.

Obituary.

WILLIAM SMEETON.

On the 18th of April, Mr. William Smeeton, Pharmaceutical Chemist, Leeds, died at the age of 56 years. For about two years he had been in feeble health from serious heart-mischief, but improvement followed the careful treatment prescribed, and his family and friends were encouraged by this. He had been able to spend a part of the present month at Blackpool, but on returning home his malady rapidly increased to the fatal result.

In Yorkshire the name of Smeeton of Leeds has for two generations been widely known as connected with a pharmaceutical establishment maintaining honourable principles of business and conducted by men enjoying the esteem of their neighbours and the public. The family is related to that of Smeaton of the same district, made famous by the great engineer and constructor of the old Eddystone lighthouse. Mr. William Smeeton was apprenticed to the late Mr. Wm. Baldwin of Ironbridge, Salop, and entered upon business on his own account in that town, but relinquished this in 1866 to acquire the pharmacy in Commercial Street, Leeds, for many years conducted by his uncle, the late Mr. Edward Smeeton.

Mr. Smeeton's amiable character and genial manner ensured his co-operation in all efforts made locally in the interest of pharmacy, and he always gave a most loyal support to the Leeds Chemists' Association. He was elected President of this Society in 1888, and again in 1889 was induced to accept the office, in view of the approaching visit of the British Pharmaceutical Conference, which elected him a Vice-President for the Leeds meeting to be held next September. He was Deputy Superintendent of the Preliminary examinations for Leeds. Mr. Smeeton continued the old practice of receiving apprentices, and from his having both wholesale and retail business, a large number of youths came under the favourable influences of his training and example, and several of them are now conducting businesses of their own in one or other department of the drug trade.

The funeral of the deceased took place at Lawnswood cemetery on the 21st instant, when in addition to the family, business staff and personal friends, the Leeds Chemists' Association was represented by Messrs. Branson, Jefferson, S. Taylor, Reynolds, Ward and Yewdall.

Mr. Smeeton leaves a widow and family, his eldest son being a member of the medical profession.

Notice has also been received of the death of the following:—

On the 7th of April, Mr. James Clarence Littlefield, Chemist and Druggist, High Street, Ventnor. Aged 33 years. Mr. Littlefield was an Associate of the Pharmaceutical Society.

On the 13th of April, at Meltham, Yorkshire, Mr. William Warhurst, Chemist and Druggist, formerly of Bury. Aged 73 years.

On the 15th of April, Mr. John Alefounder, Chemist and Druggist, Market Street, Faversham. Aged 52 years.

On the 22nd of April, Mr. John Hope, Chemist and Druggist, Brook Street, Chester. Aged 88 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

CHEMISTS' TRADE INTERESTS.

Sir,—I am a "chemist and druggist." I see something in the title and much in the occupation to be proud of.

Although a period of little more than twenty years has elapsed since this title received parliamentary definition and distinction, the public has already become aware that it carries with it qualifications and privileges of no mean order. This distinction arises from the fact that a chemist and druggist is no longer the self-accredited purveyor of drugs, mixer of physic and apothecary's lackey that once he was, but that under the provisions of the Pharmacy Act, 1868, and through the educational operations of the Pharmaceutical Society he ranks as a scientific man, possessing technical acquirements suitable to the important public duties he is called upon to perform.

It is really necessary to remember, what often escapes notice in the warmth of disputation, that the "chemist and druggist" of to-day is not the mere holder of a licence, like a licensed victualler or firework maker, etc., otherwise he could not hope to escape a supervision and periodic inspection by some government authority that would prove in his case most vexatious. On the contrary he is a man educated and elected for the performance of important duties, which duties he is left free to discharge as his own enlightened conscience dictates, according to the varying needs of the different localities where his business is being carried on.

Amongst the various functions that the chemist and druggist is called upon to perform there is one, I think, of very great importance, which if kept more in the foreground, would be of great benefit to us as a class, would help to correct a great lot of misrepresentation, and to silence a deafening, killing, "vociferated logic" on petty questions, which tends but to divert attention from far more important issues.

I maintain, sir, that one of the most important and distinguishing functions of the chemist and druggist is to stand firm as a rock as a check upon trade interests. The more manly a stand he assumes on this point the more will he deserve, the more with justice claim, and the more will he be bound to get of recognition and due reward for his services, and *vice versâ*.

"Pay what you like, and have what you please," but "Caveat emptor" is the full motto of trade; it always has been so, and always will be. It really means "pay what you like, and let me get you to take what will please you the best, and what I can make the most money out of." Worldly wisdom, too, this, but when placed side by side with our "Habenda ratio valetudinis" what a sorry figure it cuts.

The chemist and druggist as a check upon trade interests. One or two examples for the sake of a few upon whom the idea has never dawned before. First.—Somebody, two or three days ago only wanted some loaf sugar—simple, old-fashioned, sparkling cane-sugar. A lad was sent with a requisition for 1 pound of best sparkling loaf, with the result that after applying to two or three grocer's shops, and being served with another and cheaper article at highest price, one had the honesty (?) to admit the fraud and return the difference. The chemist and druggist was applied to in desperation to know if he could really get the simple proper article, which of course he could, and did by sending to a certain grocer a message for 1 pound of sparkling loaf for a chemist; it came to hand at once, with the complimentary retort, "Tell your master that this is real cane-sugar." Second case.—Saffron was wanted not long ago. A spurious article was supplied instead. Prosecution set on foot; defence: sold it just as I bought it. Ah! that will not do; your duties are to be a check upon the distribution of spurious articles, to judge in such cases, to approve or condemn for the public good. Third case.—Two teaspoonfuls of oil of turpentine, ordered for a patient by his medical attendant; a moderate dose, yet the patient dies under very suspicious circumstances; it looks as if the stuff killed him. Yes, says the chemist, and most likely it did when oil of turpentine B.P. is about the rarest thing to get at all by retail.

Sir, my dictionary tells me that the word "trade" means literally a trodden way, Anglo-Saxon, troed—tredan to tread, and its chief definition is "to act merely for money." I protest most emphatically against the business of a chemist and druggist being degraded down to the position of a trade at all. We need not go on stilts and talk about being professional men. To be real men of business, provided we attend to our own business, is distinction enough in any line of calling. With us it becomes most honourable, for as a chemist it is my work to check the kind and quality of the chemical preparations that pass through my hands for the use and benefit of the public. As a druggist the same honourable middleman capacity attaches to me with respect to all the articles of materia medica that are not of a definite chemical nature. Our true interests are far better served by a quiet adhesion to the fixed essentials of our calling than by fussiness about secondary matters, and they are liable to very great injury just now from a lot of noisy rant about the "care of trade interests."

On the strength of these considerations, which could be enforced still further if necessary, I crave, sir, that you will allow me in conclusion to make an earnest appeal to my fellow associates and members everywhere to be up and doing with respect to the forthcoming Council Election. Why should we not at once return our voting papers as soon as we have received them by post? Our votes would then be safe whether we could make it convenient to attend the annual meeting or not. Besides no one knows what may happen in a fortnight, and if one should die suddenly his last opportunity for good in this direction would not be lost.

Again do not let us be persuaded to aim at the uncertain, at the risk of losing what good we already have. A card is to hand urging us to vote for seven new Council men named thereon. Now I know that behind this request there is a certain clique whose faces were partly visible at the last election. Determined to show a bolder front next time, they have been fishing about for nearly twelve months for the best men they could get—this invited me months ago—and this is the result of their labours. Out of the seven, four are scarcely known at all; they do not subscribe to the Benevolent Fund; and three of them are not on the list of members of the British Pharmaceutical Conference. It seems to me positive impudence to suppose that a body of intelligent men should stand this sort of dictation without resentment, and it puts me in mind of what Stanley tells us, that he met with some who being yet unwhipped out of their native arrogance had unbounded faith in their native valour. Is it likely that patient, earnest, influential men like our President and his colleagues are to be insultingly set aside in favour of the untried and the unknown? And that, too, at the mere dictation of a few noisy ones who have been the enemies of the Society all along. But let us wake up at this crisis and display the hollowness and selfishness of their pretensions, and the absolute fallacy of their latest cry. As far as we are concerned the "care of trade interests" is all moonshine. J. C. Hyslop.

Sir,—It is refreshing to turn for a short time from our own troubles and contemplate the vigour of our forefathers in their early efforts to promote the welfare of their craft, as pourtrayed in Redwood's 'Progress of Pharmacy,' and see that then, as now, there were grumblers, whilst the gallant stand against and repeated defeat of the apothecaries was the work of an ardent and intelligent few. It is just worth while to note, in reply to those who now constantly argue that the Society was founded to protect our interests, that the protection then in view was against persecution from the apothecaries, and it was and always is a much easier task to defend the positions we hold against attack than to attack successfully. Public opinion supported the chemists in the former case; but it was many years before even it could be brought to accord so much protection to chemists as consists in compulsory examination, that being thought more or less an attack on free trade and vested interests.

Also, when a kind of claim is made upon the State, in consideration of the qualification it enforces, we may remember that this compulsory qualification has never been forced upon us from without, but is the result of our own efforts and progressive reform from within the body. If it were not for that, we only have to exercise our imagination to think what would be the state of things now with the present eager search for investment of capital and unremitting competition to reduce profits. There is this safeguard now. The examined pharmacist must himself be either the means of degrading or elevating his calling; even the stores cannot do it without his aid.

But as this age has pronounced so strenuously in favour of free trade, so that to work even up to the measure of the public welfare and our own defensible rights will prove no easy task, so has it shown the power of organization. As units we are nowhere, but as a united body, giving power and vigour to our Society, we should be able to do much. Organization, from the Primrose League to the Trades Unions, has shown what it can do, and when the Pharmaceutical Society represents three-fourths instead of one-third of our number it will be a power to be reckoned with.

The Society is not a legislative body, which many do not seem to recognize; nor should it be in a normal condition of seeking legislation. Yet, if thoroughly representative, its administrative powers would be great, and should be exercised for the benefit of the whole trade; the many questions which affect us would be watched in our interest, and their bearing and our responsibility made clear. It holds the key of admission into our body through the portals of examination, investing us thus with the management of our own affairs. It has now half a century of past record more or less chequered, but to which it may point with much pride and satisfaction, in spite of some rifts within the lute.

In a period when competition and cheap madness may have tempted many with delegated responsibility to dance to the degrading tunes which the public have piped, the Society has been a witness for high pharmacy and conscientious work; it has gained prestige and increased recognition at the hands of the higher scientific societies, and maintained the position of English pharmacy fairly with that of continental countries. But with all this we can but sadly admit that the times are hard, and if they are to be remedied, I think all chemists should gladly welcome to its Council any who are giving their earnest thought, and willing to give their time to its deliberations. The revived interest, therefore, in the coming election may be a matter for congratulation, for it is very desirable that the wishes and aspirations of all the sections should have a voice in the Council. Perhaps there is some hope, if able representatives are selected, who shall contend with all the argument they can to press home the convictions they hold, and at the same time be open to conviction, that the resultant of their possible antagonisms may be such as to satisfy reasonable men, and help in promoting the need of the times, above all others, strength and unity.

I feel sure that the President and many of his colleagues, to whom not many thanks have been given, will welcome such representatives to the Council. But it is a matter of the greatest importance that the services of the President be again secured. Among all the struggles of the past perhaps no one has brought to bear, through most depressing times, so much energy, patience, and unflagging service in the cause of pharmacy. Those who attend the annual meetings will know with what ability the President conducts them, and how every link in the chain of pharmaceutical politics is held by him. Whether it be the Somerset House authorities, the medical world or the Lobby of the House of Commons that requires to be interviewed in our interests, the time of the President seems to be ungrudgingly given. Whatever may be the issue of the election, a great number of us will sincerely desire that the President, who has worked so long for us, will be destined to lead a more united body to the attainment of their legitimate desires.

28, *Tulse Hill.* Wm. Warren.

The Council Election.

Sir,—It has been discovered in "Clubland" that nothing is more dangerous to a candidate for election than a reputation. Aristides discovered the same ungrateful appreciation at the hands of the Athenians 2500 years ago. Jacob Bell experienced some of its consequences more recently. No man has ever achieved distinction without making enemies, and it may be safely predicated that the man who will not risk some temporary unpopularity will never accomplish any real good.

After the lapse of a year it may be safe to advert to that wave of temporary insanity which took possession of the Pharmaceutical body in May, 1889, and very nearly resulted in the rejection of the President of the Society, and of some other members, of whom it may be said without disrespect to their colleagues that they were among the most useful and most respected members of the Council. It is now probably half forgotten upon what a ridiculous issue the polling of last year turned, and it may be necessary to remind your readers that it was a matter in which the Society had no concern, and upon which the action and sentiments of the candidates selected for the "blackballing" process by a foreign body having no interest in the welfare of the Pharmaceutical brotherhood, had been grossly and gratuitously misrepresented. The election turned very largely upon the merits and demerits of vivisection.

Let us repair this grievous blunder on the present occasion by testifying our confidence and gratitude for long and eminent services; and let us not expect that any man of sense and judgment will attempt the impossible task of adapting himself to the thousand and one crotchets of unstable minds. Government by crotchets is fatal to any broad or effective policy.

Let us, too, avoid the fatuous mistake of attempting to base the Pharmaceutical Society upon a policy of trades-unionism, the only effect of which would be to deprive it of whatever power and influence it now possesses. Pharmacy is not the only vocation that has suffered and unhappily still suffers from a cruel depression, but that depression is not due (as the shallowest thinker must know) to acts or omissions of the Council. We all desire the same thing, namely, the advancement of pharmacy, both scientifically and commercially. The means of attaining this object is a matter of opinion. I for one am firmly convinced that in this, as in many other of the affairs of life, that which appears to be the longest way round is in reality the nearest way home. But of this we must all in our hearts feel assured that the welfare of pharmacists as a body and individually has always been the aim of the Society and of its Council, and I should deplore the day when the direction of the Society's affairs is transferred from the head to the tail.

Norwich. OCTAVIUS CORDER.

Sir,—I am exceedingly surprised to notice in your last issue a report of a meeting held in the Pharmaceutical Society's House in Edinburgh, to consider the candidature of Mr. David Storrar, of Kirkcaldy, for a seat upon the Council, and at which Mr. Watt, a member of Council, presided!

However desirable it may be, from a Scotchman's point of view, that there should be another Scottish member in the Council, it seems to me that those who are of that opinion should at least have discussed such a matter elsewhere than on the Society's premises, which were not provided for holding electioneering meetings.

I can hardly imagine that a meeting to promote the candidature of Mr. "Councillor" Evans, Mr. Coleman and Mr. Grose, the candidates in Wales, with, say, Mr. Evans, a member of the Council, in the chair, would be permitted to be held at the Society's house in London, and what would our Scottish friends say if such a meeting actually took place? If in their estimation the prestige of the Society would suffer from so wide a departure from its traditions, how, may I ask, is an exactly similar line of procedure excusable in Edinburgh?

Surely an unwise advocacy has placed Mr. Storrar in an unenviable position in relation to other candidates at the forthcoming election, and in the estimation of the members at large.

Swansea. JNO. W. LLOYD.

Sir,—The report which appeared last week of the meeting held at the Society's House in Edinburgh to consider the candidature of Mr. Storrar for a seat on the Council, will, I venture to think, be read with astonishment and indignation by the majority of the members of the Society.

It is difficult in these days of self-advertisement to appreciate fully the taste exhibited by Mr. Storrar in subsequently presiding at an evening meeting summoned ostensibly for the purpose of discussing a paper called "Pharmacy as a trade and as a profession," but really having the effect of a manifesto from a candidate for election to the Council of the Society.

According to the Society's Calendar the premises of the North British Branch were provided to assist the general work of the Society, and as a member I protest against its being used as the head-quarters of a pharmaceutical caucus for electioneering purposes.

It is also extremely regretable that an official of the Society, in the person of Mr. Maben, should have gone out of his way to so thoroughly distort facts as to lay himself open to the charge of wilful misrepresentation. He is reported as stating, regarding the policy of the Council, "that a fine building in Bloomsbury Square was the only practical outcome of ten years' work." Mr. Maben knows, as well as any one, the work of successive Councils in directing affairs of education and examination, as trustees of a fund for the relief of less successful members of the craft, as enforcing the penal provisions of the Pharmacy Acts, and as responsible for the vast improvement in status which the pharmacist of to-day enjoys. But, descending to the low level of bricks and mortar, it is also well known that the Society has spent thousands upon the Edinburgh house, and it does not lie in the mouth of one of the North British Branch officials to protest against the necessary expenditure in London.

Surely the amenities of pharmaceutical politics have reached their lowest level when candidates for Council honours and their supporters have to adopt such equivocal tactics. E. J. MILLARD.

Sir,—A circular letter, signed by several members of the Society, was yesterday issued to the candidates for election to the Council requesting them to send to me replies to five questions which were put to them. The circular was dated from 17, Bloomsbury Square, and the replies were requested to be sent to that address.

I learn this morning that the Society's official address should not have been used for this purpose, and I immediately communicated to the candidates requesting them to reply to me at my private address.

I am anxious that it should be understood that the Society's address was used without official sanction, as otherwise it might be considered that the circular was issued from 17, Bloomsbury Square, by permission. I regret any trouble that this mistake may have occasioned, and am anxious to prevent any misapprehension which might arise on the subject. F. A. CAIRNS.

EXPLOSIONS DURING THE PREPARATION OF NITRITE OF AMYL.

Sir,—Last week you recorded the serious accident to Mr. Tocher of Peterhead, who was injured by the explosion of a mixture of nitric acid and amyl alcohol, which was being distilled for the preparation of nitrite of amyl.

Since amyl nitrite is frequently prepared by the pharmacist, it may be useful to direct attention to the fact that not only is the distillation of amyl alcohol with nitric acid attended with danger, but that it is in every respect a most unsatisfactory method of producing amyl nitrite. I have fully discussed its defects in a paper printed in this Journal (December 22, 1828).

Amyl nitrite may be easily prepared without the slightest danger by employing a method devised in the Research Laboratory of the Pharmaceutical Society, which is described in a paper by myself and Mr. Lloyd Williams, also published in the same number of the Journal. By means of this method amyl nitrite is obtained without distillation of sufficient purity to satisfy the present requirements of the British Pharmacopœia. If the pure compound is needed, the liquid thus produced may be fractionally distilled without any risk of explosion. During the last two years we have frequently distilled large quantities of amyl nitrite. WYNDHAM R. DUNSTAN.

CARBOYS AS ADVERTISING AGENTS.

Sir,—It recently occurred to me that our shop carboys might be made useful as well as ornamental, by making night advertisements of them.

I have found that a small neat letter pasted on the glass in front of the gas burner shows up very well, provided the colour in the carboy is not a very dark one, and that the letters are placed exactly in front of the light.

If neatly placed the letters are not unsightly during the day, and by experimenting with different kinds of letters I have found that a thick letter is preferable to a thin one. They might, of course, be painted on in the ordinary way, but it is obvious they must be quite opaque and not very far apart.

The magnifying power may, of course, be increased or diminished by regulating the distance between gas burner and carboy.

It seems a pity that such great magnifying power should be altogether thrown away, and they might be used either for name or *spécialité*.

Birkenhead. C. R. KNAPP.

The Council Election.—We have received, in an envelope bearing the Cardiff postmark, a communication upon the subject of the forthcoming election, to which the names of seven of the nominated candidates are appended. We would therefore point out that it has not hitherto been the custom to print the addresses of candidates in the body of the Society's Journal, as it would be obviously improper for the official organ of the Society to take part in influencing the election of members of Council.

Jacque.—We do not understand how the mixture should be of a brick-red colour, the slight precipitate formed being greenish brown.

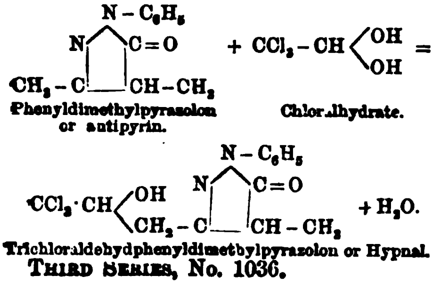
NOTICE.

School of Pharmacy Students' Association.—The next meeting of this Association will be held on Thursday, May 1, when Mr. T. J. Hayton will read a paper on the "Steam Engine," and Mr. L. W. Hawkins will give a Report on Inorganic Chemistry.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Bertie Smith & Co., W. M. Holmes, Pollard, Evans, A Little Mixed.

"THE MONTH."

Hypnal. It will be remembered that on more than one occasion reference has been made to the incompatibility of antipyrin with chloral hydrate, and to the combination of the two to form a compound not possessing the properties of either of its constituents. Recently, Herr Reuter showed that by heating antipyrin with chloral hydrate a crystalline compound could be obtained, which he described as trichloraldehydphenyldimethylpyrazol, and alleged to be without therapeutic value (see before, February 1, p. 602). According, however, to the experience of Dr. Bardet, recently communicated to the Société de Thérapeutique (*Nouv. Rem.*, March 24, p. 135), this crystalline compound, which he proposes to call "hypnal," partakes in a marked degree of the properties of both its constituents. Administered in twenty-two cases in doses of one gram (two grams being rarely required) he found hypnal to induce sleep as readily as chloral hydrate, whilst in those instances where the insomnia was caused by pain it seemed to have the same anodyne effect as antipyrin. In addition, spasmodic symptoms, especially cough, appeared to be much abated under its influence. Dr. Bardet states that hypnal consists of about 45 per cent. of chloral and 55 per cent. of antipyrin. It has been found by M. Bonnet that if concentrated solutions of the two constituents be shaken together, a considerable deposit of crystals is formed without passing through the oily stage, and this deposit, by recrystallization from water, can be obtained in enormous transparent rhombic crystals. If the chloral used be in excess the crystals take the form of prismatic needles. The compound is said to be free from odour or caustic taste. In fact, according to M. Bonnet, it is tasteless; but Dr. Bardet says that while it is free from the strong taste of chloral hydrate and the bitterness of antipyrin, it has a saline taste, a slight but not disagreeable sensation of chloral becoming perceptible on the tongue after some time. Hypnal is said to dissolve in six to eight times its weight of warm water and melt at 58°–60°; it is therefore much less soluble than chloral hydrate or antipyrin, while as to its melting-point it lies about half-way between the two. When heated with a dilute base chloral and antipyrin are reformed, and upon heating the solution the characteristic odour of chloroform is given off. It may be added that since the appearance of the last note in "The Month" upon the subject, Herr Reuter has represented the combination that takes place by the following equation, in which the chloral is made to displace in one of the methyl groups of antipyrin an atom of hydrogen, which with an hydroxyl of the chloral hydrate forms water:—



$$N{-}C_6H_5,\ N,\ C{=}O,\ CH_3{-}C,\ CH{-}CH_3 \quad + \quad CCl_3{-}CH(OH)_2 \quad =$$

Phenyldimethylpyrazolon or antipyrin. Chloralhydrate.

$$CCl_3{\cdot}CH(OH){-}CH_2{-}C,\ N{-}C_6H_5,\ N,\ C{=}O,\ CH{-}CH_3 \quad + H_2O.$$

Trichloraldehydphenyldimethylpyrazolon or Hypnal.

Dextro-Cocaine and Methyl-Cocaine. A fresh communication from Messrs. Liebermann and Giesel (*Berichte*, xxiii., 926) leaves little doubt that the substance which they described recently as "methylcocaine" is essentially identical with the dextrococaine of Messrs. Einhorn and Marquardt (*ante*, p. 790). The latter chemists also appear to have arrived at the same conclusion (*Berichte*, xxiii., 979), some difficulty attending the crystallization of their compound having been overcome, whilst the characters have been found to be practically the same, and especially the nitrate has been ascertained to present the marked insolubility characteristic of the nitrate of the supposed methylcocaine. The dextrococaine has also proved to be much more stable when heated with water than ordinary cocaine, an observation which, as the modification appears to be easily induced, may turn out to be of practical importance. Messrs. Einhorn and Marquardt also state that they have prepared four homologues of dextrococaine, which are represented as the ethyl, propyl, butyl and amyl esters of benzoyldextroecgonine. The ethyl compound was obtained crystallized, but the other three only as colourless oils, though some of their salts were crystalline. The salts of all of them are described as producing upon the tongue anæsthesia quite similar to that resulting from the action of ordinary cocaine.

Phenyl-methane. According to a communication by Dr. Giacomini to the Turin Academy of Medicine phenylmethane exercises a similar action to antipyrin, the dose required being only 0·5 gram, or about half the quantity required of antipyrin (*Pharm. Post*, March 30, p. 263). It is said to be administered best dissolved in Marsala or some other sweet wine. Dr. Giacomini represents phenylmethane as having not only antipyretic, but also an antirheumatic and analgesic action.

Sulphaminol. At the exhibition in connection with the Congress of the German Surgical Society, held a few days since in Berlin, E. Merck exhibited a new antiseptic, under the name "sulphaminol." It is represented as being thiooxydiphenylamine, obtained by the action of sulphur upon salts of m-oxydiphenylamine, dissolved in water (*Pharm. Centralh.*, April 24, p. 243). The product is a light yellow odourless and tasteless powder, insoluble in water, freely taken up by alkalies, less freely by alkaline carbonates, and also by alcohol and glacial acetic acid. Sulphaminol browns when heated, melts at about 155° C., and forms pale yellow solutions. In contact with the liquids of the body it is said to undergo decomposition and then to produce the specific action of sulphur and of phenol. According to Professor Kobert, a considerable quantity can be given to a dog without producing toxic disturbance or causing loss of appetite. Dr. Moritz states that it resembles iodoform in diminishing the strong smell in some cases of suppuration, but has the advantage of being itself odourless.

Pyoktanin. Two other new antiseptics shown by E. Merck at the same exhibition are called pyoktanin and appear to be aniline compounds. Several aniline compounds are known to exercise considerable bactericidal properties on gelatine cultures and it is claimed that these compounds far exceed corrosive sublimate in its action in this direction, whilst they are non-poisonous, odourless and promote the healing of wounds to which they are applied. "Pyoktaninum cœruleum" is intended chiefly for surgical and "pyoktaninum aureum" for ophthalmological purposes. They are to be sent out in the form of 1 and 2 per cent. dusting powders, ointment, bandages, etc.

New Alkaloid from Scopolia atropoides.

It will be remembered that, quite recently (*ante*, p. 709), mention was made by Dr. Schmidt of samples of crystalline hyoscine and hyoscine hydrobromide that had been placed at his disposal by Herr Bender, who had obtained them in working up a large quantity of *Scopolia atropoides* roots. Upon a closer examination, however, of the free base, which was in transparent crystals, the size of peas, melting at 59° C., slightly soluble in water and freely soluble in alcohol, ether, chloroform, and dilute acids, Dr. Schmidt found it to differ from the hyoscine of Ladenburg (*Apot.-Zeit.*, April 12, p. 186). Analytical results appeared to correspond best with the formula $C_{17}H_{21}NO_4$, that attributed to hyoscine being $C_{17}H_{23}NO_3$. The crystalline hydrobromide also presented characters different from those attributed to hyoscine hydrobromide by Ladenburg, and appeared, in fact, to be a salt of the new base. The gold salt was very characteristic, forming shining needles, 2 centimetres long, moderately broad, presenting at the margins a peculiar comb-like or serrate appearance, and generally showing a distinct striation. The anhydrous crystals were difficultly soluble in water and melted at 214°. The occurrence of this base has since been found to be not limited to the root of *Scopolia atropoides*, since it has been isolated in small quantities also from *Atropa Belladonna*, *Duboisia myoporoides* and *Datura Stramonium*. Dr. Schmidt thinks that its presence in *Atropa Belladonna* probably explains Ladenburg's discovery of oxytropine among the products of the action of baryta water upon belladonnin.

Commercial Hyoscine Hydrobromide.

In consequence of the results recorded in the preceding paragraph, Dr. Schmidt obtained for examination 10 grams of "hyoscinum hydrobromicum" from an alkaloid factory of repute. It was supplied in presentable crystalline fragments, attaining a centimetre in length, but presenting no definite crystalline form. Analysis of these crystals did not give the figures required for hyoscine hydrobromide, whilst the purified gold salt prepared from them could not be distinguished in respect of appearance or solubility from the gold salt of the new base from *Scopolia*, and on analysis it gave closely corresponding figures. The crystals melted at 210°-212°, or slightly below the melting point of the gold salt of the new base (214°). The liberated base, when decomposed by baryta water, yielded atropic acid and a base forming a gold salt having a melting point higher than that of isotropine. The mother-liquor of the gold salt of the new base, when subsequently treated, yielded first shining scaly crystals, melting at 204° and approximating more closely in composition to hyoscine aurochloride, and afterwards a small quantity of yellow needles, corresponding in melting point and gold percentage to those attributed by Ladenburg to hyoscine aurochloride and also observed in a double salt previously obtained by Dr. Schmidt from *Scopolia japonica* and *S. atropoides*. As the characters observed in this sample of "hyoscinum hydrobromicum" varied much from those of a sample obtained from another source some time since, it would seem that under the name of "hyoscine salts" widely differing preparations occur in commerce, and Dr. Schmidt thinks that to this fact may be due the existing diversity of opinion as to the action of hyoscine.

Ethoxycaffeine.

Ethoxycaffeine, which some time since was strongly recommended, in doses of 0·25 gram, as a remedy for migraine, can, according to Dr. Thoms, be readily prepared by treating caffeine with large excess of bromine, added gradually in small quantities, the mixture being kept cool, and then adding to an alcoholic solution of the resulting monobromcaffeine, freed from excess of bromine, metallic sodium in small fragments sufficient to combine with the bromine, and boiling. Upon concentration of the alcoholic solution the ethoxycaffeine separates in small white needles that can be purified by recrystallization from alcohol or water (*Pharm. Post*, April 13, p. 309). The melting point of the crystals is 138°-138° C., and Dr. Thoms recommends this as a means of distinguishing it from the much lower-priced caffeine with which it might be adulterated. Another point of difference is the behaviour of the two bases towards caustic potash or soda solution. A solution of 0·1 gram of caffeine in 50 c.c. of boiling water is not rendered turbid upon the addition of potash solution, whilst from a similar solution of ethoxycaffeine the compound is almost completely precipitated.

Synthesis of Grape Sugar.

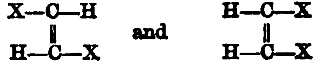
Last month reference was made (before, p. 789) to a series of operations that had resulted in the synthesis of the compounds of the mannite group, with the exception of grape sugar, the starting point having been *a*-acrose, the sugar obtained first in the condensation of glyceric aldehyd and afterwards of formic aldehyd. Since then Professor Fischer has announced, among other things, the synthesis of grape sugar (*Berichte*, xxiii., 799). Theoretical considerations had led to the conclusion that d-mannose, which was first obtained by the oxidation of ordinary d-mannite and afterwards more cheaply by hydrolysis of the "reserve cellulose" occurring in many plants, especially in the endosperm of *Phytelephas*, is a stereo-isomer of grape sugar, and that its oxidation product, mannonic acid, is a stereo-isomer of gluconic acid. As both mannose and mannonic acid had been produced synthetically the conversion of either of these into the corresponding glucose compound would extend the chain of synthesis to that series. Taking the acids as being the most convenient for working with, on account of their greater chemical stability, it was assumed that d-mannonic acid might stand in the same relation to gluconic acid either as racemic acid to one of the two optically active tartaric acids, in which case it should be decomposable into gluconic acid and a second isomeric acid, or as racemic to mesotartaric acid, in which case either acid would be convertible into the other. Attempts to split up mannonic acid failed, but it was found that when the lactone of either mannonic or gluconic acid is heated with chinoline to 140° C., a mixture of the two acids is formed, just as a mixture of racemic and mesotartaric acids is formed when either of these acids is heated with water to 170° C. The two acids can be separated by means of the different solubilities of their cinchonine and brucine salts. The gluconic acid separated from the mixture resulting from the treatment in this way of d-mannonic acid, on reduction by means of sodium amalgam, yielded a sugar, which when purified corresponded in every respect to pure crystallized anhydrous grape sugar.

New Synthetic Sugars.

In a second communication (*Berichte*, xxiii., 930) it is demonstrated that the observation by Professor Fischer, above referred to, of the possibility of reducing the sugar acids by means of sodium amalgam, promises to be at least as prolific in results as was originally suggested (*Pharm. Journ.*, *ante*, Sept. 28, p. 241). The reaction appears not to take place with the free acid, but with the lactone, and is therefore limited to acids capable of forming a lactone. This property, however, extends to all the known monobasic acids of the sugar group and to the bibasic saccharic and metasaccharic acids; the former, on reduction, all yielding sugars and the latter aldehyd acids. The conversion of a known sugar into a cyanhydrin, then by saponification into a carboxylic acid containing an atom of carbon more than the original sugar, and the reduction of this acid to the corresponding new sugar, has already been effected in several cases. From the lactone of mannose-carboxylic acid, prepared from mannose, F. W. Passmore has obtained a crystalline heptose ($C_7H_{14}O_7$), which by further reduction yielded a heptavalent alcohol (heptite, $C_7H_{16}O_7$). The latter compound proved to be identical with perseite, from the avocado pear (*Persea gratissima*), formerly supposed to be isomeric with mannite, but which M. Maquenne has recently shown to be a seven-carbon compound; incidentally, therefore, the synthesis of another natural product has been accomplished. The mannoheptose, upon being submitted to similar treatment, yielded an octonic acid and a beautifully crystallizable lactone, from which, by reduction, was obtained mannoctose ($C_8H_{16}O_8$) and the corresponding phenylhydrazon. This appears to mark the farthest advance in this direction up to the present. In a similar way, starting from glucose, H. Kleeberg has obtained glucoheptose and glucooctonic acid, whilst through galactose C. Behringer has obtained galaheptose. Rhamnose (a methyl-pentose) gave to O. Piloty analogous results, the product of the reduction of the carboxylic acid being methylhexose, which was converted into methylheptonic acid and this by reduction yielded methylheptose. In respect to the nomenclature of these compounds Professor Fischer proposes to discard the terms "dextrose" and "lævulose," as being no longer appropriate; "glucose," if thought necessary, he would retain, and as a corresponding term for fruit sugar he suggests "fructose." But he prefers to follow up a suggestion made by Kiliani to call arabinose pentose, as representing the number of carbon atoms contained in the molecule. The succeeding terms for the sugars would therefore be hexose, octose, etc. Similarly he would call the corresponding alcohols pentite, hexite, heptite, octite, etc., and the acids would take the form heptonic acid, octonic acid, etc. Lastly, in order to indicate the source of the synthetic compound he would use a prefix, as, for instance, mannoheptose, mannoheptite and mannoctonic acid for derivatives from mannose.

Synthesis of Fumaric Acid.

According to Van't Hoff and Wislicenus's theory the dihalogen addition compounds of acetylene could exist in two isomeric forms represented by the formulæ—



$$\begin{matrix} X—C—H \\ \| \\ H—C—X \end{matrix} \quad \text{and} \quad \begin{matrix} H—C—X \\ \| \\ H—C—X \end{matrix}$$

in which X stands for any halogen atom, the first formula representing a more stable compound than the second. If the X be in each case replaced by COOH the formulæ would be identical with those proposed for fumaric and maleic acids respectively. Working upon this hypothesis Mr. Keiser has succeeded in preparing two acetylene diiodide compounds, one of them solid and the other a liquid at ordinary temperatures (*Chem. News*, April 11, p. 175). By acting upon the solid compound, which was the more stable of the two, first with potassium cyanide and then with caustic potash, carboxyl groups were substituted for the iodine and the potassium salt of fumaric acid was produced.

Quassia amara and Picræna excelsa.

A chemical examination of the woods of *Quassia amara* and *Picræna excelsa* has been carried out by Herr Massute, with a view of determining whether the bitter principles of the two woods are identical, as usually assumed (*Archiv*, March 25, p. 147). By shaking an alcoholic extract of quassia wood with chloroform a mixture of crystals was obtained, from which eventually four bitter principles, differing in melting point and solubility, were separated. One of these melting at 210°-211° and another melting at 239°-242° were in too small quantity to be further examined, but the former agreed in melting point and crystalline form with the quassiin of Wiggers ($C_{32}H_{40}O_{10}$). Of the other two, one melted at 215°-217° and is represented by the formula $C_{35}H_{46}O_{10}$, while the other melted at 221°-226° and is represented by $C_{37}H_{50}O_{10}$. From the wood of *Picræna excelsa* two crystalline compounds were separated, both having lower melting points than either of the quassia compounds. One was in needles, melted at 204°, and had the composition $C_{35}H_{46}O_{10}$, whilst the other was in prisms, melted at 209°-212° and had the composition $C_{36}H_{48}O_{10}$. It appears, therefore, that all these compounds are homologous, but each wood presents a different series. A crystalline body that was obtained in minute quantity from *Quassia* wood, but appeared to be more plentiful in the bark of *Picræna* wood, dissolved in acidulated alcohol with a beautiful ultramarine blue fluorescence; it was less bitter than quassiin or picrasmin and gave the reactions of an alkaloid.

Damascenine.

It will be remembered that some years since Mr. Henry Greenish recorded in this Journal the observation that the seeds of *Nigella damascena* when treated with petroleum spirit yield a fluorescent solution, while the seeds of *N. sativa* do not (*Pharm. Journ.*, [3], xii., 681). It is now stated by Dr. Schneider that he has succeeded in isolating the fluorescent principle by shaking a benzene extract of the crushed seeds with dilute hydrochloric acid (1 in 4), adding soda solution in excess to the filtered acid liquor, filtering, treating the precipitate with absolute alcohol and evaporating the solution (*Pharm. Centralh.*, Mar. 27 and April 3, pp. 173, 191). The product is said to be an alkaloid, having the composition represented by the formula $C_{10}H_{15}NO_3$, which has been named "damascenine." It is described as occurring in well formed crystals, faintly yellowish with a bluish fluorescence, and having a peculiar narcotic odour recalling that of *Robinia Pseudacacia* or *Cytisus Laburnum*. It has an alkaline reaction and forms salts with acids, which as a rule are soluble in water, though the picrate is insoluble. The alkaloid itself is insoluble in cold water, slightly so in boiling water, and freely in alcohol, chloroform, methyl alcohol, methyl iodide, carbon bisulphide, benzine, petroleum, ether, benzol, fat oils and paraffin. All these solutions, especially when dilute, show a blue fluorescence, which in benzene in the proportion of 1 in ·200,000 is still perceptible. Solutions in dilute acids are non-fluorescent, but a solution containing excess of nitric acid upon standing assumes a beautiful violet-red colour comparable to methyl violet. Damascenine melts at 27° C. to a yellowish faintly fluorescent oil. It is said to be located in the husk of the seed, and the seeds are said to contain a ferment acting upon amygdalin and myronate of potassium (*Pharm. Zeit.*, April 5, p. 214).

Tiliacin.

The isolation from the leaves of the lime tree of a new glucoside, to which the name "tiliacin" has been given, is announced by Professor Latschinow (*Chem. Zeit.*, Jan. 29, p. 126). It is described as splitting up into glucose and tiliaretin, which again decomposes into anisic acid and other products. The leaves of *Cirsium arvense* appear to contain the same glucoside, whilst a glucoside from the leaves of *Phlox paniculata* appears to differ from both tiliacin and hesperidin.

Active Constituent of Insect Powder.

Many different statements have been made as to the active constituents of Persian and Dalmatian insect powder, several of which, however, agree in representing it as volatile; in fact, it is frequently held that an insect powder is only active whilst it retains its odour. Some experiments reported by Dr. Hirschsohn appear, however, to have given results contrary to this assumption (*Pharm. Zeit. Russl.*, April 8, p. 209). A sample that had been kept five years in thin paper and which had lost its odour completely proved to be as fatal to moths as originally. Three samples of active powder were heated to 120° during eight hours, at the end of which time they had lost all odour, but they retained their insecticidal properties. To test the statement that the activity depends upon the presence of free acid samples were made strongly alkaline with alcoholic potash and with alcoholic ammonia and dried, after which they manifested the same activity as previously. Alcohol, ether, chloroform, benzol and petroleum ether extracts of the powder were all acid in reaction, and left the residual material quite inactive; the carbon bisulphide extract was intensely yellow, and neutral to litmus, but also left the residue inactive. In water, on the other hand, the active principle was insoluble. As showing that the active principle had been taken up by these solvents it was found that a powder of chamomile flowers treated with an ethereal extract of insect powder acquired insecticidal properties. A solution obtained by shaking a petroleum ether extract with 70 per cent. alcohol left on evaporation a resinous oily mass that affected the mucous membrane of the mouth like extract of pyrethrum, but pyrethrum root was ascertained to exercise no lethal influence on moths.

Hydrocyanic Acid forming Elements in Plants.

It has long been known that in certain organs of particular plants a formation of hydrocyanic acid takes place due to the action of emulsin upon amygdalin in the presence of water. But it has been hitherto still an open question why a formation of the acid does not take place in the living plant, as, for instance, in the bitter almond, before or at maturity. To assist in clearing up this question, by determining the localisation of the principles upon which the formation of hydrocyanic acid depends, M. Guignard has submitted cherry laurel leaves and almonds to a thorough microscopical examination (*Compt. Rend.*, cx., 477). In the cherry-laurel leaf the emulsin was found to be contained in the special cells representing the endoderm of the vascular bundles of the leaf-nerves, as well as in the non-sclerified cells of the pericycle that occur sometimes isolated and sometimes combined with the endodermic sheath. In the young branches the localisation is similar, but the endodermic cells do not there form a sheath so continuous and distinctly defined in relation to the neighbouring tissues. In the almond the emulsin is contained in the pericycle in the central cylinder of the axile portion. In the cotyledonary bundles the case is the same, with the difference that there a small quantity is found also in the endoderm.

Fluoroform and Fluoral.

At a recent meeting of the Paris Chemical Society a communication from M. Meslans was read, announcing the isolation of fluoroform (CHF_3), the fluorine analogue of chloroform (*Nature*, April 3, p. 521). It was obtained, as the end product of a reaction between silver fluoride and iodoform, in the form of a gas which dissolved readily in chloroform or alcohol, but was only very slightly absorbed by water. By the action of potash solution fluoroform was decomposed into fluoride and formate of potassium. Fluoroform was also obtained by the action of silver fluoride upon chloroform and upon bromoform. In another communication Messrs. Guenez and Meslans stated that by the action of silver fluoride upon chloral they had obtained fluoral ($CF_3 \cdot CHO$), as a gas dissolving to only a very slight extent in water, but absorbed by aqueous or alcoholic potash, with formation of formate and fluoride of potassium.

Pyrrol as a Test for Essential Oils.

A dilute alcoholic solution of pyrrol, which is a delicate test for lignin, constitutes also, according to Professor Ihl, a delicate test for all essential oils containing derivatives of allylbenzol ($C_6H_5 - C_3H_5$), for instance, cinnamic acid, eugenol, safrol, and anethol. When added, with concentrated hydrochloric acid, to a very dilute alcoholic solution of cinnamon oil, it gives a yellow red colour, rapidly becoming dark red, and finally throws down a dark coloured precipitate.

Dilute solutions of clove oil, pimento oil and tarragon oil, upon being treated similarly, give a splendid carmine red colour; one of sassafras oil a beautiful rose red; fennel oil only gives the reaction faintly, and anise and star-anise oils give only a yellowish colour.

Damarium, a New Gasiform Element.

The *Chemiker Zeitung* (April 2, p. 485) contains a rather extraordinary account of the discovery in Damara Land of a new gasiform element, to which the name "damarium" has been given. The gas is said to be evolved from some funnel-like depressions in an elevated plateau, to which the attention of an exploring party was directed by the remarkable appearance of the surrounding soil. In the immediate neighbourhood of the fumaroles the colour of the soil was greenish grey, whilst further off it showed the red of ferric oxide. No vegetation existed near, but on the edges and sides of the depressions were a number of bodies of small animals, and especially of insects, the colours of which had undergone alteration. The grey and fawn colour of the antelope skin had become greenish white or greenish brown, with a distinct shade of violet, while the red, blue and yellow feathers of birds showed quite a butterfly green, white and amber colour. A leafy branch left in the neighbourhood quickly lost its green colour and became blue violet, while the indigo blue blouses worn by the men were perceptibly bleached in the course of twenty minutes. Some of the gas was filled into bottles and sent to Dr. P. Antsch, of Cape Town, who came to the conclusion that it contains a new elementary gaseous substance, half the weight of hydrogen and possessing enormous reducing powers. He states that on passing some of it through water there was an immediate evolution of hydrogen and a formation on the surface of the water of a colourless, odourless, neutral, mobile, strongly refracting liquid, which he considers to be an oxide of the new element. Upon adding a granule of zinc to this liquid a colourless gas was given off energetically, having a faint musk-like odour, burning with a pale greenish flame and forming an explosive mixture with oxygen. Upon submitting some of the liquid to electrolysis pure oxygen was given off at the positive pole amounting in volume to one-fourth of that of a gas given off at the negative pole, the specific gravity of which is stated as 0·5 ($H=1$). Dr. Antsch therefore thinks he is justified in representing this oxide by the formula D_4O. As instances of the remarkable reducing powers of "damarium" Dr. Antsch says that it immediately liberates metal from solutions of salts of platinum, gold, silver, lead and copper; separates sulphur from aqueous solution of sulphurous oxide and sulphuretted hydrogen from dilute sulphuric acid; reduces ferric salts immediately to the ferrous condition and separates calomel from solution of sublimate; decolorizes indigo blue and converts nitrobenzol into aniline. A measured quantity of carbonic dioxide allowed to stand over mercury a few days with an equal quantity of the fumarole gas is said to have caused not a trace of turbidity in passing through baryta water, having all been converted into monoxide. Dr. Antsch thinks it probable that besides damarium and its oxide the fumarole gas contains hydrogen, carbonic oxide, nitrogen and hydrocarbons. A great many other details are given, but, these notwithstanding, and indeed in consequence of some of them, the whole story has a somewhat romantic air.

Curare.

Dr. Joseph Tillie, Assistant to the Professor of Materia Medica in the University of Edinburgh, has recently published in the *Journal of Anatomy and Physiology* "A Contribution to the Pharmacology of Curare and its Alkaloids," which seems to throw more light upon the action of this drug. Somewhat divergent, or even contrary statements, have been previously published by various writers concerning the action of curare, some maintaining that it paralyses the sensory nerves and spinal cord, and others that it does not, the majority of authorities agreeing that it has no stimulant or tetanic action on the spinal cord. Dr. Tillie, however, by a series of careful experiments, proves that it does possess in large doses a tetanizing action which is quickly manifested if the alkaloid be injected directly into the aorta or applied directly to the spinal cord. Owing, however, to the effect of curarine on the circulation, the part of the dose which does reach the cord is generally either insufficient to produce tetanus, or it reaches it too late to overcome the weakness produced by the want of oxygenated blood. As neither strychnine nor brucine have been detected in curare, Dr. Tillie attributes both the paralysing and tetanizing action of the drug to curarine. That the tetanizing action of curare is due to the species of strychnos employed in its preparation, and not to picrotoxin or other principles derived from the various plants sometimes used with species of strychnos in the manufacture of curare, is proved by the fact that a genuine specimen of the bark of *Strychnos toxifera*, supplied from the Museum of the Pharmaceutical Society, Bloomsbury Square, gave the same symptoms. The bark, the crude alkaloid and the arrow poison have all been proved by Dr. Tillie to produce paralysis by a peripheral and tetanus by a central action. The suggestions by Gubler and Bartholow that methylstrychnine is formed in the process of preparing curare, is not considered probable, since no such body has been detected; its chemical characters are not those of curarine, and the latter alkaloid has 85 times the paralysing activity of methylstrychnine sulphate. It appears, therefore, that when the difficulties besetting the examination of the action of curare on the spinal cord are avoided, curare produces tetanus just like strychnine. The two alkaloids, according to Dr. Tillie, have a converse action, small doses of curare paralysing the motor nerves and small doses of strychnine producing tetanus, large doses of either alkaloid showing both actions in protected frogs. These results, however, do not seem to preclude the possibility of the occurrence of two alkaloids, the one having a paralysing and the other a tetanising action (as in calabar bean), in the bark of *Strychnos toxifera* and other species used in the preparation of curare. The chemistry of curarine and the changes that may take place in the natural alkaloid by heat or other agents has yet to be investigated, and this can only be done when a good supply of the bark of a given species has been obtained.

Dr. Cripps Lawrence in the *Lancet* (April 12, p. 824), directs attention to the uncertainty of the action of *Cannabis indica*, which is attributed to

Cannabis Indica. variation in the plant. He points out the necessity of care as to dose at the onset, and if this be done he considers it a valuable sedative and hypnotic in cases of renal disease, senile chorea and paralysis agitans, menorrhagia, migraine, persistent headache and allied conditions. He expresses the hope that the important field for research in reference to the component alkaloids existing in *Cannabis indica* may be ere long opened up by analytical chemistry. This would probably be best done in India, where the active forms of the plant could be examined at regular intervals during growth.

Natal Botanic Gardens. The allspice tree, according to the Report on the Natal Botanic Gardens, thrives well there, and plants can be reared in quantity if desired. Some fruit was sent to the Durban Exhibition in 1884, and was highly commended, so that there is a possibility of Jamaica not being the only source of this spice in future years. The East African copal tree, *Trachylobium Hornemanni*, grows well in the poorest sandy soil, and seems adapted for the coast districts. The *Cinnamomum Cassia*, which was sent from Hongkong by Mr. C. Ford, does not do well at Durban, but two plants have grown well at Maritzburg, and withstood the frost for four years. Coca also succeeds well in Natal. The Socotrine aloe (*Aloe Perryi*), of which one plant alone is left, is still alive and healthy, but does not show any signs of offsets, and there is little hope of propagating it until it is old enough to produce seeds. The plants received from Aden, through ignorance of their requirements, were packed too wet and well watered during the voyage, so that all but one died. Umundi root (*Chlorocodon Whitei*), which has a flavour like Hemidesmus, and is used as a remedy for catarrh by the natives, is being cultivated with the view of having it tried in England for the manufacture of an aerated beverage akin to ginger beer.

The Leaves of Grasses. To an ordinary observer, grass is grass, but in a little book recently published under the title of 'How to Know Grasses by their Leaves,' Mr. McAlpine has shown that at least two hundred different kinds may be identified by their leaves. He divides them into groups by the colour of their stem base, by the bulbous character of the same part, by the character of the leaf-sheath, whether cylindrical or sharp-edged, by the bitter taste of the leaves, and by the presence of hairs, ribs or lines on the laminæ, etc. There can be little doubt that a book of this kind would be most useful in encouraging the habit of careful observation in which so many students are deficient.

Action of Poisons on Sponge. In a paper by Lendenfeld (*Biologisches Centralblatt*, April 1, p. 102) the action of various nerve poisons on sponges is described. He finds that curare, strychnine and cocaine act on living sponges in much the same way as on higher animals, curare relaxing the sphincter muscles surrounding the pores in the external surface, strychnine causing a sharp contraction, and cocaine rendering them less sensible to irritants. He believes, therefore, that the cells which act as muscles are in relation with others that act as sensory nerves, which are in the first place affected and communicate their irritability to the muscle cells.

The Pharmaceutical Journal.

SATURDAY, MAY 3, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SALE OF POISONS.

THE judgment delivered by Mr. Justice HAWKINS last Tuesday, in the appeal against the decision of Judge HOLROYD, will mark an epoch in the history of pharmaceutical affairs and will give to the Pharmacy Act of 1868 a practical value that has hitherto been wanting. There can be no doubt that the original idea of the founders of the Pharmaceutical Society was that every individual engaged in the business otherwise than as an apprentice or pupil should possess a qualification. Under the voluntary system which prevailed prior to 1868 there was the Major qualification for the principal or owner of a business and also the Minor qualification for his assistant, and that arrangement was quite in accord with the practice obtaining in other countries where the exercise of pharmacy is properly regulated. But the legislation of 1868 involved a compromise of the principles of the Society for the satisfaction of its opponents, which had the effect of driving into the background the idea of personal qualification being requisite for both principals and assistants. The single qualification having been admitted as legally sufficient to entitle a person to keep open shop for dispensing and selling poisons, the equally necessary qualification of assistants, to whom the principals' duties were sometimes delegated, was lost sight of in practice, and for more than twenty years the necessity of it has been to a considerable extent disregarded. This result, amounting in fact to a partial abandonment of the principle set forth in the preamble to the Act of 1852, that persons exercising the business of pharmaceutical chemists should possess a competent practical knowledge, ascertained and certified by examination, may be regarded as one of the misfortunes consequent upon the compromise effected in 1868. It is the more to be regretted, since the main object with which that compromise was entered into, viz., that of uniting the entire trade in one body, has never yet been realized, though every registered individual thereby acquired a position of equality in the eye of the law. It has been thought that the Act of 1868 was the greatest advance that has been made in pharmacy. That it established the possibility of such an advance there can be no question, but it may be taken as equally certain that the possibility has not been fully turned to good account. The right to sell poisons and to dispense medicines containing poison, which was made the exclusive privilege of registered persons, has not been strictly maintained by those upon whom it was conferred, and many, instead of protecting their interest in this respect, have been in the habit of delegating their privilege and their responsibility to unqualified assistants, and even to apprentices, without exercising any direct personal supervision of the work so done. In some instances, no doubt, this has been done involuntarily or without due consideration, and with many persons it may have been thought the only requirement of the Act of 1868 was that of qualification of the proprietor of a business.

But, however this may have been, the interpretation now put upon the Pharmacy Act by the judgment just delivered will necessitate an entire alteration of the practice that has in some instances been followed in regard to the sale and dispensing of poisons. It is held that the handing over the counter of a poison or a mixture containing a scheduled poison is a sale by the individual who hands over the article, and that such a sale can only be made lawfully by a registered person, or under such immediate personal supervision of a legally qualified person as will admit of his being deemed the seller. It would be useless in the face of so decided a judgment as this to talk of what may be conceived to have been the intention of the Act. No amount of argument will suffice to establish the contention that the Act, both in its spirit and letter, regards the master as the seller. That view of the matter was strongly urged by the Counsel for the appellant. He contended that it would not be unlawful for an unqualified assistant to a duly registered chemist to sell poisons in his master's shop in the ordinary course of business; that the sale would be made by him merely in discharge of his duty as a servant, and that the master would be in fact and in law the seller. The reply to this argument was most emphatic in its refutation. In the mind of the judges the chief object of the Act is, over and above all other considerations, to provide for the safety of the public, and to guard as far as possible all members of the community from danger attending the sale of poisons. If it were to be admitted that an unqualified assistant, possibly unacquainted with the baneful properties of poisons, could, in the absence of his master, and without his direct personal supervision, perform an act which the law declares shall only be performed by a duly registered person the object of the Legislature would be defeated. If it were to be admitted that the qualification of the master protected an unqualified assistant from being amenable to the law the chief object of the Pharmacy Act would be frittered away, and as regards the protection of the public, it would become a dead letter. This is the view held by the judges and to our minds it appears unanswerable from every point of view. But there is, nevertheless, no necessity for inferring, as has been done, that this interpretation of the law will render it impossible for some chemists to carry on their business or to instruct their apprentices. Sales of poison and the dispensing of medicines containing poison may be conducted by assistants, or even by competent apprentices; but every act of that kind must be performed under the personal supervision of the principal or of a registered assistant to whom the master can lawfully delegate that duty. And it was very specifically stated what was to be understood by personal supervision. Mere presence in the shop or room where the sale takes place would not suffice to satisfy what are held to be the requirements of the Act; but actual participation in the act of sale is meant, so that the master may see that each individual sale of poison shall be so guarded round by the precautions prescribed by the Act, that the safety of the public may be secured as far as the law can accomplish that object. This view of the matter does not detract from the importance of the master's qualification, but it imposes upon him the obligation of a strict performance of the duties attached to it. The argument that a chemist would not be likely in his own interest to entrust the sale of poison to an assistant who was not competent to conduct such sales properly met with as little recognition from the judges. They considered that such latitude should not be allowed, and that on the contrary the express intention of the Legislature was to provide against it by insisting that every person who sells poison, whether on his own account or for any other person, should possess one uniform qualification, viz., registration under the Act, based on a certificate of proper skill and knowledge, granted after examination by examiners carefully selected and appointed for that purpose.

As a verbatim report of this important judgment is published in this number of the Journal, it will be unnecessary to consider at greater length the other points referred to. Some of them are sufficiently serious in their import to command careful consideration, but they all point to the desirability of exercising great care in the strict observance of the provisions of the Act as to the sale of poisons. That is the only ground upon which a trade restriction has been accorded to the chemist, and as we have remarked in a previous article on this subject, it would be well as a matter of trade interest that the provisions of the Pharmacy Act in that respect should be scrupulously observed by those who have the right to deal in poisons. The judgment delivered in this case may, in fact, be regarded as a measure of protection to the interests of registered persons. It has been said that it will have the effect of throwing out of employment many assistants who have long been engaged in the business, but have not become registered. We cannot appreciate the force of this objection. In the first place it would appear that if men in that position are really competent and efficient assistants it would not be a very difficult matter for them to obtain the qualification the law requires. But in any case it should be remembered that from the chemist's point of view it was for the protection of the interests of registered persons that the Act was passed, and in that sense its provisions ought to be upheld by them. For those assistants who are registered the effect of the judgment will certainly be beneficial, and they may be congratulated on the fact that the judgment fully endorses the opinion expressed in the resolution passed by the Chemists' Assistants' Association that no sale of poison should take place except under the personal supervision of a registered chemist. We trust that generally the judgment will tend to promote a regard for the value of personal qualification, and that although it may entail upon some persons a certain amount of inconvenience, in the requisite alteration of their business arrangements, it will soon be found, on reflection, to be beneficial in its influence rather than the reverse.

CONVERSAZIONE.

WE are requested to direct the attention of our readers to the notification which appears in the advertisement pages of this week's Journal that a Conversazione will be held in the Society's House, 17, Bloomsbury Square, on Tuesday, the 20th of May, at half-past eight o'clock, when the President, Vice-President and Council request the honour of the company of the Members, Associates and Apprentices of the Society. Ladies are also invited, and it is proposed that in addition to selections of vocal and instrumental music there should be an exhibition of articles of scientific interest. As this gathering will take place on the evening before the Annual General Meeting, it will afford an opportunity for the country members and associates who attend that meeting to discuss pharmaceutical matters with friends from other parts, and there is reason to believe that the accommodation the Society's new premises will provide will be the means of rendering the Conversazione as enjoyable as those which were so popular at South Kensington.

We understand that Mr. Gulliver, the divisional Secretary for the district of St. George's, Hanover Square, has held a meeting of the chemists in his district for the purpose of discussing the provisions of the Pharmacy Act which was to have been introduced into Parliament this session. Each clause of the Bill was considered and unanimously approved of, a resolution to that effect being passed. With the view of obtaining a general expression of opinion in regard to the Bill, we would suggest that the course taken by Mr. Gulliver should be adopted by the other Divisional Secretaries in the metropolitan districts, and also by each of the local Secretaries of the Society throughout the country. We may take this opportunity of mentioning that notwithstanding our invitation to those who believe that the trade interests of chemists can be better cared for than has been done hitherto, we have not received a single communication stating what trade interests require greater protection and what practical means can be adopted with such an object. One is almost tempted to ask whether there may not be in this instance some analogy to the case of Canning's needy knife-grinder, whose only reply to a sympathetic inquirer as to his presumed wrongs was, "Story! Bless you, sir, I have none to tell."

*   *   *

The Customs and Inland Revenue Bill, in which the financial proposals of the Chancellor of the Exchequer are formulated, contains some proposed alterations in the law relating to methylated spirit. The existing provision that the substance mixed with spirit for the purpose of methylation must be wood naphtha, or methylic alcohol, or some other approved "substance," is extended so as to include "combination of substances," and the term "methylated spirit" is now defined as meaning "spirit mixed with any substance or combination of substances approved for the purpose of methylation by the Commissioners." Another provision allows an authorized methylator to supply methylated spirit in vessels containing not less than a quart, provided that the quantity supplied to any one person at a time is not less than five gallons. A third provision stipulates that a retailer of methylated spirit must not sell methylated spirit in a less quantity than a reputed quart; also, if he holds a licence to deal in or retail spirits, and has not been authorised by the Commissioners to use methylated spirit in any art or manufacture, he must not receive or have in his possession or sell methylated spirit otherwise than in vessels containing not less than a reputed quart. Lastly, it is provided that in any mixture of methylated spirit with gum resin the quantity of gum resin shall not be less than three ounces in every gallon of the mixture.

*   *   *

We desire to acknowledge having received from Dr. Squibb, of Brooklyn, a number of his *Ephemeris*, in which he deals with various subjects connected with the approaching Revision of the United States Pharmacopœia, and gives some interesting information respecting the methods by which the article known as "Boston Opium" is manufactured and supplied under the attractive title of standardized opium, to meet the requirements of all purchasers in regard to price. He suggests that opium should always be bought on the basis of actual analysis.

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As another instance of magisterial honours conferred upon pharmacists, we learn that Mr. John Harrison, of Sunderland, has been appointed a Commissioner of the Peace for that borough.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

April 16, 17, 18, 23, 24 *and* 25, 1890.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Davies, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was present on the 16th, 17th, and 25th on behalf of the Privy Council.

MAJOR EXAMINATION.

16*th.*—*Four* candidates were examined. *One* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Barclay John	Birmingham.
Jenson, Alexander Benjamin	Birmingham.
Wyatt, William	Mansfield.

17*th.*—*Four* candidates were examined. *Two* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Everett, John Garwood	Ipswich.
Le Cudennec, Louis Edouard	Mauritius.

18*th.*—*Five* candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Boucher, Charles Ernest	Bristol.
Maxwell, Thomas Wellwood	Montrose.
Morrow, Charles	Hornsea.
Mundy, Alfred Jones	London.
Roberts, Robert	Llangynider.

23*rd.*—*Three* candidates were examined. *Two* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Symes, Charles Frederick	Liverpool.

24*th.*—*Three* candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Pilkington, William	Buxton.
Umney, John Charles	Sydenham.
Westmacott, George Leonard	Manchester.

MINOR EXAMINATION.

16*th.* — *Thirty-two* candidates were examined. *Eighteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Abrines, Gustave A.	London.
Adams, Arthur Edward	Cleobury Mortimer.
Agar, Thomas William	Kennington.
Allison, Henry	Birmingham.
Black, Albert Edward	Newport, I.W.
Blakemore, John Bowen	Oakengates.
Blore, George James	Uttoxeter.
Booth, Charles Henry	Colchester.
Bray, Frederick Richard	Horncastle.
Carter, Samuel	Newlyn.
Cave, Geo. Edwin Osborne	Bowdon.
Chell, Frederick	Buxton.
Coates, Thomas Henry	Chesterfield.
Shepheard, W. Fredk. John	Chester.

17*th.*—*Thirty-one* candidates were examined. *Nineteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Burton, Percy Herbert	London.
Cranston, Ernest Haughton	Hemel Hempstead.
Dodd, Henry Vincent	Slough.
Ellis, Ernest Frederick	Topsham.
Fairburn, Henry	Hutton Bonville.
Ferguson, John Eustace	Birmingham.
Fitt, Cyril H. Christian	Norwich.
Francis, John	Llandilo.
Furnival, Charles Edward	Leicester.
Gay, Valentine Henry	London.
Gedge, Augustus Westly	Bristol.
Glasspool, Herbert George	Landport.

18*th.* — *Thirty-one* candidates were examined. *Twenty-two* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Handley, Hugh	Wisbech.
Harper, James Eder	Oldbury.
Haslitt, Harry Haworth	Bury.
Henshall, Harry	Lymm.
Hutchins, Edward Coxhead	Bath.
Kay, Charles William	Leeds.
Kemp, Cecil Tabor	Bournemouth.
Metcalfe, Henry Theodore	Tickhill.
Williams, Arthur Harold	Chester.

23*rd.* — *Thirty-three* candidates were examined. *Eighteen* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Evans, Robert Nanney	Carnarvon.
Langley, John Inman	London.
Lawton, Tom	Bournemouth.
McHugh, Arthur Henry	Castleford.
Marshall, Rupert Henry	Walsall.
Mitchell, Walter Stuart	Gloucester.
Moore, Leopold Frank	Leicester.
Morley, Charles	Beverley.
Morris, Caleb Gwion	St. Clears.
Moulson, James Ogilvie	Bradford.
Nash, Albert Hardstaff	Sleaford.
Norris, William	Pembroke.
Nurthen, Frederick William	London.
Orry, John George	East Kirkby.
Pass, William Hall	Macclesfield.

24*th.*—*Thirty-one* candidates were examined. *Fifteen* failed. The undermentioned *sixteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Coulter, Charles	Walthamstow.
Evans, William James	New Quay.
Miller, Richard	Preston.
Pitt, Charles Day	London.
Quarmby, Thomas William	Market Drayton.
Raper, Edward	London.
Riding, William John	Ormskirk.
Rogers, Charles Henry	Ipswich.
Scott, James Hugill	Penrith.
Sewell, James Walker	Darlington.
Sherlock, Edward Birchall	St. Helens.
Short, George Dudley	Ryde.
Silversides, Rhd. Benj. Garbutt	Darlington.
Skinner, Gedwin John	Seaton.
Smith, Stanley	Truro.
Thomas, William John	Dorrington.

25*th.*—*Thirty six* candidates were examined. *Twenty-one* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Harding, Henry James Cooper	Sudbury.
Holland, William	Spalding.
Strickland, Ernest Frank	Cardiff.
Stubbins, Henry	Brigg.
Taylor, Herbert Henry	Rugby.
Thornhill, Ernest	Brighton.
Thursfield, Bevington	Kettering.
Townsend, John Frederic	Bristol.
Vinden, Frederick William	London.
Waind, Walter Harry	Kirby Moorside.
West, Cecil Maxe	Ketford.
Wilson, Edward Arthur	London
Wippell, Alice Mary	Perth.
Wood, Fred	Ely.
Woodward, James Henry	Spalding.

PRELIMINARY EXAMINATION.

25th.—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Baugh, John Wm. Mahanoora	Boston.
Eccles, William Henry	Barrow-in-Furness.
Gelling, William Clucas	Douglas.
Henry, Eugene	Lewisham.
McKellar, Arthur	Pollokshields.
Montgomery, James S.	Glasgow.
Neale, Denys William	Small Heath.
Potter, Henry	Peckham.
Ryley, Ernest Frederick	Wolverhampton.
Stamp, Charles Ernest	Hampstead.
Udale, George William	Cheadle.
Williams, John	Corwen.
Yeo, John Henry	Berry Pomeroy.

The Report of the College of Preceptors on the Examination held on April 8 was received.

Three hundred and eighty-one candidates had presented themselves for examination, of whom *two hundred and twenty-one* had failed.

The following *one hundred and sixty* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Adams, Edwin Crimp	Kingsbridge.
Anning, George Paul	Leeds.
Archer, Samuel	Hinckley.
Arnott, Harriet Arnott	London.
Atherton, William	Crewe.
Barnes, Charles James Russell	Grantham.
Barron, Robert	Turriff.
Barrow, John Robert	Newcastle-on-Tyne.
Beanland, Sam Percival G.	Bradford.
Beatton, Peter Samuel	Port Glasgow.
Bell, John Rowell	Newcastle-on-Tyne.
Benney, Herbert	Constantine.
Binks, John Durham	Rotherham.
Blades, Albert Ernest	Derby.
Blake, Henry	London.
Bowness, Samuel Wesley	Ambleside.
Bradford, James	Edinburgh.
Bradshaw, James Ernest	Adlington.
Bransby, John Ransome	Manchester.
Bromley, Albert William	Hull.
Bryant, Nicholas Jno. Andrew	Truro.
Buckley, Charles William	Derby.
Cameron, Robert	Crieff.
Campkin, Francis Sidney	Cambridge.
Cariss, William	York.
Carter, George	West Hartlepool.
Chapman, Alexr. Sterling Brice	Rothes.
Chase, Henry John	London.
Cocks, James Dingle	Walsall.
Cornfoot, Thomas Boots	Faversham.
Cox, Edward Watson	Leicester.
Crawford, George	Arbroath.
Criswell, Frederick Charles	St. Ives, Hunts.
Crowthers, William	Willington Quay.
Cruickshank, William	Edinburgh.
Culshaw, John	Ormskirk.
Darroll, John Walter	Warminster.
Davies, Lewis John Arthur	Swansea.
Dickinson, William	Preston.
Dickson, David	Salford.
Dix, Henry Walter	Newport, Mon.
Dixon, William	Kendal.
Douglas, Robert Donald	Falkirk.
Duncan, Alexander	Dundee.
Edge, William Drakeford	Newcastle, Staffs.
Elbourne, Ernest Gilbert	Liverpool.
Ellis, Frederick John	Chester.
Ellis, Oswald Malcolm	London.
Evans, Thomas James	Twickenham.
Evans, William Morris	Portmadoc.
Eyres, John Ernest	Southsea.
Falkner, Sandbrook	Leominster.
Fernie, James	Dundee.
Fisher, George Howard	Narberth.
Fletcher, John Guthrie	North Shields.
Forge, George Bainton	Forest Hill.
French, Thomas	Clevedon.
Fynn, Robert Hudson	Cambridge.
Gibson, William Beverley	London.
Gittins, Samuel Ernest	Oswestry.
Goodbrand, John	Buckie.
Gray, Andrew, junr.	Edinburgh.
Gwillim, John	Pontrilas.
Hadfield, Albert Edward	Stalybridge.
Handley, Arthur	Boston.
Harrison, William Killey	Peel Causeway.
Hartnup, John	Ash-next-Sandwich.
Harvey, John	Constantine.
Heap, Thomas Henry	Burnley.
Helsby, Fred	Sheffield.
Herbert, James Henry	Crickhowell.
Hicks, Fred Joel	Camborne.
Hollow, Daniel	St. Ives, Cornwall.
Holroyd, James	Ashton-under-Lyne.
Houghton, Alfred Ernest	Slough.
Hughes, Ernest James	Southport.
Jackson, Joseph Gilbert	Sheffield.
Jenkins, Evans Jones	London.
Jenkins, Thomas Henry	St. Davids.
Johnstone, Robert Ross	Cromarty.
Jones, John Richard	Aberystwith.
Jones, Stephen	London.
Jones, Thomas	Llandovery.
Jowett, Hugh Hamilton	Aylesbury.
Kemp, William	Belfast.
Kerruish, J. M.	Douglas.
Kilner, Clarence Montague	Ashton-under-Lyne.
King, Frank Herbert	London.
Knowles, George	Todmorden.
Laidlaw, James	Jedburgh.
Lester, William Henry	Nuneaton.
Lightfoot, Charles A.	Newcastle-on-Tyne.
Linklater, Peter	Edinburgh.
Long, James Ernest	Bath.
McKay, James	Aberdeen.
McKenzie, Alexander	Edinburgh.
Maunder, William Henry	Teignmouth.
Meyler, Thomas	Fishguard.
Mitchell, David	Broxburn.
Moran, William Grace	Glossop.
Morgan, David King	Carmarthen.
Morgan, Edwin	Pontypridd.
Morrey, George	Market Drayton.
Morris, Bertram Locker	Newcastle, Staffs.
Morris, David Henry	Carmarthen.
Newlove, James Robert	Malton.
Orrell, William Pilling	Ashton-upon-Ribble
Parker, William	Derby.
Peebles, David	Kirkcaldy.
Phillips, William Howard	Abergavenny.
Pilcher, Daniel Garnet	Margate.
Pirie, Joseph Mather	Arbroath.
Pitt, George M. Farquharson	Bristol.
Polgreen, Cyril	Plymouth.
Power, Thomas Joseph	Spital Tongues.
Prescott, John	Butterwick.
Priestley, Dawson Smith	Bradford.
Pring, William Wallace	Bromyard.
Proctor, Walter Bradbury	Birmingham.
Rainey, Robert Martin	Leeds.
Richards, Thomas J. White	Stony Stratford.
Rigby, Walter	Barnsley.
Robertson, David	Edinburgh.
Robey, George Robert	Lowestoft.
Ross, James Daniel	Edinburgh.
Rowan, William	Creetown.

Rowland, Sidney Comberbach	Wrexham.
Scobie, Lawrence	Falkirk.
Scotchburn, Alfred	Driffield.
Scurlock, David	Carmarthen.
Seward, Frederick George	Cheltenham.
Shearer, Robert Munro	Pollockshaws.
Shearman, John Samuel	Cambridge.
Sheed, William	Fraserburgh.
Simon, David Ap	Carmarthen.
Simpson, Willie Weightman	Louth.
Sinclair, John Gordon	Aberdeen.
Smeeton, Ernest Edward	Leeds.
Smith, Charles	Llandudno.
Smith, Henry Ewing	Edinburgh.
Stott, James	Edinburgh.
Stow, Norman Vincent	Castle Northwich.
Sudlow, Thomas Wilson	Stockton-on-Tees.
Symes, Montague Frank	Alresford.
Tilson, Annie Elizabeth	Long Sutton.
Tully, Fred. Herman	Ashburton.
Tupman, Herbert Wyke	Teignmouth.
Turner, Alfred William	Lydney.
Vergette, George Lucas	Lincoln.
Vessey, George Nicholas	Torquay.
Walbank, Arthur	Haworth.
Walker, John Frederick	Bradford.
Walters, John	Llanboidy.
Warren, Edwin James	Paignton.
Whipp, William	Skipton.
Whitby, Arthur	Birmingham.
White, David	Leith.
Whyte, Hilson	Brechin.
Williams, Frederick Lemuel	London.
Wood, Alfred	Bury.

The questions set at this examination were published in the *Pharmaceutical Journal* for April 12, p. 840.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Exam-ined.	Passed.	Failed.		Exam-ined.	Passed.	Failed.
Aberdeen	10	5	5	Lancaster	9	4	5
Birmingham	12	6	6	Leeds	19	9	10
Brighton	3	0	3	Lincoln	9	4	5
Bristol	12	4	8	Liverpool	12	6	6
Cambridge	7	4	3	London	42	14	28
Canterbury	4	2	2	Manchester	33	13	20
Cardiff	10	6	4	Newcastle-on-T.	15	7	8
Carlisle	5	0	5	Northampton	4	1	3
Carmarthen	12	10	2	Norwich	6	1	5
Carnarvon	6	2	4	Nottingham	13	4	9
Cheltenham	4	2	2	Oxford	2	0	2
Darlington	4	1	3	Peterborough	4	2	2
Douglas	1	1	0	Sheffield	8	3	5
Dundee	15	6	9	Shrewsbury	5	3	2
Edinburgh	33	15	18	Southampton	9	2	7
Exeter	15	7	8	Truro	8	5	3
Glasgow	16	5	11	Worcester	1	1	0
Hull	6	3	3	York	6	2	4
Jersey	1	0	1				

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association held on Thursday, April 17, the President, Mr. T. A. Ellwood, in the chair, a paper was read on—

MATERIA MEDICA PROBLEMS.

BY E. M. HOLMES, F.L.S.

The change that has taken place during the last forty years in the signification of the term materia medica renders necessary an explanation of the sense in which it is here employed. In the time of Dr. Pereira it included all that botany, zoology, chemistry, microscopy and the practice of medicine could reveal concerning the materials used in medicine, as well as some of the information acquired through the art of pharmacy in making preparations from crude drugs.

During the last few years the immense increase of knowledge has led, as it inevitably must in all branches of science, to differentiation. The medical profession, seeking to save time for the study of the subjects of the greatest importance in the healing art, has gradually attached less and less weight to the study of botany and materia medica as branches of medical education, with the exception of the therapeutical side of materia medica. This section has been largely developed, so that at the present time the term materia medica has become applied in universities and medical schools in Great Britain almost exclusively to therapeutics, and a professor or examiner in materia medica is *de facto* a professor or examiner in therapeutics.

On the continent the microscopical study of drugs has been as much developed as it has been neglected in this country, and the minute structure of most of those in ordinary use has been carefully made out and illustrated by Berg, Moeller, Vogl, Herlandt and Godfrin and Noel and others. The study of drugs from this standpoint has received the appropriate name of pharmacognosy, whilst the branches of materia medica relating to their physiological action and employment as therapeutical agents has been termed pharmacology.

Owing also to the vast strides that have been made in chemistry during the last twenty-five years, many of the bodies formerly known only as occurring in drugs have been prepared artificially, and have been shown to belong to groups of carbon compounds that have now been largely worked out. Such bodies are therefore now relegated to chemistry and are dealt with under that subject. Botany also has received a strong impetus from the biological side, and the life history of plants has been more closely studied. This study has led to the discovery of agents either occurring in plants as natural constituents, like papain, diastase, emulsin, myrosin, etc., or external to them, such as *Saccharomyces*, bacteria, etc., by which chemical changes in plants or plant products are brought about. New methods of investigation by means of microchemical re-agents have also been introduced. For this reason the comparatively small amount of botanical knowledge formerly thought necessary for the equipment of the pharmacist has been considerably extended, and botany in its modern sense is now taught as a distinct subject.

It is probably this differentiation of subjects which were at first intimately connected with or formed an integral part of materia medica that has led persons ignorant of pharmacognosy to say, "When chemistry and botany are taken from materia medica, what is there left?" It would be hardly less reasonable to ask, "When mathematics and physics are taken from astronomy, what remains?" Hardly any branch of science can be carried on without the aid of other branches.

The impossibility of taking chemistry out of materia medica is evident from the fact that many of the chemical bodies obtained from plants have not been studied further than the mode of extracting them, and their exact place in chemical classification is still undetermined; as for instance, the active principles of Indian hemp, ergot, lobelia, and many others. New articles of materia medica are constantly being introduced, and the chemistry of materia medica can therefore never be entirely eliminated from it. Botany also cannot be entirely taken from materia medica, since the latter represents an amount of detail, that could not be included in an ordinary botanical course. Thus botany may teach the general morphology and structure of a typical solanaceous plant, but it does not enable the botanist to indicate the differences of structure that will be present in any given species, nor will the science of the chemist enable him to point out what chemical difference will exist in the constituents of any plant which has not been examined. An analytical chemist may be very high up in his profession, and yet be unable to accurately discriminate between one crude drug and another, and a botanist who has not paid special attention to the structure of drugs would not be prepared to say whether a given fragment of a leaf were that of Stramonium, Henbane, or Belladonna; or whether another was *Conium* or *Chærophyllum*; or to distinguish between the leaf of Digitalis and *Inula Conyza*. The aid of the microscope, however, enables the student to ascertain with certainty whether or no he has a genuine drug or a substitution or an adulteration under his eye.

Pharmacognosy avails itself of the differences in drugs which chemistry and histology bring to light and utilizes them for ascertaining the identity of drugs and of determining their quality and freedom from adulteration, and thus, while dependent upon both botany and chemistry, yet forms a distinct branch of knowledge. Every drug has distinct peculiarities of its own which may be morphological, structural, histological or chemical, by which it may be distinguished from every other, and the study of these peculiarities, and the application of the facts thus obtained constitute the branch of knowledge formerly termed organic materia medica, but which is, I think, more appropriately termed pharmacognosy. It is in this sense that I use the term materia medica in the title of this paper.

During the time that it has been my privilege to teach this subject in the limited sense above indicated I have been struck with the very unsatisfactory state of our knowledge with regard to many articles of materia medica. In some the active principle has never been isolated, in others several different bodies have successively been stated to represent the activity of the drug, and in others, again, we are in total ignorance of the state of combination in which the active principle exists in the plant, and whether or no the natural compound possesses any advantage from a theoretical point of view over the commercial and official preparations. In the case of many essential oils we know very little of their composition and still less of the conditions under which they vary. Again our ignorance of a large class of amorphous bodies, possessed apparently of physiological action, is concealed under the term of "resinoid" applied to them.

It is with the aim of inciting some of the younger, and therefore more enthusiastic members of the craft, to clear away some of the obscurity that exists, that I have thought a brief notice of some of the still unsolved problems in pharmacognosy may prove useful. I am the more inclined to this belief, since I am frequently asked, as Curator of a rich museum of drugs, for subjects or objects of investigation by some of the more advanced students of pharmacy.

So much excellent work has already been done concerning coca, podophyllum, belladonna, caffeine, physostigma and cod liver oil, strophanthus, boldo, jaborandi, etc., that it may reasonably be expected that in the course of a few years the pharmacist will be in the position to determine not only the purity of all the alkaloids, but to estimate the alkaloidal strength of many more preparations than is at present the case, and that he may be able to supply chemically pure active principles so that the therapeutist may be able to indicate the particular preparation of the drug that will best suit his purpose. It has already been shown in the case of jaborandi, physostigma, etc., that active principles having a different physiological action are present in the same drug, and it remains for the pharmacist to eliminate the one or the other by the aid of his chemical knowledge, according to the desire of the prescriber.

I will now first direct your attention to some of the more powerful and to some of the more commonly used, and therefore more important articles of materia medica.

Aconite.—Notwithstanding the investigations that have been carried out by Groves, Duquesnel, Williams, Paul and Kingzett, Richards and others, there still remains so great a variation in the active principle of this drug, as supplied in commerce, that the preparation of one manufacturer is stated to be seventy times as strong as that of another, and German aconitine is said to be ten times less active than the crystalline alkaloid. There is no good chemical test known, by which this alkaloid can be detected in cases of poisoning, the physiological test being the only reliable one, and we are not yet in a position to say how far manipulation in the preparation of the alkaloid may affect its composition. With regard to the botany of the drug, the root as met with in commerce is generally of German or Japanese origin, the former being collected indiscriminately from plants which may vary as widely in properties as *A. heterophyllum* and *A. ferox*, and which certainly do vary as much as *A. Napellus* and *A. paniculatum*. The Japanese drug has been shown by Bartholow to contain an alkaloid having a physiological action very different from that of *A. Napellus*. The problem here, then, is how to obtain aconite root of as uniform strength as possible, how to ascertain the chemical purity of the alkaloid, and how to determine the alkaloidal strength of preparations of aconite.

Aloes.—It is a well-known fact that aloin does not represent the entire activity of the drug, and that its action is so uncertain that it has been omitted in the U.S.P. The causes of the absence of the crimson colour when true socotrine aloes is tested with nitric acid has not been made out, though possibly due to the oxidation products not yielding either aloetic or chrysammic acid.

Apomorphia.—The aqueous solution readily turns green on being warmed or exposed to the air and light, but the body to which this coloration is due does not appear to have been examined.

Belladonna.—A great deal has already been done to elucidate the chemistry of this plant by Ladenburg, Schmidt, Will and Bredig, Dunstan and Ransom, Gerrard and others, yet it cannot be said decidedly at the present time whether or no atropine and hyoscyamine are both present as natural constituents of the plant. A ready means of ascertaining if the hyoscyamine of commerce be that article, or atropine, or hyoscine, also still appears desirable.

Cannabis Indica.—The number of bodies that have been extracted from this plant and described as its active principle is almost as great as in the case of ergot, yet none of them seem to represent the activity of the drug so well as the purified resin. A definite chemical body which can reasonably be claimed to be the active principle, has yet to be determined. When this has been done it would not be surprising to find the use of Indian hemp largely extended. At present the crude drug varies exceedingly in strength according to the climatic conditions under which the plant has been grown.

Curare.—The active principle of this drug has hitherto been obtained only in an impure state, but the bark of one of the principal plants used in its preparation, viz., *Strychnos toxifera*, has recently undergone investigation in Edinburgh.

Colchicum.—The chemistry of this important drug also requires further elucidation.

Croton Oil.—The drastic principle of this oil yet remains to be isolated, and the nature of the vesicating principle, although stated to be easily separated by alcohol, has yet to be made out.

Ergot.—The only really satisfactory preparation of ergot at present in use is the fluid extract known as "Bonjean's ergotine." Neither sclerotic acid, ergotinine, nor any of the numerous bodies described as the active principle of ergot, appear to be so satisfactory as the crude drug. Tanret's ergotinine is a fairly definite crystalline body, which, however, soon loses its ecbolic property on keeping, and this fact seems to indicate that in ergot it may be combined with some acid to form a salt that does not readily undergo change. If this be so, it opens up a line of inquiry which may lead to useful results, viz., how far are the natural compounds of the active principles of plants superior to the pure isolated active principles.

Lobelia inflata.—The chemistry of this plant still requires investigation. The Messrs. Lloyd have evidently obtained a body possessing an emetic property comparable to that of apomorphine, but what relation it bears to the body formerly called the active principle, and which was stated to be a liquid alkaloid, is not clear.

Lupulus.—The chemistry of the hop is by no means thoroughly worked out. The active principle appears to be a body that readily undergoes change, and although a bitter principle has been extracted under different names, it has not been shown, I believe, that the narcotic properties of the plant are due to it.

Rhamnus Purshianus.—The exact nature and chemical composition of the purgative principle of this bark as well as of *R. Frangula* has yet to be decided.

Rhubarb.—The purgative principle or principles of this drug cannot be said even yet to be clearly known. The substance described under the name of phœoretin and supposed, together with emodin and chrysophanic acid, to be the purgative principles does not appear to have been clearly defined, and the medicinal properties of the neutral principle and white resin extracted from rhubarb have not been ascertained.

Ricinus.—During the last few months a body of an albuminous nature, named ricin, possessing powerful toxic properties, and apparently capable of employment in surgery, has been discovered in castor oil seeds, but there is no evidence to show that this is the purgative principle of the oil, which appears to be unknown.

Taraxacum.—The diuretic principle of this root has not, that I am aware of, ever been determined.

Veratrine.—The veratrine of commerce is recognized as a mixture of alkaloids, without any definition (beyond that to be inferred from their solubility in ether) of the alkaloids it contains. But so many bodies are soluble in ether, that a more accurate means of ascertaining the uniformity and consequent strength of the commercial product is desirable.

The points above enumerated by no means exhaust the list of problems that require solution.

Of the active principles of less important drugs which are practically unknown, I may mention that of Indian bael; the acrid principle of mezereon; the bitter principles of myrrh and elemi, of camomile and *Prunus serotina*, and of pale catechu; the diuretic and purgative principle or principles of elder, and the purgative principle of cassia fistula. The last mentioned drug is such an excellent purgative that it is strange an attempt has not been made to separate the active principle and present it in a palatable form in small doses.

The acids or bodies holding active principles in solution in aqueous menstrua, have not, I believe, been described in the case of Pareria brava, cocculus indicus, cusparia, quassia, broom, physostigma, elaterium, colocynth, santonica, arnica, taraxacum, spigelia, capsicum, digitalis, Indian hemp, cascarilla, kousso, pepper, cubebs, serpentary, and areca nut.

There are also several questions of considerable biological interest arising out of materia medica which suggest themselves as likely, if investigated, to lead to very important results.

Thus the disappearance of mannite in the olive fruit, in proportion as the oil is formed, requires explanation, and the subject if carefully studied might lead to considerable light being thrown upon the change of carbohydrates into fatty bodies.

The investigation of the production of wax upon the surface of fruits, as in *Myrica cerifera*, etc., might give further light in the same direction.

The loss of acid in lemons when kept, is well known, and an inquiry into the causes which produce it might not only enable the pharmacist to prepare and keep lemon juice of more uniform quality than at present, but would probably explain the principle of the processes of the change of the acidity of many fruits to sweetness during maturity. A knowledge of the nature of the substance in cinnamon bark that prevents for a time the blue coloration of the decoction by iodine, although starch is present, might if ascertained prove useful in the micro-chemical investigation of drugs.

There is still room also for the systematic botanist to add to our stock of knowledge of the plants used in medicine. The species of balsamodendron yielding myrrh and the allied gum resins, in Somali Land and the southern part of Arabia, east of Aden, are still very imperfectly known, and most of the natural herbaria in Europe are, I believe, without characteristic specimens of the myrrh plant. Asafœtida has been shown by Aitchison to be the produce of *Ferula fœtida*, and by Dymock *Ferula alliacea* has been proved to be the botanical source of the hing or asafœtida used in India; but it still remains to be shown whether any commercial asafœtida is obtained from the other reputed sources of the drug, and the strongly alliaceous species, *F. narthex*, *F. asafœtida*, *F. fœtidissima*, *F. teterrima* and *F. rubricaulis*. The botanical sources of sagapenum, opopanax, and the liquid galbanum of Persia are still unknown.

In Sumatra three varieties of benzoin are produced, that of Palembang having a vitreous fracture and a comparatively feeble odour, and that of Penang having a strong storax odour, but otherwise resembling the ordinary Sumatra kind (which has the ordinary benzoin odour, and is produced in the Batta country). It is not definitely known what tree produces the Penang and Palembang varieties, although *Styrax subdenticulatum* has been suggested as the source of the Penang kind, nor has the mother plant of Siam benzoin been described. The plant that yields the St. Ignatius bean of commerce is still almost unknown in European herbaria, at least as regards its flowers, and the trees yielding coto and paracoto bark have never been ascertained. The botanical sources of the various sarsaparillas will still bear a very considerable amount of investigation, good herbarium specimens, having both kinds of flowers, which are borne on distinct plants, are entirely wanting in herbaria. The plants actually yielding the commercial varieties of aloes, except the true socotrine, cannot be said to be definitely known, especially those yielding the Natal or hepatic Cape aloes, nor has the method of preparation in the case of true hepatic or hepatic Cape aloes been distinctly stated. The tree yielding sandalwood in Macassar is unknown, and that of Venezuela but imperfectly so. The species yielding the different commercial varieties of copaiba also require further investigation. The botanical sources of Chinese rhubarb also have probably not yet been entirely cleared up.

I hope that I have said enough to prove that the field of materia medica investigation is by no means yet worked out. I venture to express the hope that the publication of this somewhat incomplete summary of problems in this subject may have some influence in leading those who have the ability and opportunity to do their utmost to solve them. It may appear unreasonable to direct your attention to materia medica problems that can only be solved in distant lands, but so many young men educated as pharmaceutical chemists now find a temporary home in foreign countries, that opportunities for direct or indirect investigation occur far more frequently than would be thought possible, and my experience has been that it is almost always a pleasure to them to attempt to add to the general store of knowledge, and in particular to that of materia medica.

(*To be continued.*)

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, April 23.

Present:—Mr. Umney, President, in the chair, Mr. Gerrard, Mr. Martindale, Hon. Treasurer, Messrs. Naylor and Ransom, Hon. Gen. Secs., and Mr. J. C. Nightingale, Asst. Sec.

The minutes of the previous meeting were read and confirmed.

The Committee received with deep regret news of the death of Mr. Wm. Smeeton, of Leeds, a Vice-President of the Conference. In order to fill the vacancy thus caused it was proposed by Mr. Ransom, seconded by Mr. Martindale, and carried unanimously that Mr. Geo. Ward, F.I.C., F.C.S., be provisionally elected Vice-President, and that Mr. E. Yewdall be appointed Auditor, this position being hitherto held by Mr. Ward.

Specimens of a new circular calling attention to the advantages of the Association and inviting to membership were exhibited; many of these have already been distributed.

The following resolution, moved by Mr. Gerrard and seconded by Mr. Martindale, was carried:—"That Conference circulars be sent to all Pharmaceutical Chemists, Members and Associates in business of the Pharmaceutical Society, from time to time as they are placed on the Register."

A letter was then read from Mr. R. A. Cripps (Birmingham) requesting a grant of £5 for the purchase of materials to continue his investigations on Ipecacuanha.

It was proposed by Mr. Naylor, seconded by Mr. Ransom, and carried unanimously that the grant be accorded.

A letter was read from Mr. Branson (Leeds) with reference to the local arrangements for the meeting of the Conference in September.

Several gentlemen were elected to membership.

Parliamentary and Law Proceedings.

ACTION UNDER THE PHARMACY ACT.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* WHEELDON.

In the High Court of Justice, Queen's Bench Division, on Tuesday, April 29, Mr. Justice Hawkins delivered judgment in this appeal as follows:—

This was a case argued before my brother Pollock and myself. Mr. Finlay and Mr. Rawlinson appeared for the defendant, and Mr. Lumley Smith and Mr. Grainger for the plaintiffs who are the respondents on the appeal. This action was brought in the County Court of Surrey, holden at Wandsworth, to recover from the defendant a penalty of £5 for the sale on September 15, 1889, of poison, to wit strychnine, or a preparation thereof known as Battle's vermin killer, without being legally qualified so to do. The facts are few and simple. The defendant Wheeldon was the assistant, or servant, of a duly qualified chemist, but he was not himself a registered pharmaceutical chemist or a chemist and druggist within the meaning of the Pharmacy Act, 21 and 22 Vict., Cap. 121. On September 15, 1889, the defendant was in the sole charge of the shop of his employer, and whilst so in charge he sold, on behalf of his employer, a packet of Battle's vermin killer to a female who came as a customer to the shop. Battle's vermin killer contains strychnine, which is a poison, and is declared so to be by section 2 of the said Act, coupled with schedule A and certain additions to that schedule made in the month of December, 1869. The County Court Judge held the defendant liable under the 15th section of the Act, and he gave judgment accordingly, giving the defendant, however, leave to appeal. That appeal was argued before us in the early part of Hilary Sittings. After hearing the arguments, and having regard to the general importance of the case, we reserved our judgment, not because we entertained any serious doubt upon the matter, but for the purpose of assuring ourselves that we had overlooked nothing in favour of the appellant's contention. Having now carefully considered the subject, we are of opinion that the defendant is liable, that the County Court Judge was right, and that his decision ought to be affirmed. The Act of Parliament, the 15th section of which we are called upon to construe, is entitled an Act to regulate the sale of poison, and alter and amend the Pharmacy Act, 1852. The preamble recites "that it is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing or compounding of poisons, and persons known as chemists and druggists, should possess a competent practical knowledge of their business, and to that end that from and after the day herein named all persons not already engaged in such business should, before commencing such business, be duly examined as to their practical knowledge, and that a register should be kept," as in the Act provided. Section 1 makes it unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons, unless such person shall be a pharmaceutical chemist, or a chemist and druggist, within the meaning of the Act, and to be registered under that Act. Section 2 declares that the several articles named or described in the schedule A should be deemed to be poisons, and on reference to the schedule, strychnine will be found named, and in the addition thereto, already referred to, every compound containing any poison, whether prepared or sold for the destruction of vermin, is expressly included. Section 3 declares that chemists and druggists within the meaning of that Act shall consist of all persons who at any time before the passing of the Act have carried on, in Great Britain, the business of a chemist and druggist, in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners, and also of all assistants and associates who before the passing of that Act should have been duly registered under or according to the provisions of the Pharmacy Act, 1852, and also of all such persons as may be duly registered under the Act of 1868. Section 4 gives facilities to be registered as chemists and druggists to persons who before the passing of the Act had been for three years employed in the dispensing and compounding prescriptions as assistants to a chemist, subject to their passing such modified examination as the Council of the Pharmaceutical Society may declare to be sufficient evidence of their skill and competency to conduct the business of a chemist and druggist. Section 15, upon the construction of which the present case depends, enacts that from and after December 31, 1868, any person who shall sell or keep an open shop for the retailing, dispensing or compounding poisons, not being a duly registered pharmaceutical chemist or chemist and druggist, or shall fail to conform with any regulation as to the keeping or selling of poisons made in pursuance of that Act, shall for every such offence be liable to pay a penalty or sum of £5. It is not disputed that the plaintiff Society is the proper body to sue for such penalty. The 17th section of the Act renders it unlawful to sell any poison unless certain regulations therein prescribed are observed. It is not, however, necessary to refer more particularly to it than to state that for non-observance of those regulations certain penalties are imposed on the seller, and that for the purposes of that section, the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller. It was contended by Mr. Finlay on behalf of the appellant that it was not unlawful under section 15 for an unqualified assistant of a duly qualified chemist to sell poisons in his master's shop, in the ordinary course of business; that the sale by the appellant being a mere sale by him as a servant in the discharge of his duty, the master was in law and in fact the seller, and that as the master was qualified the sale was lawful. It was further suggested that great inconvenience and hardship would result to small chemists who could not afford to employ qualified assistants if we were to hold otherwise. We do not agree in the view thus presented, nor are we at all impressed by the suggestion of inconvenience or hardship. Nothing to our understanding can be clearer than that the object of the Act was beyond all other considerations to provide for the safety of the public, and to guard as far as possible all members of the community from the disastrous consequences so frequently arising from the sale of poisons by persons inadequately acquainted with their baneful properties. The whole object of the Act would be frittered away, and the Act itself become a dead letter, were we to declare by our judgment that an unqualified assistant can lawfully and with impunity sell any of the poisons to which the Act applies, unless upon each occasion of such sale he acts under the personal supervision of a qualified employer or a qualified assistant to such employer. By such personal supervision we mean—not mere presence in the shop or room where the sale takes place; but actual personal supervision, so that every individual sale shall be so guarded round by those precautions prescribed by the Act that the safety of every member of the public may be provided for, as far as the law can accomplish that object. Mr. Finlay, in the course of his argument, suggested that the Legislature must have assumed that every qualified chemist keeping a shop would, if he required assistants, not be likely to employ an assistant other than one having competent knowledge, and whose carefulness could be depended upon; and did not mean to enforce upon chemists the employment of no assistants but those duly qualified. That is true enough, so far as regards the general business of a chemist's shop, not involving the sale of such poisons as are contemplated by the Act. But it is otherwise where the assistant is to be entrusted with the sale of such poisons. To leave the selection of such an assistant, without regard to any qualification, to the discretion of the employer would be, in our opinion, to defeat the object of the Legislature. One employer in a large way of business might feel that his assistant ought to possess a knowledge of poisons and poisonous drugs equal to his own. Another in a smaller way of business might be content to leave the management of his business to an assistant who, though he had knowledge of the general character of poisons, had but imperfect knowledge of their distinctive properties and of the various degrees of noxious strength contained in them. A third, who was but seldom asked for poisonous drugs, might think any person of ordinary intelligence sufficient; whilst a fourth might, without thought of danger, be content to risk a mishap and leave a mere servant of his household, who knew no more than that poison is poison, to represent him. In our opinion, the intention of the Legislature was expressly to provide against such a state of things by insisting upon one uniform qualification for every person who should sell, whether on his own account, or for any other person, such dangerous commodities, viz., registration under the Act, based on a certificate of competent skill and knowledge, granted after examination by examiners carefully selected and appointed for that purpose. With such a certificate the holder of it may fairly be deemed to possess knowledge, not only of the general effect and operation of the various poisons with which he may be called upon to deal, but what is quite as important, if not more so, for the public safety, knowledge as to the quantities in which each poison may be harmlessly or beneficially taken, and the quantities in which, if taken, death or serious mischief would be inevitable. The language of section 17 fortifies us in the view we have taken; for in that section the Legislature, where it intended that the person on whose behalf a sale is effected shall be deemed the seller, has said so in express words. We are also strongly fortified in our view by the judgment in the House of Lords in the case of the Pharmaceutical Society *v.* London and Provincial Supply Association, Limited (5 App. Cases, 857). It is true the question in that case was different from that raised in the present, but the views entertained, expressed particularly in the judgment of Lord Selbourne, directly bear upon the point now at issue. As regards the appeal made to us on behalf of the smaller chemists, we can only say that those who cannot afford to keep qualified assistants must, if they desire to absent themselves from their shops for greater or less periods of time, take such precautions as are within their power, either by locking up their poisons or by other means, to prevent any sale of them during their absence. It has been urged that it is hard to punish the servant for that which he has done in ignorance of the law and in the interests of his master. This, however, is no answer to the action; we have only to deal with the law as it exists. We need hardly say that if mischief arose by reason of a master negligently leaving an unqualified person in charge of his business, no punishment of the assistant under section 15 of the Pharmacy Act would exonerate the master from his civil liability to any person injured; nor, if death ensued through such negligence that the jury found it to be of a criminal and culpable character, would he be exonerated from liability to a charge of manslaughter. The object of the Act under discussion is, however, to prevent the occurrence of such mischief, and that can only be done by rigidly enforcing its provisions. Our judgment, for the reasons above given, is for the respondents, and we dismiss this appeal with costs.

Mr. Rawlinson: May I ask your lordship, as this is a matter of importance to so many people, whether your lordship would give us leave to appeal.

Mr. Justice Hawkins: No, I think not. We considered that. We were very clear about it before we adjourned at all. We only took time to consider for the reasons I have already mentioned. We entertain no shadow of doubt about it.

Mr. Rawlinson: My only reason of course for asking is that the practice has gone on so long.

Mr. Justice Hawkins: Then it is time that it was stopped; that is our view.

Mr. Rawlinson: It affects such a large number of people.

Mr. Justice Hawkins: If we had the smallest doubt about the matter we would give you leave to appeal, but we do not think there is any doubt.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* PRESTON; E. W. RICHARDSON, CLAIMANT.

On April 30, at the Edmonton County Court, before His Honour Judge Abdy, an interpleader summons was heard whereby the claimant claimed out of the proceeds of execution the sum of £6 in respect of rent.

Mr. Holloway, barrister, appeared for the claimant, and contended that the claimant, who was the landlord of the premises occupied by the defendant, was entitled to a quarter's rent, which became due at Lady Day last. The notice required by statute had been given, and the bailiff had recognised that notice by his advertisement of sale, and he asked for an order for payment of the amount claimed out of the proceeds of sale in court.

Mr. C. W. Langley Flux appeared for the Society, and contended that inasmuch as the levy took place on March 21 last, and the claim was for rent which did not become due until a subsequent date, there was no rent in arrear at the time of the levy, and the claimant was not entitled to be paid out of the proceeds of sale.

His Honour held that the landlord was only entitled to rent in arrear at the date of execution, and it being undisputed that the rent claimed in this interpleader did not become due until after levy of execution, the claim must be barred, and he ordered that the claimant's claim be barred with costs and refused leave to appeal.

SAME *v.* SAME; IDRIS AND CO., CLAIMANTS.

At the same court a second interpleader summons was heard, whereby the claimants, Messrs. Idris and Co., claimed a number of syphons for holding mineral waters which had been sold under the execution.

Mr. Ivor Bowen, barrister, appeared for the claimants and contended that the syphons claimed were the property of the claimants, and were by the course of dealing in the trade only lent by the claimants to the defendant.

Mr. C. W. Langley Flux appeared for the Society, and contended that if the defendant could not return the syphons, then their value became a debt due from defendant to the claimants.

His Honour held that the goods being merely on loan was not sufficient to entitle the claimant to recover them back from an execution creditor, and made an order barring the claim with costs and refused leave to appeal.

PROSECUTIONS UNDER THE IRISH PHARMACY ACT.

In the Summons Court, Belfast, on Friday, April 25, before Mr. R. J. Eaton, R.M. (presiding), Mr. Thomas McClelland, J.P., and Dr. M'Gee, J.P., William J. Rankin, 173, New Lodge Road, Belfast, appeared to answer the following charge:—"For that he on March 28, 1890, did sell and keep open a shop for retailing and dispensing poisons within the meaning of the Act 33 and 34 Vict., c. 26; and did sell, retail and dispense a poison to one, Thomas Prescott, in the city of Belfast, contrary to the Pharmacy Act (Ireland), 1875, 38 and 39 Vict., c. 57, s. 30, defendant not being a person properly qualified in that behalf according to law, and for that defendant not being registered as a pharmaceutical chemist or chemist and druggist, contrary to the provisions of the Pharmacy Act." John W. Johnston, and Robert Campbell, were summoned for a similar offence; and Samuel Gibson, Robert Henderson, and Thomas M'Dowell, were also summoned in like terms, except that the word "compounding" was added.

Mr. M'Inerney, barrister, and Mr. Galway, represented the Pharmaceutical Society of Ireland, and Mr. Harper and Mr. Erlean appeared for the defendants.

In opening the case, Mr. M'Inerney said the case he would take up first was that against Mr. W. J. Rankin for selling poisons and assuming the title without being duly qualified. The 30th section of the Act stated: "So much of the Act of 1791 as prohibits the keeping of open shops within the meaning of the said Act by any person other than a licentiate of Apothecaries Hall shall be repealed, provided always that it shall be unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons within the meaning of the Act of the session of the thirty-third and thirty-fourth years of the reign of her present Majesty, chap. 26, or medical prescriptions, unless such persons be registered as a pharmaceutical chemist or a chemist and druggist under this Act, or to assume or use the title of pharmaceutical chemist or pharmaceutist, or pharmacist, or dispensing chemist, or the title of chemist and druggist, in any part of Ireland, unless such person shall be registered as a pharmaceutical chemist or as a chemist and druggist respectively under this Act, and any person acting in contravention of this enactment or compounding any medicines of the British Pharmacopœia, except according to the formularies of the said Pharmacopœia, shall for every such offence be liable to a penalty of five pounds." Section 24 provided that "The registrar to be appointed under or by virtue of this Act shall from time to time make out and maintain a complete list (to be called the register of pharmaceutical chemists for Ireland), and also a complete list (to be called the register of chemists and druggists in Ireland), of all persons registered as pharmaceutical chemists or as chemists and druggists respectively under this Act." The 27th section provided that printed copies of such registers, for the time being in force, or any extract therefrom or from the original register certified under the hand of the said registrar and countersigned by the president or two members of the said Council should be evidence in all courts, that the persons specified therein were registered according to the provisions of this Act, and the absence of the name of any person from the said registers should be evidence until the contrary should be made to appear, that such person was not so registered.

Mr. Thomas Ferrall deposed that he was the Registrar appointed by the Pharmaceutical Society of Ireland and produced the register. Objection was taken that this register was not the register of chemists and druggists contemplated by the Act, but the register of pharmaceutical chemists. This point was obstinately contended for some time, but it having been deposed that this was the only register under the Act in existence, it was eventually admitted, in accordance with the decision of the Court of Queen's Bench in the Ballybay case, and Mr. Ferrall then deposed that Mr. Rankin's name did not occur on this register.

Thomas Prescott, who described himself as Inspector to the Pharmaceutical Society of Ireland, deposed that he went to Mr. Rankin's shop and purchased some laudanum. It was supplied to him in a bottle with a label bearing the words "Laudanum, poison. Dose for an adult 10 to 20 drops in a little water. Observe, dangerous to children. W. J. Rankin, chemist and druggist."

Mr. Andrew MacNaught, pharmaceutical chemist, Belfast, deposed that he had received from the previous witness a sample which he had analysed and found o be laudanum. He had known Mr. Rankin several years and knew he was not a chemist and druggist practising in Ireland before the year 1875. Witness, who said he was a member of the Council of the Pharmaceutical Society, was cross-examined, and said that the Council had the power to admit men to the grade of chemists and druggists, and also to draw up a register of persons entitled to use that title, but it had done neither.

Mr. Harper asked that the case might be dismissed with costs on the ground of an enactment in the 19th ection that the provisions in the Act relating to chemists and druggists should only take effect after the publication in the *Dublin Gazette* of the notice of the approval of a resolution with respect to the title of chemist and druggist. After a long disputation as to whether the Gazette containing the notice had been put in, it was further argued that this Society had neglected a duty placed upon it by the Act to provide or the examination and registration of persons desirous o acquire the title chemist and druggist and thus become entitled to supply poisons to the public.

After a lengthened controversy upon a number of other points, Mr. Eaton said the Court was of opinion hat the case came within the Act of Parliament and mposed the penalty of £5. One member of the Bench differed so far that he did not think the *Dublin Gazette* had been handed in at the proper time.

Application having been made that the case might be stated for appeal, it was granted, and the other cases depending on the same point were deferred.

Robert Henderson, 5, Great Victoria Street, was then charged with selling and keeping open shop for retailing and compounding medical prescriptions, and for compounding a medical prescription, contrary to the provisions of the Pharmacy Act, 1875.

Mr. Ferrall produced the Register and deposed that it did not contain the name of the defendant.

Thomas Prescott deposed that he went to the shop of the defendant in Great Victoria Street, Belfast, which was apparently a provision shop with a compounding department, and got a prescription made up there. He did not know who wrote the prescription, but he got it from the Society.

Mr. McNaught deposed that the paper handed to him was a medical prescription. He knew the writing, which was that of Dr. Harkin.

For the defence it was stated, and deposed to by witnesses, that the assistant to whom Prescott presented the prescription refused to make it up on the ground that the defendant did not make up medical prescriptions, and upon Prescott urging that he should be supplied with something like it the assistant had made up a similar tonic from a private recipe of his own. The assistant was sharply questioned by Dr. M'Gee as to whether he had not, in fact, acted as a medical man and prescribed a tonic for Prescott.

Mr. Eaton, in delivering judgment, said the defendants no doubt suffered a hardship in this case. The law contemplated there should be some qualification before persons were allowed to compound and dispense poisons, and although it was provided there should be a modified and a much lower scale of examination test, yet the members of the Pharmaceutical Society appeared to go for one examination alone, and that of course the higher one. The facts of the case as disclosed brought the charge within the purview of the Act as it exists, but whether the Society had acted up to the spirit of the Act was another question. The defendant was fined £5.

In reply to Mr. Erlean Dr. M'Gee said it was the opinion of the Bench that a Register of Chemists and Druggists should be provided.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

CHEMISTS' TRADE INTERESTS.

Sir,—Having received a postcard headed "Pharmaceutical Council Election, May, 1890," "The Care of Retail Trade Interests," followed by the names of eight candidates, I should like these eight gentlemen to state, through the *Pharmaceutical Journal*, if they approve or disapprove of the Pharmacy Bill that has been withdrawn, and what are the retail trade interests which they would look after, which have not been looked after by the old Council?

W. W. URWICK.

Sir,—I think that it is the duty of everybody connected with pharmacy, and having the true welfare of pharmacists at heart, to speak in no uncertain terms in deprecation of the false issues that are being paraded before the electors by certain candidates for election to the Pharmaceutical Society's Council.

The election cry of these gentlemen is "Trade Interests," and a very plausible one it is, for it appeals to a large number—I was almost going to say the majority—of the electorate. It is also a seductive cry, for it is easy for a man to say, "Well! I know little or nothing about the merits of the candidates; I know little or nothing about the work done by the Society; but these gentlemen are going to protect my 'trade interests,' and I am going to support them."

Now, sir, what I would ask is, that everyone should think out for himself what is the present position of the chemist and druggist in this country, and whether that position has not been improved by the existence of the Pharmaceutical Society? Comparison of our present position with that occupied by our forefathers is difficult, for time alters everything, and probably there never has been such a period of change and of trade competition as during the last twenty-five years or so. Yet I hold that in spite of this change and competition, the present position of the chemist and druggist is higher, both commercially and socially, than that of our predecessors, and that the Pharmaceutical Society and its work has been of immense benefit to the trade.

And again, sir, I would ask every elector before he signs his voting paper to analyse carefully the meaning of the two words "trade interests," and having done so, to ask himself conscientiously, not only what he expects to be done for the so-called protection of these interests, but how it is to be done?

Do those who clamour for the protection of "trade interests," know anything at all about the difficulties attending the passing of any Bill through the House of Commons, and do they realize the impossibility of obtaining anything approaching legislative protection for a particular trade or calling?

No, sir, the true protection of "trade interests" rests with the individual, and if he conscientiously performs his duty to the public and himself, he will realise that the measure of protection which he now has, and which was obtained for him by the Pharmaceutical Society, is something after all to be thankful for.

That measure of protection cannot be increased by any chimerical efforts at legislation, which in addition to being futile, may be positively harmful, but only by supporting those who have worked hard for the Society and the Trade, and whose knowledge of the possible, and the impossible, in pharmaceutical policy renders them the only safe directors of such policy.

Before concluding this letter, I must point out, as indeed has been done many times before, the anomalous position the Society is placed in by the fact that it is supported by less than one-third of the total number of registered persons. This fact should be pressed home "in season and out of season;" for if we would increase the Society's powers for helping the chemist and druggist in his "trade interests," and in all his other interests, it can only be done by all of us supporting the Society both morally and pecuniarily, and thus enabling it to be truly representative of our trade.

I must apologize for so greatly trespassing on your space, but I feel it right to warn those who are doubtful as for whom they should vote, to be careful lest in grasping at the shadow they lose the substance.

78, Gracechurch Street, E.C. H. A. THOMAS.

THE COUNCIL ELECTION.

Sir,—In your remarks in last week's issue under this heading, page 888, you say, "it would be obviously improper for the official organ of the Society to take part in influencing the election of members of the Council."

It is true that in leading articles you certainly adopt this course, but your columns are opened to letters from correspondents of one shade of opinion only, and by this means you indirectly influence the elections.

In last week's Journal Mr. Hyslop has indulged in some tall talk about "noisy rant," "positive impudence," "mere dictation of a few noisy ones," "hollowness and selfishness of their pretensions," and these courteous remarks are applied to those who presume to disagree with the action of the Council. It is said that it is customary for some lawyers to blackguard their opponents in court when they have no case, and I would simply remark for Mr. Hyslop's guidance that hard words are not arguments. When he ceases to be courteous he is not worth notice, and he evidently judges others by his own exalted standard!

What clique he alludes to passes my comprehension. At the last general meeting, in May, 1889, I made some remarks, without any preconcerted arrangements with anyone. In fact, I stood alone and never asked any member to support me.

About three months ago overtures were personally made to me by a chemist in London to allow myself to be nominated for the Council, and after long hesitation I consented. I am a perfect stranger to every one of the new candidates, except Mr. Spink, and I have not seen him for over two years, and have only spoken to him about four times. I have had one or two letters and a post card from Mr. Coleman, and until recently I did not even know of the existence of the new candidates, so that the sneer about "a clique whose faces were partly visible at the last election" falls harmless because it is not true.

As for any personal feeling against any member of the Council, I indignantly deny that it exists, and as far as I am concerned I have spoken once only to Mr. Carteighe. Mr. Richardson and the other members are utter strangers to me. It is the policy of inaction and utter indifference to the crying wants of the trade which we object to, and the feeling on these matters is practically shown by the membership of the Society becoming yearly less. That their intentions are good I believe, but the trade cannot exist on such meagre diet.

What is wanted is action, combined with discretion, which shall bring every qualified chemist in the kingdom under the banner of the Society and unite them into a compact body, determined to have justice and a fair living in return for that examination which the legislature has compelled them to submit to for the protection of the public. The new candidates, nearly all strangers to each other, seek election with this intention; but if the members of the Society prefer to uphold the present policy of the Council they must, of course, put up with the consequences, one of which will be in my opinion "the survival of the fittest."

North Kensington, W. F. T. PERCY WELLS.

[*** In reference to the statement in the above letter that letters from "correspondents of one shade of opinion only" are admitted to the columns of this Journal, we cannot omit to say that it is at direct variance with fact, as readers of the Journal will know.—ED. PH. J.]

Sir,—A card is being circulated by some person or persons whose names do not appear on it (unless we are to infer that the candidates themselves have published it), asking electors to vote for eight candidates named, who are in favour of carrying out the *policy* of "The care of Retail Trade Interests." This card was preceded by letters written by the candidate from Cardiff and by a Kenington chemist, enclosing autograph letters from representative discontented men in various parts. Throu the courtesy of friends I have been privileged t read many of these letters, and I find from th that one objection to the present Council is, that "f many years it has been a syndicate of the wholesale, sem wholesale, and proprietary trade, and that they have d termined to do nothing for the retailer." Presuming, as have good reason to do, that this expression of opinion, as the composition of the present Council, emanates from th the same source as the card advocating the return of ce tain men as the champions of "Retail Trade Interests," suppose it must be taken as an example of the irony of fat which often dogs the steps of the would-be reformer, th the member of the present Council who is recommend on the card, "Councillor Gwilym Evans, Llanelly," if he has not altogether severed his connection with the retail trad should since his advent upon the Pharmaceutical Counc have successfully floated and become managing director o a "Quinine Bitters Company," and by so doing, I pre sume, become one of the "proprietary trade determined to do nothing for the retailer."

Another would-be improver of the Council quotes from the letter of a chemist and druggist, that "unless the Council of the Pharmaceutical Society does something soon to better the condition of the trade, there will be such wholesale secessions from the Society, that the Counc will be left alone to represent it." Although I read this opinion in the far south of England, the writer of it lives in the north; and by a curious coincidence I was talking to him only a few days before, when he asked me "What was the Pharmaceutical Council doing?" I had in my hand a copy of the last Pharmacy Bill which was drafted, and I said, "Have you read this Bill carefully?" He said, "No!" "Do you know that the Council has spent months in discussing and framing it?" "No, I have not read the Journal lately!" This gentleman is, I fear, a type of the men who are doing an incalculable amount of mischief, and are the real enemies of pharmacy and the "retail trade." Too indolent or too much engaged in more congenial ways to take the trouble to inform themselves as to facts in connection with the Society, they, nevertheless, do not hesitate to give expression to opinions which are taken up and quoted to the detriment of our Society and to the injury of the whole body of registered chemists and druggists.

With regard to the so-called "Trade Interests" and the ability of certain men to advance them, let us very briefly inquire as to the qualifications of some of the present members of Council as compared with the other candidates who are before the Society for election, and for this purpose take the names of the London men.

Michael Carteighe is himself, and that is the highest praise which any pharmacist with a knowledge of his abilities and his work can bestow upon him; but in relation to retail trade he is well known to be the responsible partner in Dinneford and Co., which is a retail and dispensing establishment of which Englishmen certainly need not be ashamed. He possesses a perfectly unique acquaintaince with every detail of the scientific and political history and work of the Pharmaceutical Society, and he devotes an amount of time and care to the best interests of retail pharmacy which no other man has ever equalled or approached.

Thomas Greenish is known wherever pharmacy is, and is respected in every city of Europe and America, as he deservedly is in every part of Great Britain. If I mistake not, Mr. Greenish is intimately and honourably concerned in the practice of the retail branch of pharmacy.

Robert Hampson must be known to every member of the Society who reads the reports of the Council meetings as a man who is ever on the alert to watch and work for the best interests of the registered chemist and druggist. I have never heard of any connection of his with "the wholesale, semi-wholesale or proprietary trade."

Walter Hills is a representative from the historic house of John Bell and Co., which I take to be a typical retail and dispensing establishment of which every English pharmacist ought to be, and is, justly proud. He brings to the Council table ability, good sense and sound judgment, and is second to no one in his watchfulness and care of all that is best for pharmacy.

On the other side may I respectfully ask the members of the Society to inquire what have the post-card men.

mended Messrs. Broad, Spink and Wells done for pharmacy that either individually or collectively they should seek to replace the old London representatives? A pharmacist in one of the western cities a few weeks ago remarked to me, "If the members of the Pharmaceutical Society ever forget themselves so far as to elect a Council of the unknown men of the craft, or a Council imbued with mere political and commercial ideas, we may be perfectly certain that in such a matter as the appointment of the Board of Examiners, and many other important duties now in the hands of the Society, the Government will step in and deprive the Society of the privileges which it has shown itself so incompetent to use aright." I commend this opinion of a man of wide experience to the thoughtful consideration of every voter, and I would ask him to ponder the matter well before he does himself and the Society so grave an injustice and such an irreparable mischief as to cross out of his voting paper the names of Carteighe, Greenish, Hampson and Hills in favour of unknown and untried men, however loudly they may have voiced the discontent which is born of ignorance and misrepresentation.

I will say little about the country members of Council who are before the Society for re-election or otherwise, except that the whole country and different phases of business seem to be fairly represented. Brighton, Clifton, Diss, Leicester, Liverpool, Newcastle, Salisbury and Sunderland should methinks furnish men who will bring together an aggregate of useful knowledge of the varying conditions under which the drug trade is carried on throughout the land, and that they do furnish types of mind and experiences capable of discussing every subject from many points of view must be within the knowledge of all who read the *Pharmaceutical Journal*. But here is really the crucial point, men who are themselves clamouring for and who aid and abet the trade newspapers in requesting fuller reports of what is done by the Council, do not, many of them (like the gentleman I have quoted above), read even such reports as those newspapers supply, much less do they read and thoughtfully digest the verbatim report furnished in our own Journal.

In conclusion I must ask all those whose names I have used in this letter to accept my apology for doing so. Those who know me will believe, and I must ask those who do not know me to accept my assurance, that not one word is written in any personal spirit; it is the pharmaceutical interest alone which I desire and hope to serve by this letter, and which has necessitated my using actual names.

Newcastle-on-Tyne. N. H. MARTIN.

Sir,—With your permission, I should like to contribute my mite to the discussion on the Council Election. It seems likely to be a livelier one than we have seen for some time; and perhaps that is rather a matter for congratulation than otherwise, for it must be admitted, we electors as a whole are an apathetic lot, and stand sadly in need of a little stirring up. I hope, however, that we shall not, in consequence of the said "stirring up," lose our heads and do foolish things which we may regret too late. There never was a time when the pharmaceutical army more needed careful manœuvring and skilful generalship than at the present time; and before making any extensive changes in our executive or policy, it will be well to calmly consider whether we should be changing for the better.

As a humble trader, living in a store-ridden neighbourhood, I am very keenly alive to "trade interests," but am not at all sure that the best means to secure them is to rush straight after them and let all the world know our goal. "All-the-world" has an unpleasant knack of putting his thumb to his nose at sight of such a proceeding! The present policy of the Council is one of cautious but steady advance, and I, for one, would be sorry to see it upset. Though a firm believer in the doctrine that if the State demands protection for itself in the matter of poisons and drugs supply, the State should be willing to pay for such protection by reciprocating it, I fear it is not yet "within the sphere of practical politics." Rather do I believe that, as a whole, our craft is not ready for it, and that our probation time must be extended farther into the future till we have been educated and elevated to a higher and more deserving level. It is coming as sure as the evolution of right out of wrong is proceeding the world over, but we should not attempt to eat our cherries until they are ripe. The Council is on the right road, and if the galling asperities of business life will only let us have patience, we shall see "the crooked straight" in good time. I wonder what the seven new "trade interest" gentlemen would do for us more than that, if we placed them in the room of those we have? I am not asking in any cynical spirit, but with a real desire for information, and such information must not be mere vague generalizations. One can correctly approve or condemn a scheme only when it is "set down in black and white." Let these gentlemen draft a Bill such as they would send to Parliament, making each clause full and complete, and naming the M.P.'s they would get to back it. Then we shall be in a position to criticize intelligently; and if they have anything good and feasible to give us, that the present Council will not grant or try to obtain, we will vote for them in a phalanx. Until then may we ask to be excused from changing our professional leaders till their work is done.

In conclusion, if it is not too great presumption on my part, I would ask my fellow members and associates to make sure that Mr. Carteighe is placed in his rightful position amongst the elect—and that is at the top of the poll. Over-confidence and meddlesome intrigue lost many votes last time. I think it will not redound to our credit if the mistake is repeated. It is no secret that the President works as hard for our real and permanent trade interests as if he were handsomely paid for it, instead of it all being, as it is, a labour of love. That he may have made some mistakes, I will not deny (who has not?), but we should have a tough job to find his match in harness. It has been stated in the Journal, oftener than once, that the Council is willing to give effect, as far as possible, to the wishes of the trade, if only these wishes are reasonable and plainly expressed; and there seems no reason to suppose that its members, if re-elected, would go back from their word. I hope they will be put to the test in that respect; only let us not expect them, though "in harness," to make asses of themselves for our sakes.

69, Loughborough Road, S.W. WILLIAM JOHNSTON.

Sir,—I was pleased to see that so able a writer as Mr. Corder has through the columns of the *Pharmaceutical Journal* drawn the attention of the members and associates to the very ungrateful treatment accorded the President at the last election. At the same time we were deprived of the services of one of the ablest business men of the Council; one, I may venture to say, who has done much good for the Society, at large, in a quiet and unpresuming manner. I refer to Mr. E. Northway Butt. It is painful to think that a body of educated men should have been so easily beguiled into deserting their truest friends through the subtle influence of an outside society. I hear with much regret that Mr. Butt will not again be tempted to seek election at the hands of the Pharmaceutical Society, and as we have only too few such men, we can ill afford to lose even one, and before it is too late, I would say, let us stand by the men who have served us honestly in the past, and show them that we prefer them to the untried and oftentimes selfish agitator.

D. KINGAN.

Sir,—Mr. David Storrar's ability, education and experience eminently fit him to represent the trade and profession at the Council Board. He has done a great deal to conserve the best interests of the trade in this district, and has ever been foremost in promoting higher and technical education in his native town. His address at the meeting of the Edinburgh Society was the natural expression of a faith gained from close observation and practical experience. No one who knows his character would insinuate that he could use an ordinary meeting of the Society to further his candidature. The address was written before he dreamt of allowing himself to be nominated as a Councillor. I understand he only consented after considerable pressure from those who know how beneficial it would be to have him at the Board. I hope, therefore, no one will be deterred from voting for him.

For many years I was his nearest neighbour, and have ever found him to be honourable, consistent, and very helpful in all our intercourse. This past experience enables me to heartily commend Mr. Storrar's candidature to our English brethren, assured that his clear head and fluent tongue, coupled with his long practical experience, would be very helpful at the present time in setting forth the wishes of the trade and bringing about a better day for all of us who are members of the Society.

70, High St., Kirkcaldy. JOHN PEEBLES.

"LITTLE AND UNKNOWN," BY ONE OF THEM.

Sir,—In your issue of the 26th inst., you have an article by Mr. J. C. Hyslop, and as I am one of the four, I should like to ask him if membership of the British Pharmaceutical Conference is in his opinion a *sine quâ non* for candidates for the Council? (If so it is a pity I resigned after 15 years membership.)

I consider I am quite as fit to represent the average pharmacist as I was then. As to insultingly setting aside Mr. Carteighe and his colleagues, I consider myself a gentleman, and no gentleman would disparage an opponent, at least that is my view. I may differ from him, but is that any reason why I should be insulted?

I probably possess more degrees than half my opponents, but I never boast. I have nothing to be proud of except using the abilities God has given me to the best advantage according to my judgment.

With respect to the Benevolent Fund, I do not subscribe, but I have given several half-guineas to *unsuccessful* candidates (widows), and I regret being compelled to mention, it as I give cheerfully and without hope of reward here.

LEWIS B. ROSS.

POISONOUS PATENTS.

Sir,—"Alpha's" suggestion in the Journal for April 19 is capable of wider application than he himself gives it. It is a smart idea to "purchase from an unqualified man one of these patents" (proprietary medicines?), "have it analysed and . . . . . have the seller prosecuted," presumably for unlawfully selling poisons. Exactly. But why stop there? Have the same medicine purchased of a *qualified* man, and "have the seller prosecuted" for selling poisons without the name of the article and the word "poison" attached. I believe it is the vendor who is the responsible party. The suggestion opens a wide question. Why are some chemists so anxious to incur the responsibility of selling other men's poisons; unseen, untested, and for such a beggarly remuneration as so-called "patents" yield? What is a poisonous medicine, and how are we to know that it is such? Must we sample and test every nostrum advertised before we supply it, if only "once in a blue moon"? A countryman hereabout had a bad cold, he was recommended to take a well-known "patent medicine." Next day he told his friend that he had taken a bottle the night before. "Surely you did not take the whole bottleful?" "Of course I did," was his reply; "do you think I was going to make two swallows of that little bottle? I shall take another to-night!" Was that stuff poison? I believe ninety-nine chemists out of a hundred would call it so. It is more than a quarter of a century since I was privy to the manufacture of a cask of bitter ale with no other bitter than strychnine by way of experiment. The whole cask was consumed in the brewer's household. Apart from the abstinence notion that alcohol is poison, was that beer poisonous? The general trade answer, I opine, would be "undoubtedly," because it contained poison. The homely "half pint of vinegar, half pound of treacle and a pennyworth of laudanum" is "poison." Throw a teaspoonful of paregoric into the Thames at London Bridge and label the river "poison" all the way down to Gravesend. That is what it is coming to, until the word "poison" will have no meaning at all. It is becoming a mere catchword, with no force; too weak to put a hundred a year into our pockets with. The principle of the Pharmacy Act is personal responsibility. The whole system of proprietary medicines tends to shirk personal responsibility. Sealed and concealed quack medicines have no legitimate *locus standi*, *sedendi*, or *jacendi*, in a pharmacy, but only *ejiciendi*. Let them be all cast out, and if any are brought back again let it be at the entire risk and responsibility of the vendor. When an educated man contributes his skill and experience and all the virtues to a quack remedy, he ought to be handsomely paid for it. The relation of chemists to the sale of "patient medicines" is a false position. For many years remuneration of thirty per cent. for handing a package over a counter was enjoyed, but the public "found us out." Shall we clear their vision again by the word "poison?"

HENRY H. POLLARD.

Sir,—I have been hoping some other fellow members would have endorsed the letter headed as above by "Alpha" in the Journal of the 19th April.

In the editorial commenting upon the recent case tried before the Lord Mayor we are informed it is the Government that threatens to take proceedings against anyone who sells a poisonous proprietary medicine which is not labelled poison, and in the comment with reference to the letter received from the Privy Council office it is there left to the police authorities to take proceedings.

We may rest assured that in any action taken either by the Government or police our trade interests will occupy a very infinitesimal position in their estimation. If a vendor who is not connected with pharmacy, as a grocer, draper or hair dresser, but possessing a patent medicine licence is selected, it will naturally result in a benefit to our trade interests; if, on the other hand, a qualified pharmacist is chosen to put under the harrow, how detrimental the result will be to the said interests.

Permit me as an old member to demur to the position taken by the Council in leaving the Government and police to take proceedings.

Quoting from the Pharmacy Act, 1868, "Any person who shall sell or keep an open shop for the retailing, dispensing or compounding poisons, not being a duly registered pharmaceutical chemist or chemist and druggist shall for every such offence be liable to pay a penalty or sum of £5, and the same may be sued for, recovered and dealt with in the manner provided by the Pharmacy Act;" Pharmacy Act, 1852, "And such penalty may be recovered by the Registrar to be appointed under this Act in the name and by the authority of the Council of the said Society." If the Council would take proceedings in conformity with the Act, such action would do more to stop the resignation of existing Members and Associates, and increase their numbers, than any reduction in the annual subscription, or relaxation of existing conditions of membership.

Harrogate. R. HATTON DAVIS.

THE JACOB BELL MEMORIAL SCHOLARSHIPS.

Sir,—In the subjects for examination to compete for the Jacob Bell Memorial Scholarships, every student is obliged to take Virgil, and in the Preliminary examination he has the option of taking either Virgil or Cæsar. The Preliminary students who take Virgil, therefore, have an advantage over those who take Cæsar, by not having fresh work to go through. Considering the limited time apprentices have at their disposal, would it not stimulate the competition if the option of Virgil or Cæsar was given, the same as in the Preliminary examination?

AN APPRENTICE.

[⁂ This letter is suggestive of the "preparation" by means of which candidates hope to pass an examination, and the writer does not appear to appreciate the fact that the real utility of examinations lies in their being a means of testing the knowledge of candidates, and of giving them opportunity to prove their qualification. Thus Virgil is given in the Jacob Bell Scholarship examination as a means of testing knowledge of Latin, not to give an advantage to a candidate who has been "prepared" in that author. —ED. PH. J.]

⁂ In consequence of the pressure upon our space we have been compelled to defer the publication of several communications.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Maiden, Morrison, Grierson, Mander, Taylor, Bonny, An Apprentice, One Willing to do his Share, S. S.

ANNUAL REPORT OF THE COUNCIL,

To be presented at the Forty-ninth Annual General Meeting of the Pharmaceutical Society of Great Britain.

The Council in presenting the forty-ninth annual report and the financial statement for 1889 has to record that the income for that year has exceeded the ordinary expenditure for the year. The sum of £3440 has been paid on account of the contract for rebuilding 15 and 16, Bloomsbury Square, to meet which £3000 stock has been sold, the remainder being temporarily defrayed out of the current account.

It is satisfactory to note that the Journal account shows a favourable balance, the amount received for sales and advertisements having exceeded by more than £100 that disbursed for the production of the "Journal and Transactions."

Rather fewer candidates presented themselves for the Minor examination, the number being 1013 as against 1091 in 1888. On the other hand it is gratifying to observe a large increase in the number of Major candidates, 138 having entered for the higher qualification. There have been 5 candidates for the Modified examination during the year. The candidates for the first or Preliminary examination numbered 1351—a decrease of 42. The rejections still constitute more than 50 per cent. of the candidates examined, and exhibit in a marked degree the absence of systematic training among those presenting themselves.

The reports on the Society's examinations by the Government Visitors were presented to the Council last month and have been published. They show, conclusively, that most of the failures in the qualifying examination are due to defective training, and both Sir Douglas Maclagan and Dr. Stevenson lay stress on the necessity for insisting on a higher standard of general knowledge in the Preliminary examination. Sir Douglas Maclagan, whose report covers a period of four years, demonstrates with a lucidity which leaves nothing to be desired what an immense boon to the candidate a curriculum would be.

It has been considered desirable that a larger number of standard works than formerly should be retained in the Library for reference purposes, and a list of them has accordingly been prepared for the guidance of the Librarian. It has also been decided that the outward carriage of books to country members should invariably be paid by the Society, leaving the cost of return to be defrayed by the borrower. The number of books added during the past year has been slightly below the average, there having been fewer works of importance published. The attendance in the Library and the circulation of books have been well maintained.

The attendance in the Museum shows a large increase, and affords satisfactory evidence of the value in which this department of the Society is held by students and others. The donations to the Museum and the Herbarium have been fully as numerous as in past years; whilst not a few among them possess especial interest. During the year a number of duplicate specimens have been distributed to local associations, and the Council has also granted in several cases the loan of articles from the Museum for the purpose of illustrating lectures and papers.

The opening meeting in October of the Session 1889-90 of the Society's School of Pharmacy was attended by a large number of persons, who accorded a hearty reception to an address by Professor John Marshall, F.R.S., President of the General Medical Council. This meeting was invested with additional interest by the presentation to Professor Gustave Planchon of the Hanbury Gold Medal, which is awarded biennially for distinguished work in connection with original research in the Chemistry and Natural History of Drugs. Dr. Planchon is the Director of, and a Professor in, the School of Pharmacy of Paris, and his name has been for some years on the roll of Honorary Members of the Society.

The alteration in the course of instruction in the Society's School, referred to in last year's report, viz., the extension of the course from five months to ten months, has worked most satisfactorily and seems to be appreciated. The number of students attending the School is greater than in many previous years.

The Evening Scientific Meetings, both in London and Edinburgh, have maintained their standard of interest. The number and value of the papers read during the year and the attendance bear very favourable comparison with any former period. In London the communications from the Research Laboratory have been especially appreciated, and in Edinburgh the opening lecture by Professor T. R. Fraser, F.R.S., was a most important and valuable contribution on the education, training and examination of the future pharmacist.

From the report of the Research Committee for 1889, presented to the Council in February last, it will be seen that many valuable investigations have been completed during the year, under the able direction of Professor Dunstan and the demonstrator, Mr. Dymond; while others of no less importance and interest are in progress. An addition to the number of workers will probably be made at the end of the current session, as the educational training afforded is attracting a larger number of the Society's advanced students. The influence of the Society is being steadily advanced by the character and completeness of the work done; and it is not without significance in this connection that a communication has been received from Dr. Quain, the Chairman of the Pharmacopœia Committee of the General Medical Council, stating that it is intended to prepare an addendum to the Pharmacopœia, 1885, and inviting your Council to co-operate with the Pharmacopœia Committee in the preparation of that addendum. This communication has led to the appointment of the following Committee:—The President, Vice-President, W. Inglis Clark, D.Sc., C. Ekin, S. Gale, Henry G. Greenish, N. H. Martin, W. Martindale, and Charles Umney.

The houses Nos. 15 and 16, Bloomsbury Square, which came into the possession of the Society at Lady Day, 1889, have been pulled down and are nearly rebuilt. Although not yet quite finished, No. 16 is sufficiently advanced to be used on the 20th instant, when it is proposed to hold a Conversazione in the Society's premises of a somewhat similar kind to that formerly held at the South Kensington Museum, and to which ladies are invited. It is proposed to transfer the Secretary's offices to the ground floor of this house in the autumn. The house, No. 15, is to be let, and will become a source of revenue to the Society.

Receipts.

GENERAL FUND—FINANCE

		£ s. d.	£ s. d.
Balance January 1st, 1889:—In Treasurer's hands		1728 8 11	
In Secretary's hands		118 2 4	
In hands of Chairman of Executive (Scotland)		86 3 1	
			1932 1
Life Members' Fund—Interest			84 1
Interest on Investments			43 1
Subscriptions:—1459 Members, Pharmaceutical Chemists		1531 19 0	
608 " Chemists and Druggists		638 8 0	
1226 Associates in Business		1267 6 0	
920 Associates not in Business	483 0 0		
28 " " " who during the year became Members or Associates in Business	14 14 0		
892		468 6 0	
908 Apprentices or Students	476 14 0		
4 " " who during the year became Members or Associates in Business	2 2 0		
904		474 12 0	
9 Entrance Fees		18 18 0	
		4419 9 0	
Fees paid upon restoration to the Society		14 8 6	
			4433 17
Examination Fees:—1319 Preliminary Examination		2378 14 0	
4 Modified "		4 4 0	
1048 Minor "		2823 10 0	
189 Major "		635 6 0	
			5841 14
Registration Fees:—25 Fees for Restoration to the Register		26 5 0	
3 Registration Fees as Chemists and Druggists		15 15 0	
			42 0
Journal:—Advertisements		4322 2 7	
Sales		336 11 8	
			4658 14
Register:—Sales to the Government		147 10 0	
Sundry Sales		15 0 0	
			162 10
Calendar:—Sundry Sales			21 1
Penalties and Costs for infringements of the Pharmacy Act			226 6
Rent of Stable in rear of 36, York Place, Edinburgh			18 18
Rent of 16, Bloomsbury Square, to Midsummer, 1889			29 5
Sale of £3000 2¾ Consols			2912 9
			£20,7[illegible]4 19 1

TEMENT FOR 1889.

Expenditure.

	England and Wales.	*Scotland.*	£ s. d.	£ s. d
uities :—Professor Redwood				100 0 0
Mr. Elias Bremridge				400 0 0
iage of Books, and other Parcels				22 12 3
ificates of Death				19 5 8
ning and other Meetings				58 16 5
miners, Boards of—				
Fees to Examiners	1562 8 0	475 13 0		
Fees to Superintendents—Preliminary Examination	212 12 6	31 10 0		
Hire of rooms for conducting Preliminary Examination	68 19 6	7 1 6		
Travelling Expenses	222 1 6	26 2 6		
Refreshments for Examiners	78 8 1	22 13 3		
Apparatus, Drugs, and Chemicals for Examinations and sundry charges in connection therewith	140 8 2	16 18 3		
	2284 17 9	579 18 6		
(*England and Wales*)		2284 17 9		
			2864 16 3	
Fees to the College of Preceptors			174 17 0	
				3039 13 3
tures and Fittings				25 8 0
niture				5 14 0
use Expenses :—Gas, Water, Coal, Cleaning Materials, etc.				287 16 1
use Servants' Wages				206 1 0
rnal :—Editor and Sub-Editor's Salaries			750 0 0	
Paper			753 13 5	
Printing			2019 4 2	
Publishers' Commission			584 12 3	
Contributions and Engraving			308 11 7	
Reporting			88 18 0	
Attending Conference and other Meetings			51 9 6	
Parliamentary Papers and Sundry Charges			84 14 0	
				4541 2 11
ctures :—Emeritus Professor of Chemistry and Pharmacy				100 0 0
Emeritus Professor of Botany and Materia Medica				100 0 0
Professor of Botany—Endowment of Chair			150 0 0	
Professor of Chemistry—Endowment of Chair			150 0 0	
Teacher of Practical Pharmacy			50 0 0	
Subscription to Royal Botanic Gardens			21 0 0	
Lecturers' Attendants			80 19 6	
boratory :—Professor of Practical Chemistry—Endowment of Chair			150 0 0	
			601 19 6	
paratus, Chemicals, Diagrams and Specimens for Lecture Classes, Prize Medals, Certificates, etc.			122 4 10	
inting and posting prospectuses			26 10 9	
				750 15 1
w Costs				875 15 1
brary :—Librarian's Salary			240 0 0	
Purchase and Binding of Books			105 3 4	
Catalogue			110 8 10	
				455 12 2
useum :—Curator's Salary			350 0 0	
Assistant's Wages			55 4 0	
Specimens and Sundries			43 15 11	
				448 19 11
xpenses in Scotland :—Assistant Secretary—Salary			150 0 0	
Taxes			33 5 11	
Travelling Expenses—Members of Executive			21 9 6	
Cleaning, Service and Miscellaneous Expenses			154 16 9	
				359 12 2
ostage :—General			212 13 1	
Journal (Cost of transmission to Members, Associates and Apprentices)			686 0 2	
				898 13 3
egister, Printing and Publication				158 13 7
epairs and Alterations				33 3 6
ent, Taxes, and Insurance of Plate Glass				58 13 9
tationery, Engraving, Printing, and Office Expenses			265 18 4	
alendar—Printing and Publication			125 1 9	
				39 0 1
alaries :—Secretary and Registrar			450 0 0	
Clerks			765 18 0	
				1215 18 0
esearch Laboratory				290 0 0
ost of Materials supplied to the Jacob Bell Scholars				10 0 0
erbarium and Council Medals				7 17 6
undries				4 19 0
ew Premises :—Galen Place—Architects' Fees			178 12 0	
15 and 16, Bloomsbury Square—Kirk and Randall, Builders			3000 0 0	
Architects' Fees			150 0 0	
Purchase of Old Materials			38 0 0	
Clerk of the Works, Wages, etc.			73 18 0	
				3440 10 0
Travelling Expenses—Members of Council				427 5 2
Refreshments for Council				40 12 0
Balance, December 31, 1889 :—In Treasurer's hands			1493 19 10	
In Secretary's hands			30 13 8	
In hands of Chairman of Executive (Scotland)			100 15 9	
				1625 9 3
				£20,724 19 1

BENEVOLENT FUND, 1889.

CURRENT ACCOUNT.

Receipts.

	£	s.	d.
Balance in Treasurer's hands, Jan. 1st, 1889	248	10	3
Balance in Secretary's hands, Jan. 1st, 1889		18	10
Interest on Invested Capital and Ground Rents . .	878	10	11
Subscriptions	1477	15	9
	£2,605	15	9

Expenditure.

	£	s.	d.	£	s.	d.
Annuitants.						
39 at £35 per annum	1365	0	0			
8 at £30 ditto	240	0	0			
1 } at £30 ditto (3 quarters) 22 10 0 at £35 ditto (1 quarter) 8 15 0	31	5	0			
4 deceased during the year	61	5	0	16[illegible]5		
52						
Casual Grants.						
Members and Associates of the Society and Registered Chemists and Druggists (15).	140	0	0			
Widows of ditto (29)	229	0	0	369	0	
Grant to the Secretary's Casual Fund . .				10	0	
Payment from the Robbins' Fund . . .				5	0	
Printing, Stationery and Postage				43	2	
Balance in Treasurer's hands				**673	11	
Balance in Secretary's hands				5	13	
				£2,605	15	

CAPITAL ACCOUNT.

	£	s.	d.
Balance in Treasurer's hands, Jan. 31, 1889	72	15	6
Donations and Legacies	355	19	0
	£428	14	6

	£	s.	d.
Purchase of £400 2¾ per Cent. Consols . .	393	12	
Balance in Treasurer's hands, Dec. 31, 1889	35	2	
	£428	14	

We, the undersigned Auditors, have examined the accounts of the Pharmaceutical Society of Great Britain, as presented in the Financial Statement and Benevolent Fund Accounts, and find them correct. We have inspected the Deeds relating to the House Property and Ground Rents named below, and also find that the undermentioned Stocks were standing to the account of the Society at the Bank of England, and in the hands of the Society's Bankers, on the 31st December, 1889, viz.:—

		£	s.	d.	£	s.	d.			
General Fund	2¾ per cent. Consols	1,500	0	0						
	2½ " "	5,500	0	0	7,000	0	0			
	Freehold Ground Rents at Paddington Green, London, W., cost.				5,551	5	6			
	House in Edinburgh, cost				1,931	10	0			
	New Premises:—Galen Place, cost . .				10,209	16	8			
	" 15 & 16, Bloomsbury Sq.				3,261	18	0			
	New 2¾ % Consols (Life Members' Fund)				3,000	0	0	30,954	10	
Benevolent Fund	2¾ per cent. Consols				2,950	0	0			
	Freehold Ground Rents at Strawberry Hill, cost.				1,020	12	6			
	Freehold Ground Rents at Battersea, cost.				12,213	0	0			
	Freehold Ground Rents at Broomwood Park Estate, Wandsworth, cost.				7,454	7	10	23,638	0	
do. (Robbins Fund)	Gas Light and Coke Co. 4 % perpetual Debenture Stock.							125	0	
Secretary's Casual Relief Fund	. . Consols							105	0	
Pereira Memorial Fund . .	. . Consols							100	0	
Bell Memorial Fund . . .	. . Consols							2,050	0	
Hanbury Memorial Fund . .	. . Consols							400	0	
Redwood Memorial Fund . .	Great Indian Peninsula Railway Stock							400	0	
Hills Prize Fund	Russian Bonds							31[illegible]		

F. HARWOOD LESCHER,
S. LLOYD STACEY,
CHARLES UMNEY.
W. MANNING WATTS,
FRANCIS YATES.
} *Auditors.*

March 26, 1890.

** Note.—£427 10s. 0d. of this balance was absorbed on January 8, 1890, in the quarterly payment to the Annuitants.

The report of the Executive of the North British Branch, presented this month, shows satisfactory progress in all the departments of the Society's house in Edinburgh. The museum and library are tated to be much used, and the educational dvantages placed at the disposal of the younger members and associates appear to be highly appreiated by them.

The Divisional Secretaries for London have met n conference with members of the Council on two occasions during the year, and the interchange of views and discussion of suggestions which have taken place have proved of great value to the Council.

With a view to infusing, if possible, more inerest into the appointment of local secretaries, he Council has decided to issue the nomination papers in October instead of sending them with he annual report and Council voting papers in May. It is of the utmost importance that the most able and energetic men available should be selected or the office of local secretary, so that nothing which may tend to the interest of pharmacy may be allowed to pass unheeded. It is felt that no approach to the unity generally desired can be secured unless the members and associates n business select in their respective localities as officers of the Society men who will loyally use their best efforts to promote the interests of the Society.

During the year 193 cases of infringement of the provisions of the Pharmacy Act have been dealt with by the Registrar. In 34 of these cases it was necessary to institute proceedings against the offenders to ensure obedience to the law.

Prosecutions for the recovery in each case of more than one penalty have been instituted with success against the sellers of poisons in the shops of four limited liability companies. The unqualiied sellers were shareholders, and the companies had been obviously formed for the purpose of evading liability to penalties under the Pharmacy Act. The penalties and costs in these cases have been substantial, and it is hoped that the institution of these proceedings may act as a warning to the owners of such companies. By the judgment in the case of the Pharmaceutical Society *v.* Wheeldon, the legal process for the recovery of penalties from offenders of this kind will be facilitated.

The appeal in the Wheeldon case, full particulars of which have been reported in the Journal, was argued in February before Mr. Baron Pollock and Mr. Justice Hawkins. The formal judgment, which was reserved, was delivered by Mr. Justice Hawkins on April 29. A full report of this important and carefully considered judgment was published in the Journal of May 3, and it will be noticed that the judges had so much confidence in their interpretation of the true intent and meaning of the Pharmacy Act that they declined to allow a further appeal.

Two memorials have been received by your Council requesting that the Inland Revenue authorities should be approached with reference to inconsistency in the present administration of the Medicine Stamp Acts. The subject has received long and earnest attention, and the President has had several interviews with the authorities at Somerset House. The communications between him and the Board of Inland Revenue have been published in the *Pharmaceutical Journal*, from which it will be seen that the Board has declined to make any alteration in its mode of dealing with exemptions from medicine stamp duty.

In the last Annual Report mention was made of a memorial on railway rates, which the Council had drafted for presentation to the President of the Board of Trade. The memorial in question was forwarded in due course, and there is reason to believe that the representations therein contained have received the favourable consideration of the Department.

The Pharmacy Act Amendment Bill introduced last year into the House of Commons shared the fate of many other Bills introduced by private members, having been pressed out at the end of the session. In February of this year the Council considered, and ultimately approved of, a new Bill, having for its objects the consolidation of the Society, by granting the privileges of members to associates in business, and the restriction of the compounding of medical prescriptions to registered persons, in addition to those provisions contained in previous Bills dealing with education and examination. The President, in making the preliminary arrangements for its introduction into the House of Commons, found that an active opposition from certain members of the trade had already commenced on the ground that the Bill did not go far enough. The Council, on hearing of the impossibility of making any progress in the House in the present dead lock of legislation, unless there was a prospect of an agreement among those who were to be benefitted by it, decided not to proceed in Parliament with the Bill during the present session. It now rests with the members and associates to consider and discuss it, so that the new Council may be in a position to know what measure of support will be accorded to a similar Bill, if introduced next session.

There has been a slight diminution in the annual subscriptions to the Benevolent Fund. In 1888, the sum of £1500 was subscribed, while the amount last year only reached £1477. The amount expended in the payment of annuities and in grants to persons needing temporary assistance has, however, remained nearly the same, £2081 having been thus distributed. Four additional annuitants were elected in December last. Two legacies have been received during the year; one of £100 under the will of the late John Williams, and the other of £19 19*s.* from the Executors of the late Richard Forrest. The desirability of subscribing to one or more Orphanages has been under the consideration of your Council and the alternatives of becoming either annual subscribers, with the privilege of voting at each election, or of purchasing the right to place a child in an institution without election have been discussed. After examining the information furnished from a number of orphanages and kindred institutions, the Council concluded that it was not desirable to adopt the first course, and that the financial condition of the Fund precluded the adoption of the second at present.

Some changes have to be recorded in the list of officers of the Society. Mr. Savage, who had been a Member of Council for 28 years, did not offer himself for re-election in May last, and by his retirement the Council lost an able member. Mr. Hodgkinson, for so many years an auditor of the Society, was unable, through ill-health, again to offer himself for that position, and Mr. W. K. Hopkin also retiring, two vacancies were left in the list of auditors. These have been filled by the appointment of Mr. Charles Umney and Mr. Francis Yates.

The death roll contains many prominent names. Wm. Valentine Radley and James Slipper (former members of the Council), Harold Woolley, James Crispe (a former auditor), Henry Allen and E. E. Morrall (Bell scholars in 1877 and 1884 respectively), Richard Forrest, J. G. Shirley, F. W. Haydon, Edward Davenport, Wm. Smeeton and Charles Croyden are among those whose loss we have to record. The Society has also lost by death the services of the following Local Secretaries:—Alfred Badger (Barnsley), W. Willan (Preston), W. W. Broom (Exeter), W. G. Jackson (Hartlepool), W. H. Harrop (Crewe), G. R. Galloway (Inverness), and John Phillips (Newport); also of two Divisional Secretaries, T. O. Sandall (Fulham), and George Balls (Deptford).

The loss of an Honorary member has also to be recorded in the death of Dr. Owen Rees, who was elected in 1856.

In conclusion, it is interesting to note that the Society has entered its fiftieth year, having been founded in March, 1841, and next year it will be a question as to the most fitting way for the Society to celebrate its jubilee.

PROPOSED RESTRICTION OF THE SALE OF METHYLATED SPIRIT.

The following circular letter was forwarded to all the Local and Divisional Secretaries of the Society last Wednesday evening in order to obtain support for the application to the Chancellor of the Exchequer for the withdrawal of the provision in the Customs and Inland Revenue Bill, that methylated spirit should not be sold in less quantities than a reputed quart:—

Pharmaceutical Society of Great Britain.

May 7, 1890.

Customs and Inland Revenue Bill.

Dear Sir—The Committee stage of this Bill is down for to-morrow night in the House of Commons. I am in communication with the Chancellor of the Exchequer with a view of amending sub-section 3 of clause 32, which prevents a chemist and druggist who has a licence for the sale of methylated spirits from selling a *less* quantity than a reputed quart.

The words of the sub-section objected to are as follows:—"A Retailer of methylated spirits must not sell methylated spirits in a less quantity than a reputed quart."

The Council is of opinion that there are serious objections to this restriction, especially as it affects chemists and druggists, and you are therefore requested to be so good as to telegraph to your member asking him to be in his place in the House to-morrow night to oppose this part of the section.

I need not remind you that you must take prompt action, otherwise, this Bill, being a Government measure, will be pushed through in the course of a few hours, without amendment.

The amount disbursed will be refunded by the Secretary.—I am, dear Sir, Yours faithfully,

M. Carteighe, *President.*

P.S.—The telegram should be to "urge the withdrawal of first two lines of Sub-section 3, Clause 32, of Customs Bill."

The Pharmaceutical Journal.

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SATURDAY, MAY 10, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CONVERSAZIONE AND ANNUAL DINNER.

The publication of the annual report of the Council in this week's issue of the Journal, as well as the report of the North British Executive and other communications of present interest, occupies so much of our space that, even with the addition of a supplement, it is necessary to omit the usual *résumé* of the Council proceedings, and to refer our readers to the documents we have mentioned. We desire now to call especial attention to the fact that the week after next the several meetings by which the anniversary of the Society is celebrated will be held, and also to point out that there is an especial interest attaching to this anniversary, since the Society will then enter upon the fiftieth year of its existence. We have already notified that the Conversazione will be held in the Society's house at Bloomsbury Square on the Tuesday evening preceding the Annual General Meeting. On that occasion the whole of the Society's premises will be thrown open, including the new examination hall and the buildings that have now nearly reached completion. The Committee charged with making the arrangements is anxious to provide as far as possible for the entertainment and refreshment of visitors by providing means for free circulation through the Museum and other rooms where objects of interest will be shown. The President, Vice-President, and Council invite every member and associate who can do so to attend the conversazione and bring a lady with him. Apprentices of the Society are also invited.

On the Wednesday, after the General Meeting, the Annual Dinner of members of the Society and their friends will take place at the Freemason's Tavern, Great Queen Street, further particulars as to which will be given next week.

SALE OF METHYLATED SPIRIT.

We have pleasure in being able to inform our readers that the anticipated inconvenience that would have resulted had the provision as to the sale of methylated spirit, mentioned in last week's Journal as having been proposed in the Customs and Inland Revenue Bill now before the House of

Commons, become law, has been satisfactorily presented. This matter is referred to by a correspondent in this week's Journal, and it formed a topic of discussion at the Council meeting last Wednesday, a report of which will be found at page 928. As will there be seen, the President represented to the General Purposes Committee on Tuesday evening that this matter was urgent and the Committee authorized him to take such steps as might be found necessary for dealing with it. As the result of his representation of the case to the Inland Revenue Authorities and to the Chancellor of the Exchequer we learn that the objectionable clause providing for a imitation of the quantity of methylated spirit sold to not less than a reputed quart will be withdrawn from the Bill. On Wednesday evening a circular letter, of which a copy appears on the opposite page, was dispatched to the local and divisional secretaries, as well as to other persons likely to be of influence in moving for the withdrawal of the objectionable restriction; but we are glad to congratulate our readers on the fact that the prompt action taken by the President has fortunately rendered unnecessary any further prosecution of the steps suggested in that circular as being requisite in opposition to the proposed regulation.

Many of those communicated with wrote at once on the subject to the members of Parliament representing their districts, and thus helped to support the opposition to this part of the Bill. We are requested by the President to say that he desires to express to those who did so his thanks for their prompt and useful co-operation in preventing what would have been a very irksome and, as it is believed, useless as well as unnecessary restriction being placed upon the sale of methylated spirit. We may, however, take this opportunity of stating that we are informed the Inland Revenue authorities are in possession of evidence as to well authenticated cases in which methylated spirit has been procured from chemists' shops and used for tippling purposes. Probably it was on the basis of such evidence that the suggestion of restriction in the sale of methylated spirit has arisen. It is equally probable that the sellers of the spirit in the cases referred to were not aware of the use it would be put to, but it will obviously be necessary for chemists in their own interest to exercise some caution in the sale of this article, especially in certain localities.

THE ELECTION OF COUNCIL.

The invitation given some weeks ago in this Journal, that those who have definite views as to the trade interests requiring protection, and as to the means by which that might be effected, should communicate definite statements of those views to the Journal, for the general information of their brethren, still remains almost unresponded to, notwithstanding the fact that it has since been repeated by several correspondents. Failing such response as we looked for, and recognizing the desirability of information to guide voters in the coming election, we have been induced to make a departure from previous practice by inserting some correspondence that has been sent for publication consisting of replies to certain questions relating to pharmaceutical politics put to the several candidates for election on the Council by some members of the Society. These letters will be found in the correspondence columns. Some of the candidates have not replied to the questions, two have requested that their replies shall be treated as private. Others have replied in general terms that their opinions and past action as members of the Council have been made sufficiently public to have enabled persons interested in becoming fully acquainted with them and to render any categorical reply to specific questions superfluous. There is also much reason for doubting the value of this mode of eliciting opinions and information as to particular lines of policy, and it is further open to the objection that it is calculated unduly to tie the hands of those who may have to deal with unforeseen contingencies when acting as members of an executive body. However, fifteen out of the twenty-three candidates for election have given such replies, and we reproduce them for the benefit of our readers.

One of the questions put to candidates for election is whether they have any special views with regard to the promotion of trade interests in general. The replies are to the effect that more just regulations are desirable as to patent medicines and licences imposed on chemists; that there is need for having chemists' interests directly represented and carefully watched and protected in the House of Commons; that steps should be taken for bringing into the Society all registered chemists; for obtaining their exemption from jury service; and that every registered person should subscribe to the Society. These points represent the opinions of three of the candidates who have replied to this question. Others say that the promotion of trade interests depends upon education in its broadest sense; upon the loyalty of chemists to each other and to the Society, so that it may be made a bulwark of strength for the whole trade; upon individual excellence and corporate unity of purpose with better education and the cultivation of a professional spirit; and upon the consolidation of the Pharmaceutical Society. These expressions of opinion do not throw much new light upon the subject, nor do they furnish any indication of the trade interests assumed to have been neglected by the Council, or show how those interests might be better cared for. On the contrary, they all tend to show that the Society has not been properly supported by the trade which expects to derive benefit from the action of its executive body. Some of them ignore the efforts that have been made to render the Society more thoroughly representative, and as regards the statements that trade interests have been disregarded or insufficiently considered, there is a total absence of any evidence or even assertion that this has been the case. Moreover some of the points referred to in these opinions could not be dealt with at all, unless the representative power of the Society were far greater than it is, and the attainment of other points has been rendered impossible by the opposition offered to the Society. Exemption from jury service, for instance, might have been long since the privilege of every chemist, if it had not been that so many abstained from joining the Society, so that when the question came before the Legislature, the only tangible body upon which exemption could be conferred was that of pharmaceutical chemists. Since that time there has been only one Juries Bill before Parliament, and then the Council, on the motion of Mr. Bottle, took steps to obtain the insertion of chemists and druggists among the classes of persons to be exempted. That was successfully done, but the Bill was not passed, and there the matter has remained. It is therefore to a great extent in consequence of the antagonism of the trade to the Society that chemists have been left out in the cold in this respect. This is also the case in regard to dispensing, which the Society has again and again sought to obtain a restriction of. That was opposed in 1865, and it has again been opposed by the trade in the Bill which has just been withdrawn. It is scarcely necessary to add that the improved educational system, by which the general interests of pharmacy would be most securely promoted, has also been opposed by the trade in favour of a system by which cheap labour can be obtained from apprentices who for their own sake ought never to be led to dream of obtaining their living by pharmacy, and for the interest of the general body ought never to be admitted to any position in connection with it.

Among the other questions, there are two relating to the position of associates in the Society. Almost all of the replies are in favour of an extension of the franchise to associates, and all are in favour of making associates in business eligible as members of Council. But this is precisely what the Council has been desirous of doing for years past, and has endeavoured to do, not only in the Bill submitted to the Privy Council in 1883, but more especially in the last Bill, which was withdrawn in consequence of the opposition of the trade. It is worth notice in connection with this circumstance that all the candidates who are put forward as representing trade interests are agreed in thinking that the first step to be taken in that direction is to establish unity among those engaged in the business, and to consolidate the Society as the actual representative of the whole body. They appear to be unaware of the fact that the Council has for years been striving to effect those objects, and that it has uniformly met with more or less opposition from the trade. So far as the achievement of this object by the reconstitution of the Society in favour of associates is concerned, it is the opposition to the Council that has been the means of preventing that result, and it is well that those who are especially interested should be acquainted with the fact. Passing on to the other questions, that relating to unqualified persons carrying on business or engaged in dispensing in surgeries, public institutions, etc., there seems to be in the question itself a certain degree of confusion of distinct matters, which renders a direct reply difficult. Having regard to general principle the replies would be necessarily different from those given if the powers of the Society alone were considered. This circumstance appears to have, in some instances, influenced the minds of those replying to this question. Thus we have on the one hand a number of unqualified affirmatives in favour of more active preventive steps by the Society, quite irrespective of its present powers or of any probability of their being enlarged, and, as we cannot help thinking, without full acquaintance with what has been done in this direction to enforce observance of the Pharmacy Acts. On the other hand it is stated that in the interests of public safety all persons engaged in dispensing should be qualified themselves or act under the efficient supervision of someone who is qualified; that prudent, well-considered steps should be taken in the direction indicated by the question, while some suggest that, however desirable the suggested reforms, the matter referred to is a little beyond the control of the Society's Council, and others discreetly abstain from expressing any opinion at all. The fourth question goes more directly to the point, and its directness has the advantage of eliciting from most of those who reply to it a more or less emphatic though regretful negative of the idea that anything can now be done to prevent "store" dispensing, the sale of drugs by grocers, etc., and to secure for registered persons a monopoly of the sale of drugs. Only three of the replies to this question are to a distinctly contrary effect; but of those one fails to show how such an object is to be effected, the second is limited to articles that are already subject to such restriction, and the third is dependent upon the problematical success of a Poisons Bill devised to secure protection to a particular trade. Free trade and competition, not always too strictly regulated by loyal regard for general trade interests, have created such a widespread desire to do every other person's business as well as one's own, and such an appetite for cheap wares, that the natural principle that a man must live has been pretty well eclipsed by the harder experience that he cannot live by the legitimate exercise of his calling. This as an experience of all kinds of trade, and it is one from which chemists are by no means exempt; but there is too much reason for thinking that their sufferings in this respect are largely the result of a perverse persistence in hostility to an organization which they might have made useful to themselves and others as a means of protection and of mitigating the effects of the mutual invasion of trades and of unwholesome competition.

It will be seen from the report on another page, that information has been received of the death of Mr. William Atherton, who was elected an Annuitant on the Benevolent Fund in 1876.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 7, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Evans, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Robbins, and Southall.

The minutes of the previous meeting were read and confirmed.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Barclay, John
Bethune, Andrew Wright.
Boa, Peter.
Boucher, Charles Ernest.
Carswell, Thomas Ritson.
Everett, John Garwood.
Jenson, Alexander Benjamin.
Le Cudennec, Louis Edouard.
Maxwell, Thomas Wellwood.
Morrow, Charles.
Mundy, Alfred Jones.
Pilkington, William.
Roberts, Robert.
Symes, Charles Frederick.
Umney, John Charles.
Westmacott, George Leonard.
Wyatt, William.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barclay, John	Birmingham.
Boa, Peter	Edinburgh.
Brown, James Joseph	London.
Carman, Frederick Henry	Haddiscoe.
Carswell, Thomas Retson	Edinburgh.
Cowie, George	Aberdeen.
Davies, David Sidney	London.
Everett, John Garwood	Falkenham.
Fuller, George Sydney	London.
Le Cudennec, Louis Edouard	Mauritius.
Maxwell, Thomas Wellwood	Montrose.
Morrow, Charles	London.
Mundy, Alfred Jones	London.
Pilkington, William	Buxton.
Roberts, Robert	London.
Smith, Frederick	Oxford.
Stonham, Herbert Lovett	Maidstone.
Symes, Charles Frederick	Liverpool.
Tabor, Thomas Slade	London.
Umney, John Charles	London.
Westmacott, George Leonard	Manchester.
Wyatt, William	Lancaster.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Bew, John	Manchester.
Dewar, Francis Lyon	Edinburgh.
Litchfield, William	Longton.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Allan, Charles Joseph	Camborne.
Aplin, John Dare	Romsey.
Baker, Henry Whitmore	Buxton.
Brookes, Tom	Hornsey.
Chantry, John Henry	Southborough.
Davies, Daniel Thomas	West Hampstead.
Dobson, Fred Ainsworth	Birkenhead.
Doe, Walter James	Leyton.
Dyson, Alfred	Grays.
Evans, Alfred Herbert	Dorchester.
Evans, Stephen William	Middleton.
Fulcher, Herbert Ashton	Tewkesbury.
Gale, William Gillam	Dalston.
Gossling, William Richard	Southsea.
Gould, William Emanuel	Teddington.
Hamlin, Charles Booth	Wood Green.
Hartridge, James Hills	Highgate.
Heath, Jonathan Lucas	Derby.
Henderson, Thomas Cuthbert	Stornoway.
Jeans, Edward	Manchester.
Jessop, Sam	Nelson.
Johnson, Walter Edmund	Southampton.
Jones, James	Great Crosby.
Kay, James Spencer	Middleton.
Kennedy, Alexander	Glasgow.
Kennett, John Nash	Weybridge.
Kloss, Sidney Albert	Chelsea.
Knapp, Charles Ricketts	Birkenhead.
Lawrenson, John	Manchester.
Longman, Samuel Hurman	West Cowes.
McDonald, George	Glasgow.
Nichols, Frederic Bulstrode	Petersfield.
Parkes, Geo. James Robert	Kilburn.
Pratt, Alfred James	Southsea.
Rowe, Frank	Starcross.
Smith, Charles	Rushden.
Spurr, Herbert Edward	Huddersfield.
Thirsk, Arthur Tom	Hull.
Thompson, Henry Clarence	Liverpool.
Tothill, Mortimer A. Legett	Cape Town.
Wallbridge, John George	Stalybridge.
Watt, Arthur	Bervil.
West, George William	Stokesley.
Wing, Arthur Joseph	Woolwich.
Wood, Alfred Lyon	Stonehaven.

Modified.

Mortimer, David Alexander	Aberdeen.
Ritchie, David	Aberdeen.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Abrines, Gustave A.	London.
Adams, Arthur Edward	Cleobury Mortimer.
Allison, Henry	Birmingham.
Beattie, James Brown	Fife.
Bell, Peter	Edinburgh.
Billyard, William Frederick	Boston.
Black, Albert Edward	Newport, I.W.
Blore, George James	Uttoxeter.
Brittain, Florence	Birmingham.
Brown, John	Edinburgh.
Buckley, John Davies	Leominster.
Burton, Percy Herbert	London.
Clarke, James	Liverpool.
Coulter, Charles	Walthamstow.

Cranstone, Ernest Haughton	Hemel Hempstead.
Curtis, George	Aberdeen.
Dean, John Thomas	Haslingden.
Dodd, Henry Vincent	Slough.
Durno, Alexander Elmslie	Aberdeen.
Ellis, Ernest Frederick	Topsham.
Essery, William George	Plymouth.
Fairburn, Henry	Hutton Bonville.
Fitt, Cyril H. Christian	Norwich.
Fletcher, John	Scunthorpe.
Gay, Valentine Henry	London.
Gedge, Augustus Westly	Bristol.
Graham, Charles Heskey	Liverpool.
Haining, Edward	Dumfries.
Handley, Hugh	Wisbeach.
Harding, Henry James Cooper	Sudbury.
Harper, William	Turriff.
Hazlitt, Harry Haworth	Bury.
Henshall, Harry	Lymm.
Kay, Charles William	Leeds.
Kemp, Cecil Tabor	Bournemouth.
Marshall, Charles Bushby	Shrewsbury.
Morgan, Alfred	Market Drayton.
Morley, Charles	Beverley.
Morris, Caleb Gwion	St. Clears.
Nurthen, Frederick William	London.
Ogden, Alfred	Radcliffe.
Pass, William Hall	Macclesfield.
Perkin, Robert James	Milford Haven.
Qualtrough, Thomas Stanley	Douglas.
Quarmby, Thomas William	Market Drayton.
Riding, William John	Ormskirk.
Rogers, Charles Henry	Ipswich.
Ross, Charles	London.
Scott, James Hugill	Penrith.
Sewell, James Walker	Darlington.
Shepheard, W. Fredk. John	Chester.
Sherlock, Edward Birchall	St. Helens.
Silversides, Richard B. Garbutt	Darlington.
Skinner, Gedwin John	Seaton.
Spence, Alexander	Linlithgow.
Spink, Arthur Bowman	Westminster.
Stewart, James Tennent	Dumfries.
Taylor, Herbert Henry	Rugby.
Thomas, William John	Dorrington.
Thursfield, Bevington	Kettering.
Vinden, Frederick William	London.
Waind, Walter Harry	Kirby Moorside.
Williams, Arthur Harold	Chester.
Williams, Thomas John	Plymouth.
Wilson, Richard Henry	Elton.
Woodward, James Henry	Spalding.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Booth, Samuel Verdon	Sheffield.
Bowness, Samuel Wesley	Ambleside.
Broom, Frank Willey	Exeter.
Chase, Henry John	London.
Connan, Campbell Allan	Crieff.
Cornfoot, Thomas Boots	Faversham.
Dewhurst, William	Blackburn.
Elliott, Edward Matthews	Wallsall.
France, William Henry	Rotherham.
Fynn, Robert Hudson	Cambridge.
Haslam, George Thomas	Skegness.
Hicks, Frederick Joel	Camborne.
Hollow, Daniel, jun.	St. Ives, Cornwall.
Hoskins, Augustus Stevens	London.
Innes, John	Dufftown.
Jenkins, Thomas Henry	St. Davids.
Johnstone, Robert Ross	Cromarty.
King, Frank Herbert	London.
Mansell, Thomas Caleb	London.
Mountcastle, William James	Knutsford.
Parker, Thomas	Coniscliffe.
Perrett, George Stanley	Bath.
Plant, Thomas	Hanley.
Polgreen, Cyril	Plymouth.
Richmond, Stewart	Swansea.
Rigby, Walter	Barnsley.
Robey, George Robert	Lowestoft.
Shaw, Tom	Rochdale.
Shearman, John Samuel	Cambridge.
Simpson, Willie Weightman	Louth.
Soper, Henry	Plymouth.
Spivey, Fred	Huddersfield.
Stow, Norman Vincent	Castle Northwich.
Thornton, Frank Butler	London.
Tully, Fred. Herman	Ashburton.
Tupman, Herbert Wyke	Teignmouth.
Twelves, Charles Henry	Whittington Moor
Wharmby, Walter Frederick	Mansfield.
Whitby, Arthur	Birmingham.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Raphael Charles Humfrey, 83, Barton Street, Gloucester.
Wilfred Burnham Southgate, 97, Middleton Street, Hull.

ADDITIONS TO THE REGISTER.

The Registrar reported that

Thomas Briers, 2, King Villas, Southgate, London, N., and
James Giles Hoyle, Corporation Street, Clitheroe,

having severally made declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been duly supported, their names had been placed on the Register.

REPORT OF THE EXECUTIVE, NORTH BRITISH BRANCH.

The following report from the Executive of the North British Branch was presented:—

Report of the Executive of the North British Branch.

"The Executive of the North British Branch has now to submit the following report on the work of the year from March, 1889, to March, 1890.

"At a meeting of Executive held on April 24, 1889, it was arranged that the annual election should take place on Wednesday, June 19, 1889; and the present Executive was accordingly elected at a meeting of members and associates in business of the Society residing in Scotland, held on the above date.

"The Executive has held three meetings during the year. At the first meeting on June 27, 1889, Mr. William Gilmour, Edinburgh, was elected Chairman, and Mr. David Storrar, Kirkcaldy, Vice-Chairman; and the resident members were appointed a General Purposes Committee to attend to business arising in the interval between meetings of the Executive.

"The General Purposes Committee has met twice and has had charge of the Evening Meetings and the cleaning and painting of the Society's House.

"At the meeting of Executive on November 20, 1889, the following were nominated for election by the Council as the Board of Examiners for Scotland for 1890:—William Inglis Clark, David Brown Dott, Adam Gibson, William Gilmour, Alexander Kinninmont, Thomas Maben, John Nesbit, and John Bertram Stephenson.

"The financial statement up to December 31, 1889, has already been forwarded to the Council.

"The following particulars indicate that the departments connected with the Branch continue in a satisactory condition:—

"*The Examinations.*—The Examinations continue to be conducted as formerly. A more extended experience of the alterations in the dispensing department confirms the favourable opinion expressed in last year's report.

"*Evening Meetings.*—The Evening Scientific Meetngs of the Society in Edinburgh have been continued during the past session, four such meetings having been held. The Executive were fortunate in securing the services of Professor T. R. Fraser for the opening lecture, and several interesting and valuable papers have been read during the session. The Executive desire to record their thanks to those gentlemen who have rendered valuable service in this way. The attendance at the meetings has been well sustained. It is becoming increasingly difficult to obtain a supply of suitable communications for these meetings, and the Executive regret to say that from this and other unavoidable causes they found it impossible to carry out their intention of having meetings in December and January.

"*Library.*—During the year a number of new and valuable books have been added to the Library by purchase, and a few by donation. The complete duplicate set of the *Pharmaceutical Journal* purchased during the year has given general satisfaction and supplied a much felt want. The Library continues to be largely taken advantage of in the manner described in last year's report. The circulation of books again shows an increase, as will be seen from the following statement:—

	1888-89.	1889-90.
April	56	88
May	116	103
June	98	71
July	56	94
August	37	49
September	77	78
October	60	121
November	62	110
December	62	99
January	65	118
February	79	94
March	106	89
	874	1114
		874
Increase		240

"The circulation consists mainly of new and standard works recently added; the demand for some of these being so great that several readers have frequently to wait their turn. The circulation of books to provincial chemists shows a slight increase as compared with last year. During the twelve months (1888–89) 65 volumes were circulated to readers outside Edinburgh and Leith. During the twelve months (1889–90) 79 volumes have been so circulated. The number of books in the Library now exceeds the capacity of the bookcases, fitted up four years ago, and the Executive recommend that additional shelving be provided.

"*Museum.*—The Executive desire to record their thanks to several donors of valuable specimens received during the year. The collection has also been further enriched by interesting duplicate specimens from the Society's Museum in Bloomsbury Square. The students' specimens of materia medica have been frequently renewed and the whole collection has been recently overhauled and replenished wherever necessary.

"The attendances at the Society's Library and Museum in Edinburgh are shown by the following table:—

Attendance of Visitors during the Year from March, 1889, *to March*, 1890.

		Day.	Evening.	Total.
1889	April	208	129	337
	May	183	110	293
	June	143	100	243
	July	228	113	341
	August	37	closed	37
	September	124	closed	124
	October	229	141	370
	November	165	140	305
	December	157	95	252
1890	January	162	110	272
	February	103	115	218
	March	125	109	234
	Totals	1864	1162	3026
	Totals for previous twelve months	2174	1039	3213
			Decrease	187

"The above indicates a slight decrease on the previous twelve months, but the attendances are still very satisfactory.

"The Library and Museum continue to be largely taken advantage of for reference by local and provincial chemists. The conduct of students also continues to give satisfaction.

"*House.*—The cleaning and painting recommended in last year's report were satisfactorily executed during the autumn holidays at a cost of about £21. The whole property and furnishings of the Society in Edinburgh are now in good order.

"*April* 16, 1890. W. Gilmour, Chairman."

Mr. Martin moved that the report be received and entered on the minutes.

Mr. Evans seconded the motion.

The President, in putting the motion, said the report was very satisfactory, and it was very gratifying to find that the Executive took so much interest in the detailed work of the Society in Scotland, that the house and premises were made such good use of, and that in fact the Society was as well represented in Edinburgh for the whole of Scotland as it was in London for the whole of Great Britain. He might take this opportunity of referring to what took place some years ago when the house in Edinburgh was purchased. Some of the Scotch friends then expressed the hope and belief, and almost promised, that more subscribers would be obtained, but he had not noticed that that expectation had been realized. Perhaps the friends in the north would endeavour to carry it out during the coming year.

The motion was carried unanimously.

Report of the Finance Committee.

The report of this Committee was of the usual character, and recommended various accounts for payment.

The President, as Chairman of the Committee, moved the adoption of the report and recommendations. The receipts had been, as usual in April, rather large, the subscriptions being received to a great extent in that month, and there was also a considerable amount for examination fees. On the Benevolent Fund account the dividends on consols had been received, and he might mention that there was now a sum of nearly £3000 in consols awaiting a favourable opportunity for investment in freehold ground rents. One ground rent had also been received and £650 in subscriptions, which was a very handsome sum, and he congratulated the Local Secretaries and those who took an interest in the work on what they had done. The payments were of the usual kind, and required no comment.

Mr. Martindale seconded the motion, which was at once agreed to.

Report of the Benevolent Fund Committee.

The report of this Committee included a recommendation of the following grants:—

£5 to a pharmaceutical chemist member (age 51), from 1870 to 1886. Applicant had been in business many years, but had to give it up, owing to an attack of paralysis. (Surrey).

£15 to the widow (age 58) of a registered chemist and druggist who died in 1888, insolvent. She has two children and a grandchild dependent on her. (Norfolk).

£5 to the widow (age 46) of a registered chemist and druggist who died in February last, leaving her with four young children unprovided for. (Kent).

£10 to the widow (age 43) of a registered chemist and druggist. She has had two previous grants of like amount. Has six children wholly or partially dependent on her. (Cardiff).

£5 to a registered chemist and druggist (age 64) who has a chronic disease which prevents him doing much. He had a grant of £10 last year. (London).

£10 to the widow (age 41) of a registered chemist and druggist, who committed suicide lately from pecuniary embarrassment, leaving applicant with four young children dependent upon her. (Staffordshire).

£10 to the widow (age 44) of a member from 1853 to 1887. Applicant has had two previous grants of £10 each; she has five children dependent upon her. (Yorkshire).

£5 to a registered chemist and druggist (age 76) and subscriber to the Fund from 1876–79. He carried on business for 29 years, but is now beyond work. (King's Lynn).

£10 to the widow (age 62) of a registered chemist and druggist, who died in 1877. She is in very bad health. (London).

Two other applications the Committee had declined to entertain.

Death of Two Annuitants.

The Secretary had reported the death, on April 16, of Mrs. Augusta Jones, who was elected an annuitant in 1888, and of Mr. William Atherton, aged 74, who was elected in 1876.

The Vice-President, as Chairman of this Committee, moved the adoption of the report and recommendations, which contained nothing requiring special notice. He said the number of applications had been rather large, but they were of the usual character.

Mr. Atkins said he had received a letter from a very well known gentleman in North Wilts, saying how much the assistance rendered to the late Mrs. Jones had been appreciated in the neighbourhood.

The President said it was very satisfactory to find that the Society's efforts were appreciated outside its own ranks.

Report of the Library, Museum, Laboratory and House Committee.

LIBRARY.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
March	Day . .	731	39	15	28
	Evening .	199	21	4	9

Circulation of books.	Total.	Town.	Country.	Carriage paid.
March	279	157	122	£1 12 5

The undermentioned donations to the Library h been received, and the Committee recommended th the usual letter of thanks be sent to the respecti donors:—

For the Library in London—

Geological and Natural History Survey of Canad Annual Report, 1887–88. From the Surve

College of Preceptors, Calendar, 1890. From the Colleg

Martindale and Westcott, Extra Pharmacop 6th Ed., 1890. From Mr. W. Martindal

Cathelineau (H.), L'Ouabaïo, poison des Somali 1889. From L'École Supérieure d Pharmacie de Par

Société des Pharmaciens de l'Eure, Bulletin, N 16. From the Sociét

Flückiger (F. A.), Gegenwärtiger Stand unser Kenntnis des Curare, 1890. From the Autho

Dymock, Warden, and Hooper, Pharmacographi Indica, part 2, 1890. From the Autho

For the Library in Edinburgh—

Martindale and Westcott, Extra Pharmacopœia, 6th edition, 1890. From Mr. W. Martindale

Victoria, Pharmaceutical Register for 1889. From the Pharmacy Boar

Brown, Complete Herbalist, 1871. From Mr. George Shear

The Committee recommended that the undermentioned works be purchased:—

For the Library in London—

Extra Pharmacopœia, 6th edition.

Van't Hoff, Dix Années dans l'Histoire d'une Théorie.

Wislicenus, Räumliche Anordnung der Atome.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Averag
March	Morning	617	38	13	23
	Evening	105	8	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Museum in London.

Three specimens of Massoi bark. From Professor Van Eeden, Haarlem.

Specimen of Sandal wood oil distilled from Paraguay Sandal wood. From Messrs. Wright, Layman and Umney.

Specimen of oil of Star-anise from Tonkin and of a species of Artemisia from West Africa. From Mr. Meyjes.

Specimens of the Hiccup nut (*Poirea bracteosa*). From Mr. J. Medley Wood, Durban.

For the Museum in Edinburgh—

Fruit of *Areca Catechu* and leaves of *Chavica Betel*. From Messrs. J. Robertson and Co.

Two large tubercles of Jalap and two varieties of Chinese Galls. From Messrs. T. and H. Smith and Co.

Specimen of Trichloracetic Acid. From Mr. Alexander Kinninmont.

Specimen of Dyak Arrow Poison from Borneo. From Mr. R. Jamie.

The Committee had considered and finally approved the draft of the Annual Report.

The President, as Chairman of the Committee, moved the adoption of the report, which was unanimously agreed to.

REPORT OF THE CONVERSAZIONE COMMITTEE.

This Committee had held two meetings, and reported that arrangements had been made for the exhibition of objects of scientific interest, and for vocal and instrumental music, on the occasion of the Conversazione.

The **PRESIDENT**, as Chairman of the Committee, moved the adoption of the report and recommendations. He said a good many details had been considered, and it was hoped there would be a large attendance. It was proposed to have the band of the Coldstream Guards in the Examination Hall, in one corner of which the reception would take place. In the Lecture Theatre glees and part songs would be given throughout the evening, the doors being closed when the hall was full, and a change of programme and a change of audience taking place from time to time. It was hoped this would provide the needful rest for visitors, as it would be impossible, with due regard for facilities in moving about, to make very ample accommodation for sitting down. Refreshments would be served in the old examination rooms, and in the first-floor rooms of No. 16, Bloomsbury Square. The Committee was anxious as far as possible to provide that the entertainment and refreshment of the visitors should be so arranged that there should be a general circulation throughout the building during the evening. In the Museum and other rooms it was hoped there would be something interesting to show, but those arrangements were not yet complete. He hoped every member and every associate would attend, and bring a lady with him, the main object of the members of the Council being to have an opportunity of talking to friends whom they had very few opportunities of seeing.

Mr. **ROBBINS** seconded the motion, which was carried unanimously.

THE NOTTINGHAM AND NOTTS CHEMISTS' ASSISTANTS' ASSOCIATION.

The **PRESIDENT** said an application had been received from this Association for assistance in its educational operations. The ordinary course was to refer such an application to the Library and Museum Committee, which would consider it and report at the next meeting of Council. He might, however, be permitted to say that so far as he had been able to see, the educational part of the work done at Nottingham was extremely well done, and, thanks to the assistance which the University College at Nottingham afforded, a considerable number of men had been educated. He had examined a number of men who had been apprenticed in and acquired their knowledge at Nottingham, and they had passed most creditably. That being the case, he was quite sure the Committee would approach the consideration of the application with a desire to give it a favourable reply.

The motion to refer the letter to the Committee having been carried,

Mr. **EVANS** asked if there would be a reasonable probability of the Society rendering assistance to some of the colleges which he hoped would soon be established in Wales, as the result of the new Education Act, if proper laboratories were put up suitable to give the education required by students of pharmacy.

The **PRESIDENT** said what had been done hitherto—and he had no doubt that succeeding Councils would follow the same line—was to supplement the facilities of local colleges, in order that the special instruction required by pharmaceutical students might be provided. For instance, in most of these colleges there would be instruction in chemistry, but in pharmacy, and in botany the instruction offered might be too limited for pharmaceutical purposes. In such cases the Society had been in the habit of dealing as liberally as the case demanded, by making the general course rather more technical.

REPORT OF THE GENERAL PURPOSES COMMITTEE.

The report of this Committee included the reports from the Professors on the examinations for the winter course, the substance of which was as follows:—

Practical Chemistry.

Professor Attfield had reported that every bench in the Laboratories had been occupied, and that the progress of the class had been very satisfactory. Thirty-one pupils had competed for the prizes.

Chemistry.

Professor Dunstan had reported that nineteen students had competed in this class. The papers as a whole indicated a sound knowledge of the elements of chemistry. The order, attendance and diligence of the class had also been very satisfactory. The majority of the pupils were now attending the advanced course.

Botany.

Professor Green had reported that fourteen pupils had competed for the prizes; he was satisfied with the way in which the majority did their work, and the best papers were quite up to his expectations.

Materia Medica.

Mr. Holmes had reported that there had been seventeen competitors for the prize in this class. The first paper had no error in it, and the next two only one mistake each. The next eight were also very good.

Pharmacy and Practical Pharmacy.

Mr. Ince had reported that there had been thirteen competitors for the prize in this class, of whom five obtained 75 per cent. or more of the possible marks.

Acting on the above reports, the Committee recommended that the following awards be made:—

Practical Chemistry.

Bronze Medal	John Charles Umney.
Certificates of Honour	Edward Birchall Sherlock. Charles Ernest Boucher.

Chemistry.

Bronze Medal	Charles Ernest Boucher.
Certificates of Honour	Edward Birchall Sherlock. Harry W. Kilby Pears.

Botany.

Bronze Medal	Charles Ernest Boucher.
Certificates of Honour	Harry W. Kilby Pears. Harry Howes Sturch.

Materia Medica.

Bronze Medal	Harry W. Kilby Pears.

Pharmacy and Practical Pharmacy.

Bronze Medal	Harry W. Kilby Pears.

Solicitors' Report.

The usual letter had been received from the Solicitors. Reference was made to the appeal in Wheeldon's case, of which a full report has appeared in the Journal. One defendant had paid into Court the amount of five penalties and costs prior to the hearing. Another had confessed judgment and offered to pay by instalments. The progress made in certain other cases was reported, and in a subsequent letter the Solicitors had reported the payment into Court of the penalty and costs by another defendant.

Some other cases had been considered by the Committee and proceedings recommended.

Sale of Poisons.

The communication from the Privy Council, enclosing a letter from the Battersea Ratepayers Protection Association with regard to the alleged "heedless sale of poisons," which had been referred to the Committee by the Council, had been considered and it was recom-

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1889–90.

	Committees held Once a Month or Oftener.		Committees held Occasionally.			
	Finance.	Library, Museum, Laboratory, and House.	Benevolent Fund.	General Purposes.	Special Committees.	Total Number of Attendances.
Number of Committee Meetings held.	12	11	11	11		
Abraham (*Liverpool*)	7	*	*	7	*	14
Allen (*London*)	11	10	*	11	11	43
Atkins (*Salisbury*)	*	9	11	11	3	34
Bottle (*Dover*)	1	10	10	10	19	50
Carteighe (*London*)	12	11	0	11	30	64
Cross (*Shrewsbury*)	11	5	*	11	*	27
Evans (*Llanelly*)	4	1	*	4	*	9
Gostling (*Diss*)	*	*	7	8	3	18
Greenish (*London*)	*	9	6	7	10	32
Hampson (*London*)	*	10	*	10	7	27
Harrison (*Sunderland*)	3	*	*	8	1	12
Hills (*London*)	9	7	*	11	11	38
Leigh (*Brighton*)	*	*	10	11	*	21
Martin (*Newcastle-on-Tyne*)	9	9	*	9	4	31
Martindale (*London*)	*	11	9	11	7	38
Newsholme (*Sheffield*)	11	*	*	11	2	24
Richardson (*Leicester*)	*	8	6	5	4	23
Robbins (*London*)	*	7	9	8	10	34
Schacht (*Clifton*)	8	1	*	8	7	24
Southall (*Birmingham*)	*	0	8	8	*	16
Watt (*Haddington*)	*	*	6	6	1	13

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1889–90.

Abraham, Alfred Clay	7	Gostling, Thomas Preston	10	Martindale, William	11
Allen, Charles Bowen	11	Greenish, Thomas	9	Newsholme, G. Thos. Wilkinson	11
Atkins, Samuel Ralph	11	Hampson, Robert	10	Richardson, John George Fredk.	9
Bottle, Alexander	10	Harrison, John	9	Robbins, John	11
Carteighe, Michael	11	Hills, Walter	11	Schacht, George Frederick	8
Cross, William Gowen	11	Leigh, Marshall	11	Southall, Alfred	9
Evans, Gwilym	6	Martin, Nicholas Henry	9	Watt, James	6

Number of Meetings during the year, 11.

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* Not appointed on this Committee.

mended that the Registrar be instructed to inform the Privy Council that all cases of illegal sale of poisons reported to the Society were dealt with under the provisions of the Pharmacy Act, 1868.

The Sale of Methylated Spirits.

A clause in the Customs and Inland Revenue Bill relating to this matter had been considered, and the President had been requested to put himself in communication with the Government to see if any amendment of the clause in question can be obtained, when the Bill is in committee, in favour of the sale by retailers of smaller quantities than a reputed quart.

The portion of the report relating to the Professors' reports having been agreed to, the Council went into Committee to consider the remainder. On resuming, the report and recommendations of the Committee were unanimously agreed to.

Report of Examinations.

April, 1890.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (16th)	4	3	1
„ (17th)	4	2	2
„ (18th)	5	5	0
„ (23rd)	3	1	2
„ (24th)	3	3	0
	— 19	—14	— 5
Minor (16th)	32	14	18
„ (17th)	31	12	19
„ (18th)	31	9	22
„ (23rd)	33	15	18
„ (24th)	31	16	15
„ (25th)	36	15	21
	—194	—81	—113
	213	95	118

SCOTLAND.

	Candidates Examined.	Passed.	Failed.
Major (23rd)	4	3	1
Minor (23rd)	11	4	7
„ (24th)	16	10	6
„ (25th)	14	9	5
„ (29th)	15	6	9
„ (30th)	15	8	7
	—71	—37	—34
	75	40	35

Preliminary Examination.

	Candidates Examined.	Passed.	Failed.
(8th)	381	160	221.

(25th)—Thirteen certificates were received in lieu of the Society's examination.

Methylated Spirit.

The **President** said he had received letters from Mr. Wilkinson, of Manchester, and several others, calling attention to the Customs and Inland Revenue Bill and to the clause dealing with the sale of methylated spirit, an abstract of which had been published in the Journal. As the matter was somewhat urgent he had on the previous evening brought it before the General Purposes Committee, which had authorized him to approach the Government on the subject. The clause proposed that in future retailers of methylated spirit should not be allowed to sell less than a reputed quart. It appeared that a large number of those engaged in the drug trade were in the habit of selling in smaller quantities, and it was believed that the new regulation would be not only detrimental to them, but inconvenient and possibly dangerous to the public. He believed one of the objects of the excise authorities was to prevent the tippling of methylated spirit, and there was a very strong feeling in the House of Commons in favour of doing everything possible to prevent that practice, but it appeared to the General Purposes Committee that such a regulation would have the very opposite effect to that intended. No doubt another object was to be able to some extent to follow the sale of methylated spirit more easily. There was a provision that methylators might sell a quantity limited as before to five gallons in reputed quart bottles; and apparently the notion was that it should be dealt with as a sort of proprietary article, passed along through the retailer to the public in bottles which came originally from the maker. It would be very inconvenient to the public to have to buy so much methylated spirit at a time; the spirit was used in small quantities for various domestic and medical purposes, and in these days of travelling it would be a very serious inconvenience to be obliged always to purchase such a large quantity. Of course some business men might say that they would be able to sell small quantities of medicated spirits of wine at a higher price, and that would probably be the case, but from a temperance point of view it would probably be more harmful. As the Bill was being rushed through the House, he would ask the Council to accept the recommendation of the Committee that he should see the excise authorities, and if necessary the Chancellor of the Exchequer, and try if any modification could be obtained. Possibly the Commissioners, if they would not alter the Bill, might be disposed to make some exception in favour of registered chemists and druggists, who were an educated and respectable class of men.

Mr. **Hampson** said the great objection to the proposal was the utterly un-English character of the restrictions on the liberty of the purchaser, and he thought the Council ought to protest on principle against such a measure, unless there were an astonishing amount of evidence, of which at present they knew nothing, with regard to the danger of selling small quantities. A student wanted methylated spirits for his lamp, and artisans who wanted it for cleaning and polishing purposes did not want to buy a quart at a time. He hoped every means would be taken to bring pressure to bear on members of Parliament to induce them to vote against such a proposal. He thought it would be well if local secretaries were telegraphed to.

Mr. **Harrison** said it could not be too clearly pointed out that this proposal, instead of checking what might be called the illegal consumption of methylated spirit would rather tend to increase it; not only from the fact that a larger quantity would be placed in a person's hands than he required, but because in all probability the methylator would adopt some attractive mode of bottling it, and place it in the hands of all who might choose to take out a licence, many of whom would be persons not of the character and education of chemists and druggists, who would naturally desire to discourage any improper use of it.

Mr. **Atkins** was glad the President proposed to take prompt action in this matter. The more he thought upon it the more clear seemed the necessity of doing what could be done to prevent this Bill being rushed through in the hurried way which was proposed. Up to the present he had had no knowledge of the suggested evils arising from the sale of methylated spirit, but he quite agreed that so far as one could see any such evils were more likely to be increased by proposed legislation. In all probability the trade in this article, which in some places was of considerable importance, would gradually drift away, and it would become in a sense a packed or proprietary article, which would pass out of the hands of chemists and druggists altogether.

Mr. **Hampson** suggested that the London divisional secretaries might be set in motion, in order to bring pressure to bear on the promoters of the Bill.

Mr. **Hills** agreed in the views expressed by previous speakers. He had been informed by a chemist who had considerable experience in a manufacturing town in the West of England, that he had never had reason to suspect tippling on the part of small buyers of methylated spirits, who required it for the purposes of their trade; the only case where he did suspect such a thing was where a person bought a considerable quantity at a time, and he in that case took means which he need not explain to stop it.

The **Vice-President** having read clause 32 of the Bill said it appeared to contemplate wine merchants and publicans selling methylated spirit, which it appeared to him would be very objectionable.

Mr. **Allen** said he so understood the clause, and it would obviously tend to increase the evil against which temperance reformers were contending.

Mr. **Abraham** asked if it meant that those who supplied the spirit in retail quantities would not be allowed to have it in bulk?

The **President** said it did not say so. As he read it the ordinary retailer might have a five gallon jar, and retail it in quarts; but a publican or wine merchant would only be allowed to have it in his possession in vessels containing not less than a reputed quart.

Mr. **Southall** remarked that at present publicans were not allowed to sell it at all.

Mr. **Martindale** said the great objection was in the case of travellers. It would be an intolerable hardship if persons accustomed to use it could not obtain less than a pint and a half.

Mr. **Hampson** pointed out that the association of methylated spirit with other spirits in a wine merchant's or publican's establishment would be an evil in itself. It would take it out of the category of chemical and manufacturing articles, and place it beside whiskey and rum.

Mr. **Gostling** said if one object of the Legislature was to prevent methylated spirit from being used in dram-drinking, it was very absurd to allow it to be sold by ordinary retailers of wines and spirits.

The **President** said he was much obliged for the suggestions made, which would be very useful to him. He hoped to see the Excise Commissioners that afternoon on the subject. He rather thought the idea was that methylated spirit might be sold by the holders of what were known as grocer's licences, not by publicans.

Mr. **Evans** suggested the preparation of a circular to be sent to local secretaries and others, which they might forward to their representatives in Parliament. He did not in the least wish to interfere with any action the President might take, but rather to strengthen his hands by bringing pressure to bear from outside.

The **President** said the great difficulty was the want of time. If the Council could get this clause postponed, or a promise to reconsider it on report, something might be done in the way suggested.

The Reports of the Government Visitors on the Examinations.

The **President** said the Board of Examiners for England and Wales had passed a resolution with regard to the recommendation of Dr. Stevenson, in his report, that a knowledge of pharmacy law should be required of candidates, to the effect that such an examination was desirable, and recommended that a bye-law be passed having that object. The Board of Examiners for Scotland had considered the reports, but did not find that they contained anything calling for special comment. The Boards of Examiners had had this question of examination in pharmacy law before them for some time, and the general feeling had been that until new bye-laws were being framed it would be premature to make any recommendation. The London Board had, however, now made this recommendation, and he had no doubt the Scottish Board would concur in it. Before long it would be necessary to frame new bye-laws, which might be done concurrently with the introduction of a Bill in Parliament.

The Annual Report.

The Council went into committee to consider the draft annual report.

On resuming, the report as amended was ordered to be printed and circulated to the members and associates in business with the voting papers.

International Congress at Milan.

Mr. **Greenish** asked if the President had received any intimation with regard to the meeting of the International Congress at Milan.

The **President** said he had not.

Mr. **Greenish** said the time was approaching when members would be planning their annual trips, and it was desirable to ascertain whether the Congress was to be held or not.

The **President** said inquiries should be made.

EXAMINATIONS IN EDINBURGH.

April 23, 24, 25, 29 *and* 30, 1890.

Present on each day,—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on the 23rd, 25th and 29th, on behalf of the Privy Council.

MAJOR EXAMINATION.

23rd.—Four candidates were examined. *One* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bethune, Andrew Wright	Lochgelly.
Boa, Peter	Stranraer.
Carswell, Thomas Retson	Paisley.

MINOR EXAMINATION.

23rd.—Eleven candidates were examined. *Seven* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bates, Frederick	Allendale.
Blyth, William Brew Adam	St. Andrews.
Brierley, Herbert Charles	Halifax.
Connal, William	Greenock.

24th.—Sixteen candidates were examined. *Six* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Chalmers, William	Dundee.
Clark, George Alexander	Portsoy.
Clark, James	Thornhill.
Craig, Henry Riddell	Biggar.
Dean, John Thomas	Haslingden.
Eatough, Nicholas William	Blackburn.
Fletcher, John	Scunthorpe.
Gillies, William	Manchester.
Graham, Charles Heskey	Liverpool.
Ogden, Alfred	Radcliffe.

25th.—Fourteen candidates were examined. *Five* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Grassick, Alexander	Aberdeen.
Haining, Edward	Dumfries.
Hannah, Henry	Paisley.

Harper, James	Edinburgh.
Hoseason, James Henry	Edinburgh.
Jackson, Oliver Lincoln	Blackpool.
Kilpatrick, Robert	Edinburgh.
Lyon, William	Keith.
McAuslane, Robert	Carluke.

29th.—*Fifteen* candidates were examined. *Nine* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Rawsthorne, Reginald	Bolton.
Robinson, Frederick	Manchester.
Robison, Ebenezer	Hawick.
Russell, James Anderson	Glasgow.
Spence, Alexander	Linlithgow.
Stott, John William	Bolton.

30th—*Fifteen* candidates were examined. *Seven* failed. The undermentioned *eight* passed and were declared qualified to be registered as Chemists and Druggists:—

Qualtrough, Thomas Stanley	Douglas.
Stewart, Hawthorn	Ayr.
Stewart, James Tennant	Dumfries.
Thomas, Thomas	Llandilo.
Tweedie, Thomas Shortridge	Annan.
Wadsworth, Edgar	Huddersfield.
Walker, George	Insch.
Wilson, Richard Henry	Elton.

Provincial Transactions.

INVERNESS CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Wednesday, April 30, the annual supper and conversazione, in connection with this Association, took place in the Victoria Hotel, under the presidency of Mr. D. Macritchie, chemist. Mr. John Fraser, chemist, was croupier.

After an excellent supper, the Secretary read a report on the work of the Association. It stated that the Association was formed in October, 1888, its principal object being the mutual improvement of its members by means of lectures, discussions and classes. Mr. Fraser, the President, inaugurated the session with a paper on the "Past, Present and Future of Pharmacy," and they were now closing it with this supper, which was given by their much esteemed employers—the master chemists of Inverness. Bi-weekly classes in chemistry, materia medica and pharmacy had been held regularly since October, Mr. Bethune demonstrating in materia medica and pharmacy, while Mr. Wright did so in chemistry until his departure from Inverness in February. A library had also been started in connection with the Association, Mr. Galloway commencing it by presenting several valuable books. On the suggestion of Mr. Macleod, a botany class was also to be started.

The report, which was considered highly satisfactory, was unanimously adopted.

Mr. Macritchie, in an appropriate address, proposed the toast of the "Inverness Chemists' Assistants and Apprentices' Association."

Mr. Bethune, chemist, Vice-President, responded.

The other toasts were the "Pharmaceutical Society," proposed by Dr. Mackenzie, and acknowledged by Mr. Allan; "The Medical Profession," proposed by Mr. Fraser, and replied to by Dr. Macnee; "The Inverness Medical Association," proposed by Mr. J. Leslie Fraser, and replied to by Dr. Murray; "The Field Club and Kindred Societies," proposed by Dr. Macritchie, and acknowledged by Mr. James Barron; and "The Inverness Chemists' Association," proposed by Dr. Chapman, and replied to by Mr. Mitchell.

The succeeding programme included several songs and recitations.

Parliamentary and Law Proceedings.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* THOMAS ONION.

This action, which was brought by the Council of the Pharmaceutical Society of Great Britain against Thomas Onion of 135, Gooch Street, Birmingham, to recover two penalties of £5 each incurred by the defendant on the 22nd August and the 11th November, 1889, in selling poison, was tried before his Honour Judge Chalmers at the Birmingham County Court on the 11th March last, when his Honour found for the plaintiffs upon the facts in the case, but reserved his formal judgment until after the Divisional Court of the Queen's Bench Division had given judgment in the case of the Council of the Pharmaceutical Society *v.* Wheeldon. A report of this case appeared in our issue of the 15th March last.

Judgment having been given in the case of the Council of the Pharmaceutical Society *v.* Wheeldon in favour of the plaintiffs, application was made on the 6th instant to his honour for judgment in this action, and—

His Honour gave judgment for the Society for the two penalties sued for, with costs on the higher scale.

PROSECUTIONS FOR SALE OF "PAREGORIC" DEFICIENT IN OPIUM.

At the Barnsley Borough Court, Jas. Wood, shopkeeper, Darton, and Wm. Moxon, grocer, Cawthorne, were charged under the Sale of Food and Drugs Act with selling as "paregoric" a mixture almost without opium, essentially different from the compound tincture of camphor, of the British Pharmacopœia, popularly known as paregoric, and therefore of greatly diminished medicinal value.

The Inspector proved making the purchase, and produced the County Analyst's certificate, showing the "paregoric" not to be the real article. Defendant Wood was represented by his wife, who said the preparation was sold as "paregoric substitute."

The Bench imposed a fine of 10*s.* and costs, cautioning defendant against selling these "sham articles" in future. The chairman added that there was nothing to prevent them selling the preparation, providing they had it properly labelled, and did not sell it as "paregoric."

For the defendant Moxon a bottle was produced, from which it was said the Inspector had been served, and which bore a label "Non-poisonous, and free from opium." He contended that the preparation was not sold to the prejudice of the purchaser. The same penalty as in the previous case was inflicted.

POISONING BY CHLORODYNE AND MORPHIA.

An inquest was held on Monday, the 28th April, at Carlisle, as to the death of Mr. F. L. Charters. It appeared from the evidence that deceased, who was studying for the medical profession, had been found dead in his bed, having left a pencilled note to his wife saying that he had taken "chlorodyne and HCN." Two empty bottles were found in a portmanteau in the room, one labelled "chlorodyne" and the other as a mixture.

Mr. C. S. Hall, surgeon, stated that deceased must have been dead four or five hours when the body was found. The bottled labelled "The Mixture" contained a tincture of chloroform and morphia, which somewhat resembled the proprietary nostrum known as chlorodyne, with this important difference, that it contained four times as much morphia. A reasonable dose would be from five to ten minims or drops. An ounce would contain forty-eight full doses. The tincture was contained in an ounce and a half bottle.

Mr. John James Robinson, assistant with Mr. Joe

Todd, chemist and druggist, said deceased came to Mr. Todd's shop, and gave him a prescription to make up. He took a copy of the prescription, which was for one ounce and a half of chlorodyne and morphia. From the short conversation witness had with him, witness concluded that deceased was a medical man, and he did not consider it necessary to ask him about the dose. He was perfectly collected. Witness gave him an ounce of the tincture in an ounce and a half bottle, as it was all he had made, and deceased said it would do.

The jury found a verdict of "Suicide during temporary insanity."—*East Cumberland News.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Election of Council.

Sir,—"When bad men conspire, good men must combine" is an axiom that rises involuntarily in one's mind at this juncture. I disclaim any offensive application of it to comparisons of the moral goodness or badness of any candidate. But, as one of the jury to whom appeal is made by both plaintiffs and defendants, I shall require something more substantial from those who ask that the present Council may be unseated, than the assurance that they (the plaintiffs) "are for trade interests" and "agin the goverment." Governments of various kinds are apt to receive scanty justice when events make against the material interests of their subjects, but, before changing our pharmaceutical governing body, we have a right to know what their accusers could have done for our benefit that has not been done.

The present Council of the Pharmaceutical Society has no responsibility for the revolutionary change wrought by the decision of the House of Lords interpreting the Pharmacy Act of 1868, nor can it help the absolute refusal of all governments to confer upon a class exclusive privileges in dealing in drugs generally. That it has, within a few months, done its best to reserve to the qualified class the compounding of prescriptions was a bold stroke for trade interests, justified by public advantage, and deserving a very different measure of trade support from that accorded to it. In many other directions we have ample knowledge of the past record of the defendants, and my rather active experience of pharmaceutical politics for more than thirty years induces me to accept them as excellent representatives of the members in the varied districts of Great Britain. "Trade interests" surely get fair representation from the several able men who are past-Presidents of the late Chemists and Druggists' Trade Association.

Our opportunity of knowing the qualifications of the plaintiffs is very much smaller, and, in the absence of any authorized programme, we are entitled to regard them as gentlemen not too scrupulous to use a meaningless electioneering cry.

I trust that last year's election will not be forgotten. The indignation then felt throughout the Society at the affront put upon our President was too deep to have yet passed away, and many who allowed their votes to be manipulated by an outside hired wirepuller must have seen the situation more calmly on further reflection.

I am glad that the disaffection, which so mischievously crops up in pharmaceutical politics when united action is necessary to success, has for the moment taken a concrete form, although every visible plank of its platform is rotten. It can now receive from the jury the verdict which it has challenged. I trust this will be the rejection of every one of the eight names upon the blue electioneering card, and due reparation to our President for last year's mistake, by giving him a high place on the poll.

Leeds. RICHARD REYNOLDS.

Sir,—Although I have hitherto abstained from taking any part in the controversy connected with the election of the Council, there seems now a necessity for all that know the working of the Council to speak out. With this conviction I feel myself called upon to endorse the views so ably stated in the Journal this week, by Messrs. Urwick, Thomas, Martin, Johnson and Kingan. Having for a very lengthened period been a member of Council, I can truly state that a more efficient or trustworthy board of management could not be appointed. Many of the candidates before election have from time to time thought that they could improve the order of things; but they are not long in the Council before they discover that the working of the Society (the details of which are not sufficiently known) is much more difficult than their previous conception had led them to believe, and that, after all, "Trade Interests" are carefully considered by the Council as far as they can be. But I am at a loss, without a definite statement, to know what the present aspirants to the honour of a seat in the Council mean by "Retail Trade Interests." If that phrase means exclusive privileges to the trade, they must know well enough that the Legislature will not listen to any such proposal; indeed it is inimical to the present state of trade. The competition of trade is so very different from what it was some time ago. What would be thought twenty years ago of a stationer's window being full of cheap watches and clocks? or of the linen draper being a purveyor of toys, perfumery, etc., etc. Indeed, it would appear nowadays as if there were no distinctive trade, every one trying to supersede his neighbour. This fact is too well known to the chemist, and had it not been for the Pharmaceutical Society still larger encroachments would have been made on his trade. The new candidates for the Council are no doubt highly respectable men, but I contend those who now constitute the Council are much more familiar with the requirements of the trade, and have a prestige not lightly to be esteemed. The extraordinary energy and ability of the President are best known to those, like myself, who have worked with him. All the members of the Council give a great deal of time to the duties devolving upon them, and are fully entitled to the support which they have so well merited, and I for one shall most readily record my votes in their favour.

W. D. SAVAGE.

Sir,—In answer to Mr. H. A. Thomas in your last issue. He charges me with others (who are well able to answer for themselves) with trying to obtain a seat on the Council by false issues. If he have no other argument but to accuse candidates of being untruthful, it shows clearly how weak a cause he champions.

Let him prove that the Pharmaceutical Society has been of "immense benefit to the *trade.*"

What has the Society ever done for *trade* interests? Has the Pharmaceutical Society even *interested* itself with regard to our position in respect to a forthcoming budget, by placing clearly before the Chancellor of the Exchequer the hardships an increase of taxation on certain things would bring on the chemist?

At present we are to pay for compensation to the publican, by the increased duty on spirit. Would other trades help to pay compensation to chemists?

With regard to the difficulties attending the passing of any Bill through the House of Commons, I beg to state that I should be surprised if Mr. Thomas has had anything like the experience of lobbying as I have had. Here, again, the present Council need help, and that is one reason why I am offering myself as a candidate, because I know so many M.P.'s personally that I could help with this most important department of the Council's work. I do not recognize the impossibilities, as the present Council and Mr. Thomas do.

Mr. Thomas proves his weak point, and therefore his faith in the policy of the present Council; "the true protection of trade interests rests with the individual." Yes, relieve the Council of all responsibility, and place it on the unit. Why is the Society supported, according to Mr. Thomas, by less than one-third of the total number of registered chemists? Because over two-thirds have evidently "no confidence" in the way the present Council administers its affairs.

Mr. Martin evidently likes to generalize and quote other people, but when he has anything of his own to say he is inaccurate or abusive; the latter is exemplified by alluding to candidates that he owns he knows nothing about as "unknown and untried men, however loudly they may have voiced the discontent which is born of ignorance and misrepresentation." A sweet little sentence, over which Mr. Martin evidently prides himself, but where is the truth, or even sense in this peculiar abuse.

Mr. Martin told me that he should not think of stating his opinions before the electors, because if they had not confidence in him to do what was right, knowing his views, they need not elect him; if he had said he had to learn what policy his wirepuller was going to follow before being able to state his views, would not this have been nearer correct?

Mr. Martin wants to know what I, among others, have done for pharmacy. What I have done I have not courted the glory and allowed others to do the work, *vide* Mr. Proctor's speech at Newcastle in September, 1889, "They had arranged the matter very nicely beforehand, it being agreed that Mr. Clague was to have all the work, Mr. Martin all the glory," etc.

I come forward as a candidate to do the best I can for the Pharmaceutical Society, and I object to the uncalled-for slurs and insinuations appearing in letters to your Journal.

I have had nearly ten years' experience on public Boards, and am used to the lobby work of the House of Commons, but I suppose all are of no avail because I happen to be a new candidate for Council, not selected by the old Council, and am not interested either in appointing examiners or desirous of being appointed one myself.

510, *Hornsey Road, N.* JOHN MORRIS BROAD.

Sir,—Numerous as have been the letters upon the above subject, I venture to ask you to insert a short communication. The continual attacks which have been made upon the Council seem to me to be more particularly directed against our President, and therefore I trust that all loyal voters will actively participate in the coming election, and by giving him their votes, will secure his position at the head of the poll.

It is, I think, clear that Mr. Carteighe and the majority of his colleagues are acting directly contrary to their own personal interest, and this is a very strong argument in favour of their "educational policy." Does it not seem to be a natural consequence of the higher professional education of pharmacists that much of the support now given to large west end and similar establishments should be transferred to the ordinary pharmacists, when they are sufficiently educated to be justly considered professional men? For these large connections have been brought together originally by the superior scientific attainments of their proprietors. If this be so, as I for one believe it is, all honour to those who are seeking to benefit the body pharmaceutical at the cost of time and personal interest into the bargain. On the other hand there is an equally strong interest (notably in the patent medicine trade) in keeping down the education of the pharmacist, for his education must mean the expulsion of quackery from his premises. Is it possible this personal interest weighs more heavily in some quarters than that of broader minded men such as now compose the great majority of our Council?

In conclusion, may I suggest to those who do not "plump for the President" that they keep the post-card we have heard so much of, as a guide whom *not* to vote for.

Birmingham. R. A. CRIPPS.

Sir,—It seems to me absurd that "trade interests" should be brought forward as a motto by the new candidates, whose idea of a chemist's business is simply to sell other people's nostrums at full prices, as if that were the *summum bonum* of a chemist's trade.

Whilst the Council has been, and is, exerting itself to lift up pharmacy from the low level of quackery, these people try to defeat that object and make the pharmacist a mere distributor for the so-called "patent medicine" man.

I hope every voter will speak in no uncertain voice in the matter, as it lies in their power to further or undo the good work already done.

Mr. Carteighe should be placed at the head of the poll, as a mark of approbation for his services to the Society and to chemists in general.

Aberystwith. E. J. EVANS.

ELECTION OF COUNCIL.

Sir,—It is a great misfortune that our pharmaceutical politics cannot be carried on without importing into them invidious comparisons, and uncalled for personalities.

There are two sides to every question: amongst us we have the "rest and be thankful policy" and we have also the "muttering and grumbling policy." Now, sir, I consider that each side has a perfect right to its own opinions, as well as to pursue its own methods, so long as each proceeds upon what we may call constitutional lines, and ought not to be charged with unfair motives, either individually or collectively.

I hold no brief for either side; both the candidates and members of the present Council are personally unknown to me, and I consider that *fair play* should be meted out to friend and foe alike.

There are some writers in the Journal who profess to have "only the good of pharmacy at heart," who do not exhibit a very generous spirit towards those who differ from them.

So far as I can judge, the method adopted by these candidates for pharmaceutical honours is perfectly legitimate, and has nothing in common with the "*escapade*" of last year; that was indeed an "*unworthy*" method, which was fostered by an "alien society," and met with the fate which it most richly deserved.

Some of your correspondents appear to forget, that all who are eligible for election to a seat in the Council chamber have a perfect right to come forward and offer themselves for election, and they ought not to be charged with trumping up the cry of "trade interests" for an unworthy purpose, by doing so.

The question does arise, are there, or have there been, any trade interests requiring to be looked after which have been neglected? Some say there has been a great deal of "*cant*" about trade interests; in a certain sense, it may be true enough, but we must also remember there has been a very large measure of "cant" about the "safety of the public."

Is it not possible, that when we come to analyse each kind we shall find as a nett result a goodly proportion of "self interest" mixed up with that very laudable "sentiment," "self abnegation," which all of us more or less lay claim to.

Here, then, is my idea of trade interests which have been overlooked or ignored. First of all, take the case of Wheeldon reported in the last issue of the Journal.

Now if the interpretation of the preamble of the Pharmacy Act, 1852, its amendment, 1868, and now in 1890, is good law and is to be construed as expressing the meaning and intention of the framers of the Act originally, it follows as a logical sequence that it has been "the law" for a great number of years, but has never been put into operation, and, we ask, why has it been so neglected or ignored?

Here is an instrument which has been in the hands of the Executive for years, which, had it been judiciously handled, would have been of immense advantage to the trade at large. It was in its power to lessen—if not to sweep away—much of the incompetence which from time to time has been complained of; but this duty has been overlooked, or neglected, until the present hour, and had it not been for the fatal consequences which followed, we should probably never have known that the Act was invested with such far-reaching powers.

Then, again, we have the case of Mr. Matthias, who has had cast upon him the stigma of a conviction before a magistrate for neglect of duty, and what, in the eyes of the unthinking public, is construed into an act of carelessness, and this because no warning had been given, and no previous action taken to enforce "the law." Surely there is neglect or blame somewhere.

There is also another clause in the Act, known as the "widow's clause," in which the Council did take action; but it was an arbitrary proceeding, and the fact that they suffered defeat does not at all alter the want of magnanimity and justice shown in the case.

Here, then, sir, are, I think, some distinct cases of "trade interests" not well looked after, which justify the demand for some "amended" course of action on the part of the Society's Executive.

Whatever may be the result of the coming elections, it would, I think, be an act of wisdom for the Council to reconsider its position in relation to the "trade at large," and try to enlist the sympathies and active co-operation of those outside its ranks. There can be no doubt that there is a power outside which is able to make itself felt, and possesses potency enough to prevent the passage of any Bill, educational or otherwise, through the House of Commons.

Apathy—jealousy—want of loyalty—not only amongst outsiders, but within the ranks of our own membership, are amongst the causes which create opposition and discord. One thing to my mind is clear: the Pharmaceutical Society cannot do without the trade, and the trade cannot do without the Society.

There must be something more of the "give and take" principle before anything like success can be attained and a truer spirit of unanimity produced.

Brighton. G. G. Hornsby.

Sir,—If you would spare me a small space to reply to a question propounded me by Mr. Ross, and a line on the strictures of Mr. Wells, I should feel obliged

"Is membership of the B.P.C. a *sine quâ non* for candidates for the Council?" Certainly not. But there seems to me no *sine quâ non* about the matter at all, except, perhaps, that we should be in earnest (if a change must take place) to find better men to come in than those who are to go out. If one's name does not occur in the list of the members of the B.P.C. after twenty-five years of its existence, and further is not in the list of subscribers to the Benevolent Fund after a gradually increasing popularity of fifty years, what are we to think as to his interest in the progress of British pharmacy or the welfare of the Pharmaceutical Society?

Mr. Wells would remind me that "hard words are not arguments." Certainly; but why then has he chosen to ignore my arguments and try to fix me on my hard words?

From his own admission this arises, I suppose, from his little experience of the average champion of chemists' "trade interests" compared with my own. For Mr. Wells would otherwise know that this specimen is always a most inveterate talker, and that a simple thoughtful man has no chance in his presence, but has to—

> "Sink back into his chair,
> Fix on the wainscote a distressful stare," etc.,

and that not until one breathes afresh the serene atmosphere of his own dispensing department can he hope to come at his opponent with the least show of success. If on such occasions his weapon seems to fly with unexpected force, who is to blame?

J. C. Hyslop.

Sir,—I have read with considerable interest and some amusement the discussion that has been carried on through the medium of the Society's and other trade journals in reference to the above matter.

I feel a certain amount of diffidence in attempting to add anything to the very able, lucid, and just arguments put forward by Mr. N. H. Martin in your last week's issue, but I think his reference to "Councillor Gwilym Evans, Llanelly" and that portion of the "Trade Interests" (?) candidate's letter which accuses the present Council of being "a syndicate of the wholesale, semi-wholesale and proprietary trade" is singularly applicable to Mr. Maltby, who is essentially a wholesale dealer, and as he is also interested in a well-known vermin-killer, I venture to think that it would be injudicious to elect such a gentleman upon a Council that sometimes has to form itself into committee to discuss the desirability or otherwise of instituting a prosecution for the unlawful sale of a poison. The poison in question might even be this particular vermin-killer.

Mr. Lewis Butler Ross calls himself a "manufacturing chemist and wholesale chlorodyne manufacturer;" hence for the same reason it would not be wise to support his candidature.

Mr. T. F. Percy Wells is evidently one of those individuals, so well described by Mr. Martin, who fail to make themselves conversant with the work of the Society, or he surely would not have accused you, Mr. Editor, of admitting letters "from correspondents of only one shade of opinion."

The only qualification Mr. Alfred Coleman appears to possess, is that of putting himself forward as the leader and mouth-piece of the so-called "trade interest" party, without their consent. I am given to understand, on the best possible authority, that he sent out those much talked of but misleading post-cards, without even consulting the individuals whose names appeared upon them. Can one be surprised, therefore, if these gentlemen are disgusted at such presumptuous and indiscreet conduct. Mr. Coleman has certainly apologized to Mr. David Storrar for the making use of his name, but only after reading that gentleman's disclaimer in the *Chemist and Druggist*. It would have shown better taste and better judgment had he admitted that he had treated the majority, at least, of his so-called colleagues in a similar manner.

I would earnestly entreat each one who has votes at the coming election to carefully inquire into the merits of the respective candidates before casting them. To my mind it is better not to vote at all, than to give one's support to those about whom one knows nothing that justifies their candidature.

H. H. Millhouse.

Sir,—Mr. Martin reported in last week's Journal, Carteighe (Dinneford and Co.), Hills (J. Bell and Co.), are in retail business, and purposely omitted to state they are both largely connected with wholesale and proprietary trade, which is very misleading to the electorate as well as the other candidates seeking election. Martin, Richardson and Schacht are also all connected with wholesale trade, and has not stated such is the case. Mr. Martin made hostile attack on a well-known Sussex retail chemist last year in the columns of the Journal, and now has chosen Kensington and Cardiff in a more modified form. It is much to be regretted so much personality should be introduced, more particularly coming from a member of Council, and should be omitted rather than so much partiality to a section of the trade. I rejoice to inform Mr. Martin the cards issued from Cardiff, Kensington and elsewhere have met with most hearty reception, apparently to his discomfiture, and also must be made aware of the more than probable defeat of the President and certain of other colleagues in the contest.

Kensington. G. W. Sargent.

Sir,—I have read with considerable interest the letters on this important subject, and there is one point I should like to dwell upon very briefly, viz., the poor support accorded to the Pharmaceutical Society by the trade generally.

The general excuse given by outsiders for not joining the Society is that it does not protect "trade interests," but they seem to forget that were they members they could, if dissatisfied with the existing Council, replace them by men after their own heart. The Society does not consist merely of its important officers, but of every single member.

If the majority of chemists supported it, far more could be done for "trade interests" than at present. I do hope this discussion will result in some practical good to the members of our business.

London. Stanley Summers.

Sir,—Having read with much interest the letter of Mr. J. C. Hyslop in the Journal of the 26th inst. on the above subject, I would be glad to offer my opinion of the trade, although I have not yet quite finished my term of five years apprenticeship, and it is that if chemists would only look after their own interests without expecting the Council to do it for them they would get on much better. Now my opinion of apprenticeship is that it is a "farce from beginning to end."

About two weeks ago we had someone fined at Sheffield or Leeds for the sale of defective sp. ammon. ar. How can you wonder at this? When I asked about testing the strength of acetic acid, liq. calcis., sp. æther. nit., etc., the reply was: Do you want to do the Major work and not passed the Minor? Now my master can do this work for himself, but practically he says "What does that matter for my apprentice? I have got his premium, and so long as he cleans my windows and puts my stock up I am safe." I therefore think that, without so much talking of the present bad state of things, it would be better for the Council to pass a curriculum compelling apprentices to go to the Square for a term of three years or so. This would keep the trade more select, and I am sure in the long run we would not look for someone better off than ourselves to look after our trade interests.

I am hoping to have six months in at the Square this October, in order to get a training in these subjects, which ought to be given by every thorough business man to those under him whom he professes to teach.

Manchester. AN APPRENTICE.

SALE OF POISON BY UNQUALIFIED PERSONS.

Sir,—The judgment in the Wheeldon appeal case has at length been delivered, and the Council has thereby secured what is practically a new Pharmacy Act.

As the discussions which preceded the Council's action in this matter have never been published—for they were conducted in committee—it may possibly be supposed that all its members sanctioned the course adopted.

In view of the approaching election, in which my name will appear as one of the candidates, I think it right to state that such was not the case, but that I opposed it earnestly.

The grounds of my opposition were, broadly, that the prosecution of the assistant of a *registered* pharmacist for the sale of a poison was contrary to the plain and generally accepted meaning of our Act; and that the effects of such a prosecution, if successful, would be unfortunate, not only for all sections of the pharmaceutical body, but also, through them, for the public.

Notwithstanding the remarkable delivery of the judges, I think so still.

It is right, therefore, that my fellow-members of the Society should know this, in order that, if they approve the action of the majority of the Council and disapprove of mine, they may return my name at the bottom of the poll.

Bristol. G. F. SCHACHT.

Sir,—I would like to endorse every opinion expressed in your leader of last Saturday, regarding the importance of the legal decision in the action under the Pharmacy Act, "The Pharmaceutical Society *v.* Wheeldon," by Mr. Justice Hawkins.

I write at present, however, more to point out the absolute necessity, in face of this decision, for the Council of the Society to pass a resolution that every candidate for the qualifying examination should be strictly examined on the various points connected with the Poison Act, and the poisons therein contained. If I remember rightly this was recently recommended by one of the Government visitors (appointed to attend at the examinations), but so far as I am aware it has never been acted upon, simply from the fact that the Boards of Examiners have never received any instructions regarding the point. When upon this subject let me point out another recommendation made, also by one of the Government visitors, more than once, regarding the use of the microscope in the examination. I speak from a very lengthened experience, and I say that the examiners do an injustice to themselves, and, I am also sorry to think, much more to the candidates, in not introducing and using this important and useful agent when required. I could give many examples of this, but would rather rest my appeal to the Council on the simple merits of the case.

16, *Elm Row, Edinburgh.* W. GILMOUR.

Sir,—The decision in the Wheeldon case is given at last, and a veto is placed on taking a judgment from the Supreme Court; therefore, we may discuss the matter freely.

As the result of this decision no apprentice or unqualified assistant to a chemist may sell or dispense a poison unless the qualified owner or senior assistant is superintending the transaction.

This is absolutely unworkable in small shops, and so it will be found before long.

It means that in a place where only apprentices are kept (and their name is legion) the master must be on his premises day and night, week day and Sunday all the year round.

Such a poor chemist's soul is not his own, for a county court judge and two judges of the High Court deprive him of the privilege of going to church unless he is rich enough to leave behind him a qualified man.

Let us look what a difference this decision makes to hundreds of poor chemists who work their businesses by means of a senior and junior apprentice: the cost of an apprentice is *nil*, his premium paying for his board and lodging. The cost of a qualified assistant, on the other hand, is about £80 or £100 a year (board, lodging and salary).

Now an apprentice of two years' standing should be able to hand a penny packet of white precipitate out of the drawer, without his master being behind him to see he reads the label on the packet correctly, and does not give Epsom salts instead.

It is absurd to suppose that he cannot read the label on the packet; for in the majority of pharmacies it is already weighed, wrapped and labelled.

Suppose the vicar of the parish comes into such a shop when the proprietor is out for a walk, or gone up to the General Meeting at the Square on May 21; he asks for a bottle of paregoric; the apprentice, an intelligent, educated gentlemanly fellow of twenty years of age, says, "You must please call again; I cannot serve you unless my master is watching me to see I give it properly."

On the same day a little ragged urchin of ten goes to the neighbouring grocer's or oil shop with a ginger-beer bottle for half-a-pint of carbolic acid. The uncouth, uneducated grocer's errand boy can sell the carbolic acid, and need not label it or use any precaution; and yet the carbolic acid is in fact a much more deadly poison than the paregoric.

I hope our new Council (which will, I trust, contain the names of all the new candidates and of Messrs. Evans and Schacht) will try to get more poisons scheduled; will get us the sole right to sell poisonous patent medicines; will try for the exemption of chemists and druggists from the jury service; and extend the Council seats to associates in business.

These are in my opinion some of our "trade interests," and are quite as important as the curriculum.

The only crumb of comfort I can get out of this decision of Justice Hawkins and Baron Pollock is that it may lead to our exemption from jury service. I believe, relying on this decision, our Council would get this boon granted us. Surely if the poor chemist must be always present when poisons are sold or dispensed, he should be granted the same boon as doctors; and if we get that, we should have a little bit of good out of what must be to us a great deal of evil.

Let all associates in business and chemist and druggist members vote particularly for those candidates who are chemist and druggist members, and who will try for their own sakes as well as ours to get the Juries Act altered in our favour.

The pharmaceutical chemists are exempted, so they do not feel the shoe pinch, or else I think we should have got it long ago.

Sunninghill. T. ERNEST TAYLOR.

PROPRIETARY PREPARATIONS CONTAINING POISONS.

Sir,—In the case reported by you a short time ago, viz., the Crown *v.* Matthias, some remarks were made which ought to bear fruit.

The Crown prosecutor successfully contested that mixtures containing poisons should be labelled as such, unless protected as physicians' prescriptions or under Letters Patent. The Pharmacy Act, 1868, contemplated that poisons used as medicines should only be sold by registered persons, and by them only under the conditions of the Act, Schedule A, parts 1 and 2

Now chlorodyne, Kay's linseed, and many other notorious proprietary articles, admittedly contain poisons, are freely sold by grocers, stores and oilmen, etc. (who as unregistered persons could not if they would comply with those conditions). Mr. Gill said that although no one had a roving commission to ferret out infringements of the Act, yet the Treasury would prosecute when they were brought under notice. I should like to know who will look after chemists' interests if they do not do so themselves. The Act, as far as it confined the sale of poisons to chemists, to us has remained for over twenty years almost a dead letter, because it is no one's business to look after it. I am continually reminded of the mice in the fable who all agreed that cats were very injurious animals, but none of them could pluck up courage to "bell the cat." If a score of chemists in different localities were to purchase some of these articles of unregistered persons, and simultaneously lay them before the public prosecutor, they would benefit the trade more than by quarts of ink and acres of correspondence. If any gentlemen are willing to act in concert with me, I shall be happy to hear from them on the subject.

202, Caledonian Road, N. E. WARRELL.

POISONOUS PATENTS.

Sir,—My purpose in writing on the above named subject was simply to open the question, thinking that as all chemists are more or less interested in the matter, many might take the opportunity of expressing their opinion thereon. Mr. Pollard has indeed given the matter a much wider application than I intended, my definition of a poison in the subject in question being "any one of the articles named in the two poison schedules," which I think sufficiently definite for the object in view. Mr. Pollard asks, —why stop at the unqualified man—why not have the same medicine purchased of a qualified man and have the seller prosecuted? For two reasons, both of which will, I think, commend themselves to the majority of chemists. First, because the Council would, I hope, shrink from prosecuting a chemist, unless no other means of obtaining the object offered, and second, because the conviction of an unqualified man (by an unqualified man, I mean a grocer, oilman or other unqualified man of that class who keeps an open shop for retailing poisons) would be a double conviction, one for sale of a scheduled poison without the poison label, the other for selling a scheduled poison illegally. If, however, Mr. Pollard would rather have the qualified man prosecuted, it would be a generous act to bell the cat himself.

Surely it would not be a difficult matter to find a patent (or proprietary, custom has rendered the term synonymous for general purposes) medicine containing even aconite in general sale by oilmen and grocers unlabelled poison, whilst a pennyworth of paregoric must have the red label affixed.

ALPHA.

THE SALE OF METHYLATED SPIRIT.

Sir,—It appears from your note in the *Pharmaceutical Journal* on the new Inland Revenue Bill that we shall not be allowed to sell methylated spirit in less quantities than one quart at a time. Is this correct? If so, will it not be a great interference and interruption of sale among the working classes? We sell a fair quantity, but it mostly goes in half-pints and pints. It would be a trouble and expense to many of the working class to provide a quart vessel. Why is such a new regulation required?

Stonehouse, Devon. D.

*** [Our correspondent will find, on reference to p. 914, in consequence of a representation by the President of the Pharmaceutical Society, the Chancellor of the Exchequer has consented to withdraw from the Bill the provision that would have prohibited the sale of methylated spirit in quantities less than a reputed quart.—ED. PHARM. JOURN.]

PEPPERMINT WATER.

Sir,—Perhaps the following may interest some of your readers.

My attention was attracted a short time ago to the remarkable condition of some peppermint water which possessed the consistence of weak mucilage. Nothing abnormal was to be observed on holding the bottle up to the light, but suspecting the presence of some confervoid growth, I allowed some of the water to dry on a glass slip, and after staining the film with rosaniline, examined it under a high power, when a large number of short rod-like bacteria were rendered visible. A few days later there was a slight deposit on the bottom of the bottle and several oval and roundish cells were found. These cells contained darker bodies varying in number from one to seven. Unfortunately I was not able to pursue the investigation further, but in all probability the bacteria were the swarm spores of some palmellaceous alga, and their enormous numbers were the cause of the almost viscous condition that the water presented when poured from the bottle. The water was made by shaking Mitcham oil of peppermint with hot distilled water, and I can only account for the presence of the bacteria by supposing the germs to have been contained in the filter paper.

Here we have a saturated solution of peppermint oil in which bacteria not only exist, but thrive, and it suggests the question whether menthol itself is as powerful a bactericide as it is claimed to be. The best way of examining bacteria is to allow the liquid to dry on a thin glass cover, then stain in an alcoholic solution of rosaniline, wash away the superfluous colour with a little rectified spirit, dry and mount in Canada balsam.

7, Belgrave Mansions, S.W. W. MURTON HOLMES.

OPINIONS OF CANDIDATES FOR ELECTION ON THE COUNCIL.

The following correspondence, received in reply to questions addressed to candidates for election as Members of Council, has been forwarded to us for publication:—

QUESTIONS.

1. Are you in favour of extending the franchise to "associates not in business?"
2. Are you in favour of making "associates in business" eligible for election to a seat on the Council?
3. Are you in favour of taking more active steps to prevent the carrying on of businesses and of dispensing in surgeries, public institutions, etc., by unqualified persons except under the *direct* superintendence of those who are qualified?
4. Do you think any practicable steps can be taken to prevent "store" dispensing, the sale of drugs by grocers, etc., and to secure a monopoly of the sale of drugs to registered men?
5. Have you any *special* views with regard to the promotion of trade interests in general?

Reply received from Mr. S. R. ATKINS, Salisbury.

1. Yes.
2. Yes.
3. In the interests of public safety, I think that all persons who dispense medicines, whether in surgeries, public institutions or elsewhere should be qualified or act under the *direct* superintendence of some one who is qualified. I should be prepared to support any well-considered scheme for securing such result.
4. I do not think any practicable steps can be taken to prevent "stores" from dispensing, if the dispensing be conducted by qualified persons. Most naturally, I should desire to restrict the sale of drugs to registered persons, but to attempt to enforce such a monopoly, I regard as perfectly utopian.

Reply received from Mr. JOHN MORRIS BROAD, 510, Hornsey Road, N.

1. Yes.
2. Yes.
3. Yes.
4. Yes.
5. More just regulations as to patent medicines and licences imposed on chemists.

Reply received from Mr. M. CARTEIGHE, 180, New Bond Street, W.

My views upon matters pharmaceutical have been so often publicly stated and published, that I do not think it necessary in my case to reply to your series of questions.

Reply received from Mr. ALFRED COLEMAN, Cardiff.

1. Yes.
2. Yes.
3. Yes.
4. Yes, beginning with poisons and medicines containing poisons.
5. The necessity of having our interests directly represented and carefully watched and protected in the House of Commons.

To protest against the vexatious and oppressive administration of the Medicine Stamp Acts, and to bring about an equitable revision.

To take steps for bringing into the Society all registered chemists.

To obtain exemption from jury service for all registered chemists.

Reply received from Mr. Gwilym Evans, Llanelly.

1. Yes.

2. Yes; and all associates not in business. I believe that once a man is qualified, he should be on a par with his brother chemists whether in business or not. It is for the electors to decide whether he should be elected to a seat on the Council or not. I think that associates have a right to be represented on the Council.

3. Yes; and consider it very hard that we should prosecute assistants of chemists whose employers may be temporarily absent, and overlook unqualified men permanently in charge of surgeries and dispensaries.

4. I am afraid not; but I believe every qualified chemist should be permitted to put up any preparation of his own, and sell it over his own counter unstamped, leaving advertised proprietary medicines to be stamped as at present.

5. Nothing in addition to what I have already advocated in the Council.

Reply received from Mr. N. M. Grose, Swansea.

1. Yes.

2. Yes.

3. This question gives me more difficulty, believing that in the country the medical men are our best friends. If they will not write prescriptions, do their dispensing for them; if you cannot get that, supply them with drugs. Still, seeing that such evils do exist in the large towns as open surgeries, and if the public safety is the reason why only registered men may dispense prescriptions or sell scheduled poisons, I would take active steps to prevent these things being done except by qualified men, either under the Medical Acts or the Pharmacy Act.

4. No.

5. Education in its broadest sense—scholastic, apprenticeship and Square—or some other good school where superficial cram is not the only aim of teacher and student.

Reply received from Mr. Robert Hampson,
Baalbec Road, Highbury, N.

1. Yes.

2. Yes.

3. I am in favour of taking prudent steps indicated by this question.

4. I do not think any practicable steps can be taken at the present time.

5. I have no "special views" to offer. Trade interests are affected and controlled by so many varied causes and conditions. It is just as difficult to describe a remedy for adverse trade influences, as it is to discover a specific for bodily disease. Our first duty and best policy is loyalty to each other, and loyalty to the Pharmaceutical Society. The latter should be made a bulwark of strength and union, comprehending as far as possible the entire trade. It will then be a fit instrument to contend with the possibilities of the future.

Reply received from Mr. John Harrison, Sunderland.

1. Yes.

2. I would arrange that all associates in business should become members, and so give eligibility to the Council.

3. I have always been in favour of preventing, as far as the powers at our command will allow, the carrying on of business by unqualified persons. The dispensing in public institutions is professedly under the superintendence of the medical officer, and I imagine therefore beyond our control.

4. I am quite certain that no Parliament we are likely to see elected in our day would grant such a monopoly.

I have forwarded a statement of my views on pharmaceutical matters to the *Chemist and Druggist* and *British and Colonial Druggist.*

Reply received from Mr. Walter Hills, 225, Oxford Street, W.

1. I see no objection to "extending the franchise to associates not in business."

2. I am in accord with clause 5 of the Draft Pharmacy Bill, 1890, which, as you are doubtless aware, provides that associates in business shall be eligible for election to a seat on the Council.

3. I am in favour of taking any well-considered steps to repress the dispensing of medicines by unregistered persons unless such dispensing is conducted under the *bonâ fide* superintendence of qualified men.

4. I fear that in the present state of public opinion no practicable steps can be taken to prevent dispensing by "stores" (when conducted under the above conditions), or to stop the sale of simple drugs by grocers, etc., or to secure the monopoly of such sales to registered men. It is possible, however, that in the near future the sale of the compound preparations of the British Pharmacopœia, together with the dispensing of medical prescriptions, might be secured to registered men, if the members of the trade at large were to support with unanimity the efforts of the Council in this direction.

I consider that it is useless to prepare for Parliament any Bill containing clauses, however desirable from our point of view, which cannot with confidence be defended in the Lobby of the House of Commons, and there shown to be for the advantage and greater protection of the public.

5. "Trade Interests" are, in my opinion, best promoted by individual excellence and corporate unity of purpose. The Pharmaceutical Society should have the hearty support of all who are on the Register, and who, having elected their Council, should be ready to sink individual crotchets and views and trust the Council to do its best for the general body. A better preliminary education and training than in many cases exists, and a curriculum, are highly desirable. Also the cultivation of a *professional* spirit, by which I here mean a kindly thought for the interests of fellow members of our craft, and a jealousy for the honour of the corporate body; a spirit utterly opposed to the selfishness (often thoughtless) evinced by one qualified man "cutting" against another, thus leading the public to undervalue the skill and care which, rightly considered, are a portion of the chemist's stock-in-trade.

Little advantage there is in seeking to close the "stores," as long as chemists compete with one another in asking the public to remunerate them on what, if universal, would be a starvation scale.

I trust it will be understood that I am not advocating any impracticable uniformity of remuneration, which would ignore conditions of surroundings and other requirements, but I am anxious to raise my voice against a course of action which is often as unnecessary as it is undesirable.

Finally, experience tells us that internal discords are most damaging to our true interests; only by showing a united front can much that we desire be effected.

Reply received from Mr. Marshall Leigh, Brighton.

1. Yes.

2. Yes.

3. Yes.

4. Nothing can be done to prevent "store" dispensing by qualified men. There is no hope that Parliament will restrict the sale of drugs (other than poisons) to registered men.

5. The consolidation of the Pharmaceutical Society is the first essential; afterwards many things may be possible that are now impracticable.

Reply received from Mr. N. H. Martin, Newcastle-on-Tyne.

My delay in not replying to your circular letter and queries has arisen solely from my difficulty in answering the latter. The questions do not lend themselves to a mere categorical "yes" or "no" without a good deal of explanation, and in thinking over them I have been reminded of an eminent politician who was seeking the suffrages of a Scotch constituency, and at one of his meetings he was asked, "Will you, or not, vote for the disestablishment of the Scotch Church?" He spoke for an hour and a quarter and not one of his audience knew whether he had answered the question in the affirmative or negative. In the same week, at another meeting, he was again asked the question and requested to give a plain "yes" or "no." He spoke for three-quarters of an hour, and my informant, who was one of his hearers, told me that again no one knew whether he was in favour of it or not; he gave so many arguments and reasons on both sides. If I were gifted with an exuberance of verbosity I could write for two hours, and at the finish leave you in a complete state of mystification as to whether I had said "yes" or "no" to either of the first four of your questions. With regard to the fifth, will you do me the honour to turn to the *Pharm. Journ.* of Nov. 9, 1889, pages 371 and 372, and read the latter two-thirds of that address. I think it will convey to you my "special" views as to what will best promote even the trade interests of a conscientious chemist.

The result of answering your question and the publication of the answers must be to influence members who possess a vote to use it either for or against me as an individual at the coming election, and this practically amounts to my writing an election address. I have hitherto resisted all attempts to be inveigled into such a step, but as such an attitude may be misunderstood, I will conclude this with an address, and leave it to your entire discretion to publish it or not, as you deem best for pharmacy.

First, I would ask all who feel interested in what may be my view of the qualifications for a member of Council, to read my letter to the *Pharmaceutical Journal*, vol. xix., page 986.

I mean entirely what I say when I write elected means hard work to the best of my experience and judgment for the *good of the craft*; non-elected means liberation for work which is personally congenial and far *more profitable*! My last *year's* work on the Council has cost me about six weeks of time, nearly 13,000 miles of railway travelling, and not less than £30 in expenses out of pocket. From what I know of human nature, I am sure the average chemist will not believe that I or any other man can give this without a *quid pro quo*, and I shall be glad to tell you what the *quid* is to me. It is the fact that I, in common with some other loyal members of the Council, love that much abused entity, the Pharmaceutical Society. I respect the memory of its founders, and the record of good work which, in spite of opposition and difficulties, they have done, and as soon as my own private affairs of business and finance were in the condition that I could choose to do what I liked with a portion of my time, I was glad to consent to go on the Council, and to try my best to follow in the footsteps of such men as Allen, Bell, Deane, Morson, Squire and others. If my fellow members of the Society this or any other year decide, that in their opinion, out of the choice they have before them, there be fourteen men, each of whom is more capable and better able to work for the good of pharmacy than I am, I shall not quarrel with them on being left outside; but if in their judgment they decide to elect me, I shall continue to do my best, and neither the flattery nor the blame of those self-constituted censors of the Society, the trade newspapers, will move me one hair's breadth from that which I believe to be the best for pharmacy.

Reply received from Mr. LEWIS B. ROSS, Driffield.

1. Not at present.
2. Certainly.
3. Yes.
4. I fear not: but would consider any feasible suggestions and support them.
5. See my letter in *British and Colonial Druggist.*

Reply received from Mr. G. F. SCHACHT, Clifton.

In reply to the inquiries contained in your circular as to my opinions on certain points of pharmaceutical policy, I beg to refer to my speeches and votes at the Council table, more especially to those recorded during the last few months.

I should like my return to the Council to depend upon the approval or disapproval with which my course of action in the past is regarded by my fellow members.

Reply received from Mr. H. N. BOWMAN SPINK, Westminster.

1. I would give the franchise to every man qualified as a chemist on his paying the subscription of half a guinea.
2. Yes.
3. Yes.
4. Yes, by means of a Poisons Bill with a largely extended schedule, and the election of one of our members to watch and protect our interests in the House of Commons.
5. My general opinion is pharmaceutical education should progress, but that material progress and prosperity should also progress both for the protection of the public and as a return for the trouble and expense for pharmaceutical knowledge. I also think that every man qualified and on the register should be compelled to pay an annual subscription of half a guinea and have all the privileges of membership. This would, of course, increase the power and stability of the Society, and enable us to present a united front to our many enemies.

Reply received from Mr. DAVID STORRAR, Kirkcaldy.

1. Yes.
2. Yes, on the lines of the Bill recently introduced and withdrawn.
3. Yes.
4. It would, in my opinion, be trespassing too much upon the convenience of the public to prohibit the sale of simple non-poisonous drugs by grocers, etc.; but I do think that a monopoly of dispensing prescriptions should be claimed by registered men, and that these registered men should be *bonâ fide* proprietors of businesses, and not simply employers of limited companies.
5. No, except that every effort should be made to induce all the members of the trade to join the Society, and so influence its policy.

"*A Little Mixed.*"—The description given of the fertilisation of the *Arum* is founded on the published observations of H. Müller, the greatest authority on the subject. Most of the leading points, however, have been corroborated by personal observations of the writer of the article, but in order to attain a position to speak dogmatically on the subject from personal observation, it would be necessary to devote close attention to the point for several seasons.

J. J. O. Evans.—(1) Bentham and Hooker and the London Catalogue have been followed in placing *Adoxa* in the Caprifoliaceæ. (2) Hayward's 'Botanist's Pocket Book' is published by G. Bell and Sons, price 4s. 6d. (3) You will find *Helleborus viridis* referred to in the February article; it is now in fruit. (4) Fruits and cuttings of Ruscus would be acceptable to the writer.

H. Lucas.—*Ranunculus bulbosus.*

R. C. L.—There are several British colonies in which an unqualified person would not be allowed to carry on the business of a chemist and druggist; Canada is one of them.

Apprentice.—Apply to the Secretary, 17, Bloomsbury Square, for the necessary form, and a copy of the Regulations of the Board of Examiners.

Ajax is referred to the rule as to anonymous communications.

Several letters have been received too late for insertion.

NOTICES.

North Kensington Chemists' Association.—In consequence of the Conversazione to be held on the third Tuesday in the present month, the next meeting of this Association will be held at the Leinster Hotel, Ossington Street, Bayswater, on Tuesday evening, the 13th inst., at 9 o'clock. Subject for discussion: "Trade Interests."

Chemical Society.—At a meeting of this Society to be held on Thursday, the 15th inst., there will be a ballot for the election of Fellows, and communications will be read on "Diethylphosphorous Acid," by Professor Thorpe; "The Ten Isomeric Dichlornaphthalenes," and "The Action of Chlorine and Naphthalene and Naphthalene Derivatives," by Professor Armstrong and Mr. W. P. Wynne; and "A Third Naphthaquinone," by Professor Meldola and Mr. Frank.

School of Pharmacy Students' Association.—A meeting will be held on Thursday, the 13th inst., when papers will be read on "Coal," by Mr. G. H. Lansdowne, and "How Drugs are Imported," by Mr. J. C. Umney.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Read, Butt, Pickering, Bedford, Humphrey.

LESSONS FROM FIELDS AND LANES.

MAY.

In most people's minds May is the month which of all others is associated with a luxuriance of wild flowers. The present season forms no exception to the general rule, and the sunshine and shower of the last few weeks have even induced some of the denizens of those bleakest of all bleak places—the moors—to put forth their tiny flowers. Moorland and mountain are more frequented in late autumn than in early summer, and the consequence is that many of their prettiest and most interesting flowers are quite overlooked. Two plants which are to be found on almost every moor are now in fine condition for our purpose. The bilberry (*Vaccinium Myrtillus*) and the cowberry (*V. Vitis-Idæa*) belong to the heath order (*Ericaceæ*), but are distinguished from the true heaths, and, indeed, from all the other members of the order, except the cranberry, by their inferior ovary. The bilberry is an erect shrub with very angular stem and branches, and varying in height from 6 inches to 2 feet. It sheds its leaves on the approach of winter (leaves *deciduous*), and is now putting forth along with its flowers a number of fresh green leaves which render it one of the most conspicuous features of the moorland. These leaves are ovate in shape, with well-marked reticulate veins and *serrate* margin, and are often of a reddish tint when young. The *scales* which protected the buds are still to be found at the base of the petioles. The flowers are solitary, axillary, and drooping. The calyx is *turbinate* or top-shaped, and is joined to the ovary throughout with the exception of a slight ring at the top forming the *limb*. The corolla is *gamopetalous*, with five minute teeth, and *globose*; in colour it is greenish-pink, and has the peculiar waxy appearance so characteristic of heaths. The stamens are eight to ten in number and situated on the ovary (*epigynous*); the filaments bend inwards, so that the anthers are made to press closely round the style, and each is provided on its back with a kind of tail (*dorsal awn*). A description of the function of these awns will be found in the article of last August (*Pharm. Journ.*, xx., p. 102). The cowberry is easily distinguished from the bilberry. It is in habit procumbent, with evergreen leaves, which, like most leaves that last throughout the winter, are very leathery in texture (*coriaceous*); the margins are entire and somewhat revolute, and are dotted on the under surface, which is paler in colour than the upper. The flowers are in drooping *racemes*; the corolla is pinkish-white and bell-shaped (*campanulate*), while the anthers are devoid of awns.

A woodland walk will now furnish abundant material for study. The oak and the beech, both catkin bearers, and belonging to the same order as the hazel, are just coming into flower; the sycamore—or plane-tree, as it is called in Scotland—(*Acer pseudoplatanus*) is in the full prime of flower and leaf; in similar condition is its kinsman, the horse-chestnut (*Æsculus Hippocastanum*), which, however, is not an indigenous tree. The flowers of the ash (*Fraxinus excelsior*) are rapidly passing into fruit, and the wild cherries are asserting their right to be regarded as spring flowers by breaking out in masses of white blossom. The limits of space prevent anything but a brief reference to these, but there are points of interest connected with most of them which it may be well to note. The sycamore and horse-chestnut belong to the order *Sapindaceæ*, an order interesting to pharmacists from its including guarana. The flowers of the sycamore are green and exist in pendulous racemes, thus readily distinguished from the common maple (*Acer campestre*), whose flowers are in erect *corymbs*. The leaves of the sycamore are among the best examples to be had of the *palmatifid* or palmately cleft type. The leaves of the horse-chestnut are *septenate* (consisting of seven leaflets), while the leaflets are *cuneate* or wedge-shaped; the inflorescence is known as a *thyrsus* (a panicle or branched raceme in which the pedicels are short and somewhat thickened, especially those at the apex and base of the inflorescence). The ash looks perhaps more striking just before it flowers, so black and forbidding are its buds. The flowers, however, are most interesting; they are *polygamous* (some male, some female, and some hermaphrodite) and destitute of floral envelope; the anthers are purple, and the somewhat oblong ovary is surmounted by a purplish, sessile, indistinctly two-lobed stigma. The ash belongs to the same order as the olive (*Oleaceæ*) and to the same genus as the manna-yielding species of Southern Europe. The leaves of the ash are *compound* and *impari-pinnate* (leaflets arranged in a feather-like manner with an odd one at the end) and are just beginning to peep out from their protecting scales. The only other British representative of the olive order is the privet (*Ligustrum vulgare*), a plant whose lanceolate entire leaves and unassuming little flowers, with four lobed funnel-shaped corollas, will next month be among the most conspicuous hedge ornaments. The cherries belong to a genus which appears to be gifted with an inherent tendency to vary, for systematists are much divided about some of its species having any right to be regarded as species at all. One of the species, the sloe, has already been referred to (*Pharm. Journ.*, xix., p. 951); it is closely allied to the plum, a wild variety of which is to be found in some districts. There are two well marked species of wild cherry, which there should be no difficulty in recognizing, *Prunus cerasus*, the dwarf cherry, and *P. Padus*, the bird cherry. The former has its flowers in umbels, while in the latter they are in pendulous racemes of singular beauty. The bird cherry is a small tree, while the dwarf cherry is more of a bush. A variety of the dwarf cherry, however,—*P. Avium*, the gean,—often grows to the height of a fair-sized tree; it is more common in Scotland than further south, and at Colinton, near Edinburgh, it has been found growing in great profusion. The characteristics of the order *Rosaceæ* may be studied to advantage in the cherries, and also in the mountain ash or rowan, which is now one of the most charming features of the hillside plantations. The inflorescence of the rowan is a good example of the *cyme* (the order of expansion of the flowers being therefore centrifugal); its leaves are *pinnate*, and the leaflets very markedly *serrate*.

The *Umbelliferæ* are fast developing their annual show. Dwellers in the north should find plenty of the sweet cicely in their walks through the pasture-land, and fields and hedge-rows everywhere are fast becoming covered with the compound leaves and white flowers of the hedge-parsley. For a description of these, and the order to which they belong, the article of last August should be referred to (*Pharm. Journ.*, xx., p. 101). Sweet cicely is somewhat local in its distribution, although in some districts very common. At Craigmillar Castle, near Edinburgh, it grows in great profusion, and in the neighbourhood of Sheffield it is frequently met with.

The order *Rubiaceæ*, to which belong the madders and bedstraws, is now represented in the hedgerows by the crosswort (*Galium Cruciata*) and the woodruff (*Asperula odorata*). It is closely allied to the cinchona order (*Cinchonaceæ*) and to the order to which the elder belongs (*Caprifoliaceæ*). The crosswort is readily recognized by its ovate, hairy leaves being in whorls of four, with the *cymes* of minute yellow flowers crowded together in their axils; the ovary is inferior and provided with two styles, each surmounted by a *capitate* stigma; the stamens are four and *epipetalous*, while the corolla is *rotate* or wheel-shaped (a gamopetalous corolla with a short tube and spreading limb); the calyx has become so minute as to be unrecognizable. In the woodruff there is a distinct calyx, the flowers are white, and the leaves are in whorls of six to nine. The plant is best known, however, by the sweet odour which it develops on drying. The field madder (*Sherardia arvensis*) may also be found in flower in almost any dry field. Its minute blue and pink flowers in terminal sessile umbels distinguish it at once from all the other members of the order. It is creeping in habit and the structure of the flowers is similar to those already described.

Many interesting members of the orders *Labiatæ* and *Scrophulariaceæ* are beginning to force themselves on our attention (see *Pharm. Journ.* xix., p. 950, xx., p. 22). The white dead nettle (*Lamium album*), the red dead nettle (*L. purpureum*) and the yellow weasel-snout or archangel (*L. Galeobdolon*) vie with the speedwells and the eyebrights in the representation of their respective orders. The *Lamiums* belong to the labiate order, and the most marked characters of the genus are the five-toothed calyx, *ringent* corolla (*L. ringens*, grinning), with its arched upper lip enclosing the *didynamous* (two long or two short) stamens, the two lower of which are the longer, and flat almost entire lower lip. If the flower of a *Lamium* be examined, its remarkable adaptation for cross-fertilization by insects will be at once seen. A bee in search of the nectar which is situated at the base of the corolla-tube alights on the lower lip and inserts its proboscis into the flower; the position which it must needs take up in doing this brings its back into contact with the anthers, which deposit on it a quantity of pollen; if the position of the stigma be noted, however, it will be seen that before it can touch the anthers it must have come into contact with the stigma, which does its best to seize and retain any pollen which its visitor has brought with it from another flower. The speedwells are readily distinguished from all the other members of their order (*Scrophulariaceæ*) by their two stamens, and *almost regular* corollas, which are always of a blue or lilac colour. The species of Speedwell are determined by the duration of the root and the form taken by the inflorescence. There are four species with *annual root* and *solitary axillary* flowers now to be found almost everywhere. Banks furnish the ivy-leaved speedwell (*Veronica hederifolia*); fields and waste places look bright with the pale blue corollas of *V. agrestis*, and the more decided blue of *V. polita*; while here and there may be found the large bright blue flowers of *V. Buxbaumii*. *V. serpyllifolia*—the thyme-leaved speedwell—should be looked for on wall-tops; its blue flowers are arranged in *terminal* bracteate *racemes*, and it has a perennial root. There are three common species with perennial root and flowers in *axillary racemes*. *V. Beccabunga*—the common brook-lime—frequents ditches and wet places, and is soon distinguished by its large succulent leaves and small blue or pink flowers, which somehow always strike one as not "matching" the leaves; *V. Chamædrys*—the germander speedwell—is one of the best-known species, and its large bright blue flowers greet one in woods and by waysides everywhere; *V. officinalis* is more common on hillsides and is readily recognized by its obovate serrate and somewhat coriaceous leaves. The veronicas secrete their honey on a disk at the base of the ovary; it is sheltered from rain by the hairs lining the corolla tube. The lines which form such a marked feature in the corollas are known as "honey-guides," from their function in showing insects the way to the nectaries.

A woodland ramble in May would scarcely be complete without some notice of that most distinctive of plants, the toothwort (*Lathræa squamaria*). The toothwort belongs to the broom-rape order (*Orobanchaceæ*), an order remarkable from the fact of all its members being *parasites* (plants which grow upon and take their nourishment from other plants). In structure the toothwort very closely resembles the foxglove and labiate orders. Its stamens are *didynamous*, its corolla two-lipped, with the upper lip arched, and its ovary is provided with a honey-secreting disk. The flowers are arranged in one-sided (*secund*) racemes, and are each provided with a bract. There are no leaves, but the flowering axis and underground stem are thickly covered with *scales*. The whole plant is of a dull creamy colour tipped with purple. If it be dug up its rootlets will be found attached to the rootlets of the tree on which it preys. The flowering axis varies in length from 4 inches to about a foot, and will at once be recognized by its peculiar fleshy appearance. The absence of true leaves and of green colouring matter are characteristic of parasitic plants, and a little reflection will show that they are to them unnecessary. The leaves and their chlorophyll are the active bodies in converting the inorganic constituents of air and earth (carbon dioxide, water and salts) into the organic substances (starch, cellulose, etc.) which form the cell-contents and plant frame. In the case of the toothwort all this is done for it by the leaves of its host. It has therefore discarded all unnecessary organs, and retained those only which enable it to perpetuate the existence of itself and its species, namely, its sucking roots and its flowers.

There is another interesting little plant which although somewhat local in its distribution may yet be looked for in many moist woods with some probability of success. Herb Paris (*Paris quadrifolia*) is generally placed in the order *Liliaceæ*, although its very distinctive features have induced some botanists to give it an order to itself (*Trilliaceæ*). It is distinguished from all the other *Liliaceæ* by its leaves being in a whorl (generally of four but sometimes of five or six), and their venation being *reticulate*—a very exceptional feature in a monocotyledon. The long white *rhizome* grows at a great depth and sends up an aerial stem from 4 to 10 inches in height, which bears at its apex the whorl of leaves. From the centre of this whorl springs the peduncle bearing a very remarkable looking flower. There are three to five narrow green sepals alternating with the same number of yellow petals which are narrower still; the stamens vary in number from six to twelve, and the styles from four to six. The plant is a most variable one in all its parts, yet its general appearance is so characteristic that once known it can never be mistaken for anything else. The structure of the stamens is remarkable from the fact of the *connective* (tissue between the anther lobes) being prolonged beyond the anthers. The flowers of Paris do not secrete any honey. They are fertilized by carrion-loving flies, which are attracted by the disagreeable smell of the flowers and by the glittering purple appearance of the ovary. The stigma is ripe before the anthers (*proterogynous*). The absence of honey and the greenish colour of the floral envelope show Paris to be one of the most primitive members of its order.

THE INDEFINITE PHARMACY ACT.

The following letter has appeared under the above title in the *Globe* for May 1:—

"Sir,—Happily one more section of the Pharmacy Act has been settled, after long arguments by counsel and great consideration on the part of the two eminent judges who tried the case of the Pharmaceutical Society *v.* Wheeldon. And the majority of the chemists and the public will welcome this decision. As an appeal was refused in this case, it is unlikely that the decision will be upset by another court, as was the case with another section of the same Act, tried in 1878 by a judge of the county court. That case next came before the Court of Queen's Bench on March 15, 1879, Lord Chief Justice Cockburn and Mr. Justice Mellor being the judges. They came to the conclusion 'that the intention of the Act was to prevent anyone, except qualified persons, selling poisons and carrying on the business of a chemist and druggist; consequently, as a company could not qualify, it could not do such things.' The judgment of the county court judge was, therefore, reversed.

"The defendants appealed, and the case came before the Court of Appeal on February 22, 1880, when the arguments were repeated. On March 16, judgment was given, their lordships (Baggallay, Bramwell, and Thesiger) agreeing that the appeal should be allowed. The final appeal to the House of Lords was heard on July 21 and 22, 1880, before the Lord Chancellor (Selborne) and Lords Blackburn and Watson, and the Pharmaceutical Society was defeated. Lord Watson said: 'It is impossible to disguise the fact that the statute is characterized by great ambiguity, I would almost go to the length of saying, confusion of language;' and this opinion is endorsed by many who have studied it. When we consider that ever since 1878 to the present time, so many eminent judges on different occasions have been unable to agree on the meaning of the several sections of the Act, is it not full time that such an Act should be erased from the statute book? An Act which is vexatious to those who have to deal with it and dangerous to the public. With a Pharmacy Act the public were impressed with the idea that there was no further danger. All druggists must be qualified. This was all a delusion; the community at large became careless. To them the coloured bottles were a symbol of qualification. To my mind, there is less security to the public at the present day than prior to the passing of this Act.

"The Pharmaceutical Society was originally a voluntary association of chemists and druggists, formed for the purpose of advancing chemistry and pharmacy, and for promoting a uniform system of education, and in 1843 it was incorporated by Royal charter. From this time until 1868, the public became aware there were two classes of drug vendors, particularly the better class of society, who obtained their medicine from those whom they and their physicians considered the most fit to supply them, but the Pharmacy Act of 1868 branded the drug vendors all alike; the most that the Act did was to protect the title 'chemist and druggist,' without preventing their work being done by unqualified companies. There were also some chemists who did not pass the apology for an examination, and some of them are still in existence in many of our small country towns, where they keep general shops. These tradesmen bring up a larger number of apprentices than all the chemists in London. They get their supply principally from among those who are ignorant of the education necessary for a chemist and druggist. In time these young men find out they are utterly unfit for their calling. Many turn their hands to something else; others get employment as dispensers to surgeons, in which capacity, with a little tuition, they are able to fulfil their duties. As a rule, they will have half a dozen, or at most a dozen, different kinds of mixtures to attend to, made up, as they often are, in gallon bottles: also to serve out the different kinds of pills obtained in quantities from the wholesale druggists, who are not under the control of the Pharmacy Act. When these assistants have obtained a little smattering of dispensing and medical practice, they are just ripe for quackery, and equally ready to supply the wants of our great unqualified emporiums with assistants. To say that none of these may become competent chemists, is to say that a charity boy may not become a great physician or a great lawyer; but it is the exception, not the rule.

"A new Pharmacy Bill is talked of, but any future Act will be incomplete which does not provide for completely protecting the public from all classes of drug vendors, whether they be individuals or trading companies, and giving those who are qualified a reasonable protection for the expense of education and responsibility imposed upon them. It must also provide for the compulsory education of chemists at some special school of pharmacy, and that the Preliminary examination must be passed and registered, at the Society's office, before beginning an apprenticeship. For they must have sufficient mental training at the beginning of their pupillage to enable them intelligently to study the scientific books they will have to master, and to comprehend the principles on which their work is based.

"I do not see any valid reason why the so-called patent medicine vendors should be allowed to sell poisons simply because a stamp duty is paid upon them. There is nothing whatever to prevent their selling the most deadly poisons, under fancy names, in quantities sufficient to poison a whole army, and without the possibility of tracing the sale of the poison, as is the case when chemists sell the ingredients under their proper names and duly registered on their books. Parliament will do well to consider this matter and be prepared to do justice to the public and the druggist when the time comes for the consideration of the next Pharmacy Bill, which is now being prepared. CHEMICUS."

The Pharmaceutical Journal.

SATURDAY, MAY 17, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CONVERSAZIONE AND ANNUAL DINNER.

WE are glad to inform our readers that the arrangements for the Society's Conversazione, next Tuesday, are now well advanced towards completion. From the number of replies to the invitations that have been received there is every reason to expect that there will be a large attendance. At 8.30 the visitors will be received in the new Examination Hall, by the President, Vice-President and members of Council. During the evening a selection of instrumental music will be given by the band of the Coldstream Guards in the Examination Hall, and one of vocal music by Mr. JOHN FOSTER's company of Glee-singers in the Lecture Theatre. There will also be exhibits of general scientific and pharmaceutical interest. Provision will be made for the care of hats, coats, etc., in the front room of the new building. Refreshments will be served in the new Council Room and in the old Examination Rooms.

The arrangements for the Annual Dinner at the Freemasons' Tavern on Wednesday are also progressing satisfactorily, and the gathering promises to be exceptionally successful this year. The number of those who have accepted the office of Steward is largely in excess of any previous occasion. Already the number of tickets sold is considerably over a hundred, and of the invitations sent out thirty-eight have been accepted. Among the number of distinguished guests who have signified their intention of being present we mention Mr. ECKELL, of Christiania, and M. FERRAND, of Paris, two of the visitors to the International Congress held in London in 1881. In order to overcome difficulties in the allotment of seats at the table, that duty has this year been entrusted to a sub-committee consisting of Mr. ALLEN and Mr. TAYLOR, whose decision in this matter is to be absolute. Those who desire to be seated together with friends will therefore do well to communicate their wishes at once, or at latest by Tuesday morning, as the final arrangements will be made in the course of that day and cannot be altered afterwards. Early intimation of what is desired will enable the Committee to provide for the convenience and satisfaction of all.

UNQUALIFIED ASSISTANTS.

WHETHER it be the special excitement connected with the approaching election of members of Council or the influence of the recent judicial decisions to which we must attribute the increased interest shown in matters connected with the business of pharmacy, it is evident from the correspondence that has appeared in the Journal during the last few weeks that more active attention is being paid to many of the subjects which materially affect pharmacists. We are glad to find that in many instances the consideration of the judgment delivered in the WHEELDON case is not limited to the question whether it does or does not virtually or practically amount to the passing of a new Pharmacy Act; but that on the contrary the important effect of that judgment in protecting and conserving the interests of registered persons has been recognized. That is the consideration which should naturally take the foremost place from the purely pharmaceutical point of view, and upon that ground the judgment ought to be regarded as constituting a valuable step in advancing the work which is the special business of the Society, namely, the protection of those who carry on the business of chemists and druggists. A great deal has lately been said about the intention of the framers of the Pharmacy Act having been different from the judicial interpretation that has been given to the Act, but we question whether the discussion of the matter from that point of view is of much practical value. Parliament, under the influence of various conflicting interests, passes Acts, but it is the subsequent judicial interpretation of those Acts that makes law. It was no doubt far from the intention of any persons concerned in framing the Pharmacy Act that seven unregistered persons should associate together to do what no one of those persons could do individually, but the judicial interpretation of the Act made that to some extent possible. In the case of the recent judgment, the effect of it is not detrimental to the interests of chemists, but is distinctly in their favour. However, it is only incidentally that this is the case, the main consideration in the minds of the judges having been the interests of the public. The counsel for the appellants, in asking for leave to appeal, did so on the ground that it affected so many people. Whether that was a manifestation of *naïveté* or audacity, it was equally admirable. Truly the judgment affected many people, for it was one in which the whole community is interested.

But it is a remarkable circumstance that one of the loudest objections to the decision put forward by those who as registered persons might be expected to look upon it as a means of protection for themselves, is that a large number of unqualified assistants will be injuriously affected. Such as bjection from those whose chief complaint is that heir business is interfered with and damaged by he competition of unqualified traders is, to say the least, singularly inconsistent. It is urged too that he unqualified assistants whose cause is thus championed have long been practically engaged in the business, and that they are fully competent o perform their duties. That being the case egal qualification ought not to be a matter of much difficulty for them to obtain, and it may be expected that many who are in the position stated will adopt that course. But even that is not absolutely necessary for all. The judgment in the WHEELDON case distinctly recognizes the justice of the argument that chemists would not be likely to employ assistants who were not competent, but that was admitted only as regards the general business of a chemist's shop not involving the sale of poisons. It was not considered that the Legislature meant to enforce upon chemists the employment of no assistants but those duly qualified. Nor is that now a necessity, though it has been ssumed to be so. It is only in relation to the sale and dispensing of scheduled poisons that it is held, from the terms of the Act and its paramount object, that the intention of the Legislature was not to leave an employer any discretionary power, but to insist upon one uniform qualification for every person who sells or dispenses the articles to which the restrictions of the Act apply. The argument that hundreds of unqualified assistants will be thrown out of employment is therefore one that cannot be sustained; they may in certain instances be put to some disadvantage from want of the legal qualification; but if they are competent and experienced persons that disadvantage can be overcome, and any attendant inconvenience must be looked upon as the result of neglect to qualify at an earlier period. In any case the necessities of the position are now made evident for both employers and assistants. Whatever may have been the feeling of the trade in the past—and it cannot be said that the Council has failed to represent that feeling—it is now clear that the part of a chemist's business which is restricted to legally qualified persons must be carried out by those who are really so qualified. It is only the acceptance and observance of this principle that can furnish any basis for the claim that the trade in all articles containing scheduled poisons should be confined to registered chemists.

We are informed by Mr. R. M. Ewell, the Honorary Secretary of the Dover Chemists' Association, that at a meeting of the Association held last Wednesday, a letter was read by Mr. Bottle, which he had received from Mr. G. Wyndham, the member of Parliament for Dover, in reference to the recent action taken by the Council of the Pharmaceutical Society in opposing the clause in the Customs and Inland Revenue Bill relating to the retail sale of methylated spirit by chemists. Mr. Bottle mentioned that he had written to that gentleman, and thanked him for his attention to the wishes of his constituents in this matter. It was then proposed by Mr. J. B. Hambrook that a vote of thanks should be forwarded to the President of the Pharmaceutical Society for his prompt and successful intervention with the Chancellor of the Exchequer, through which a most objectionable clause in the Customs and Inland Revenue Bill, prohibiting the sale of methylated spirit in small quantities, has been expunged from that Bill, and also thanking him for the general interest he takes in all matters affecting the "trade interests" of chemists. This was seconded by Mr. Bottle and adopted unanimously by the meeting.

* * *

In the Committee of the House of Commons on the Customs and Inland Revenue Bill, on Thursday, the 8th inst., in accordance with the promise given to the President of the Pharmaceutical Society by the Chancellor of the Exchequer, the 32nd clause, containing the objectionable provision as to the sale of methylated spirit, was withdrawn, Mr. Jackson undertaking to bring up a new clause on report. The new clause appeared among the notices on Tuesday, and proved to be identical with the former one, with the important exception of the omission of the provisions limiting the retail sale of methylated spirit to quantities not less than a reputed quart, and prohibiting a dealer who also holds a spirit licence from having in his possession or selling methylated spirit otherwise than in vessels containing not less than a reputed quart.

* * *

A well-attended meeting of the chemists of the North Paddington district was held on Tuesday at the instance of Mr. R. H. Parker, the Divisional Secretary for that division of the metropolis, for the purpose of considering the draft Pharmacy Bill, 1890. Each clause of the Bill was discussed separately, and though it was considered that many difficulties and inconveniences might be experienced in the working of its provisions as an Act of Parliament, it was the opinion of the meeting that these would not be serious. The whole of the clauses were therefore approved of, and the following resolution was passed unanimously:—"That this meeting cordially approves the draft Pharmacy Bill, 1890, and will make every effort to secure its successful enactment."

* * *

A further discussion then took place on the recent judicial decisions: (1) That no scheduled poisons may be dispensed or sold by unqualified assistants except under the immediate supervision of a legally qualified person, and (2) that all proprietary preparations containing scheduled poisons are subject to the provisions of the seventeenth section of the Pharmacy Act, 1868, whether sold under cover of a medicine stamp or otherwise. The opinion generally expressed was that to apply these principles fully immediately is impracticable; but it was thought advisable, taking into consideration the results that must follow the application of these decisions, viz., the prohibition of dealing in poisons by bogus companies and other unqualified traders and the restriction of the sale of all proprietary medicines containing scheduled poisons to registered chemists, that the new position should be recognized by chemists, and that they should gradually educate themselves as well as the public to the conditions the law is now declared to require. A resolution was carried unanimously, "That the best interests of chemists are advanced by these judicial decisions."

* * *

The report of a meeting of the Brighton Association of Pharmacy, which was received too late for insertion in this week's Journal, states that after a discussion of the annual report of the Council of the Pharmaceutical Society, in which Messrs. Savage, Williamson, G. Watkin, Histed and Leigh took part, a resolution was unanimously carried, "That this meeting, whilst approving generally of the Report of the Council, regrets to see the continued falling off of members, and desires to suggest that some steps be taken to secure the adherence to the Society of a larger number of the trade, and with that view would suggest that the privilege of voting be granted to all associates and that of eligibility for election on the Council to associates in business."

* * *

On another page will be found printed a Bill for amending the Pharmacy Act (Ireland), 1875, which has been introduced into the House of Commons and now stands for second reading. It bears the names of Mr. Johnston, Mr. Sexton, Sir James Corry, Mr. T. Dickson, Sir E. Harland, Mr. Webb and Mr. Macartney, and appears to have for its principal object to provide for the drawing up of a Register of Chemists and Druggists in Ireland. This it would do by repealing the 15th section of the Act of 1875, which empowers the Council of the Pharmaceutical Society of Ireland, if it should think fit, to allow certain persons to acquire the title of chemist and druggist, and by enacting that a Register of Chemists and Druggists shall be prepared, in which certain persons shall have the right under stated conditions to have their names included. This registration would be evidence of the right to keep open shop for the sale, retailing or compounding of poisons, but it would not confer the right to compound medical prescriptions. The persons entitled to registration without examination would be those who produce evidence that they were practising as chemists and druggists in Ireland in the position of principal on the 1st of January, 1889; or who at any previous time had practised as principals for a period of not less than five years; or who had previous to that date served seven years as apprentices or assistants to persons entitled to registration as chemists and druggists under the Bill. Persons who may have gone into business as principals since the 1st of January, 1889, or who shall have served as apprentices or assistants for not less than four years, to persons entitled to be registered would be able to claim registration, after passing an examination as to knowledge of English orthography and composition, arithmetic, the appearance of various drugs and the usual tests for poisons in general use. Other persons who shall have served an apprenticeship of four years with a registered chemist and druggist will be entitled to present themselves for examination under the principal Act, which provides that the examination for the title of chemist and druggist shall be a modified form of that for pharmaceutical chemist. An additional service of one year with a pharmaceutical chemist and the passing of the "Preliminary" Examination would then entitle such a person to present himself for the higher examination. A payment of a registration fee of half a guinea is another condition of registration in each case. The Bill also provides that examinations for the title of chemist and druggist shall be held as frequently as those for the higher title, in Dublin, Belfast, and such other places as may be convenient, but it would not be compulsory to hold an examination at any place outside Dublin unless there were at least twelve candidates who desire it. Registration as chemist and druggist would entitle a person, upon payment of the proper subscription, to become an associate of the Pharmaceutical Society of Ireland and to take part in its management, including voting for members of the Council, which would after this year include not less than nine chemists and druggists among its twenty-one members. On the other hand every chemist and druggist or pharmaceutical chemist who remained unconnected with the Society would have to pay an annual fee of half a guinea to secure retention of his name on the Register. Lastly, the Bill provides that a person keeping open shop for the retailing and compounding of poisons, or for this and the compounding of medical prescriptions, shall himself "personally manage and conduct such shop" or employ a properly qualified person in his stead, and inquiries from the Registrar as to the proprietors of such shop or their assistants would have to be answered under a penalty of one pound a day during default. It only remains to say that notice of opposition to the second reading of the Bill has been given by Dr. Kenny.

* * *

We have been requested by Mr. Richardson, of Leicester, to insert in the Journal an address indicative of his views in regard to pharmaceutical politics, but we regret being unable to comply with the request since we have, in accordance with established usage, declined to insert the addresses of other candidates for election to the Council. On this point we have no doubt; but in Mr. Richardson's case we experience some difficulty which may be a fitting retribution for the partial departure from the wholesome rule which has hitherto been observed. It appears that by the publication of the replies to questions in last week's Journal, Mr. Richardson may perhaps have been made to appear disadvantageously. We learn that the absence of any reply from him was owing to his desire that his reply should be treated as a private communication out of regard for the resolve of his colleagues not to issue election addresses. We therefore feel constrained to state that Mr. Richardson's reply was to the effect that he considers his general views on pharmaceutical politics, and his past endeavours to interpret the Pharmacy Acts in a liberal spirit for the benefit of the trade, have been sufficiently indicated by his public action as a member of Council during the past ten years to enable the electors to judge of the course he would take in the future. We may add that this appears to be the only sound basis upon which any proper estimate of the claims of candidates can be formed, and that to those who take an active interest in the work of the Society it is of far greater value than any election addresses or replies to questions, which may be altogether destitute of meaning, besides being possibly a source of unforeseen embarrassment in the future.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 7th inst., at No. 11, Harcourt Street, Dublin, at three o'clock.

The President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President (Mr. Wells), Professor Tichborne, and Messrs. Whitla, Merrin, Simpson, Beggs, Hodgson Treasurer), Hayes and Dr. Burnes.

Letters were read from Mr. James Hartford, M.P.S.I., New York, Messrs. D. O. Haynes and Co., Detroit, Proprietors of the *Pharmaceutical Era*, and Mr. F. B. Kilner, New Brunswick, in reply to inquiries which he Council had made through Mr. Hartford as to what States of America recognized the licence of he Pharmaceutical Society of Ireland. Copies were orwarded of the *Pharmaceutical Era* containing information on the subject.

The President said it appeared that the *Pharmaceutical Era* contained replies from twenty-two States on he subject. From five of these the answer as to whether the licence of the Irish Society was recognized or not was "yes;" from five others "no;" whilst rom the remaining twelve the answer was uncertain.

Professor Tichborne: We are under great obligations o these gentlemen.

On the motion of Mr. Beggs, seconded by Mr. Whitla, t was resolved that the best thanks of the Society be given to Mr. J. Hartford, to the proprietors of the *Pharmaceutical Era*, and Mr. F. B. Kilner, for the valuable information contained in their communications.

A letter was read from Mr. Miller, Registrar of the General Medical Council, stating that the communication in reference to the addendum to the Pharmacopœia which had been forwarded by the Council of the Society would be laid before the Pharmacopœia Committee of the General Medical Council. Also a letter, ated April 14, was read from Dr. Quain, the Chairman of that Committee, stating that he was sure they would appreciate the trouble the Council had taken in bringing together the information which they had ent, but pointing out that by the original communication sent from the Pharmacopœia Committee different equests were addressed to the "medical authorities" nd to the "Pharmaceutical Societies" of Great Britain and Ireland.

The President: We fell into a mistake. The circular asked the medical men to say what drugs they approved of; whilst the Pharmaceutical Societies were asked for their assistance as to how those drugs should be prepared. We thought it wise that we should also ay what drugs were most in use. All that we can do s to wait until we hear what drugs have been chosen by the medical men of the three kingdoms.

Professor Tichborne said he was inclined to take a ittle further notice of the letters which had been received. It was quite true that the Council had made a mistake in the matter; but the two questions were mixed up in the same paragraph of the original letter of December 3, 1889, which they received from the Chairman of the Pharmacopœia Committee. That etter ran as follows:—"It is of the utmost importance o obtain accurate information as to which of the comparatively new medicines and compounds possess well-recognized medicinal value, and the Committee are asking the co-operation and assistance of the arious medical authorities with the hope of obtaining his information. But as to the manner of preparing r defining the medicines and compounds, the Committee are instructed to invite opinions from the members of the Pharmaceutical Societies of Great Britain nd Ireland, and of the pharmacists generally through the Councils of those Societies or otherwise." The whole business being wrapped up in one paragraph it was easy to make the mistake in question. At the same time he thought that the communication which the Council had sent forward to the Pharmacopœia Committee ought to be of immense value to them; and with great respect to that Committee he thought that after all the Council had done the right thing. The Committee had asked for two things; one was a plebiscite or consensus of opinion as to what medicines were most in use. They said that they had asked the physicians for that. Then they said that they had asked the pharmacists to tell them how to make up those preparations. He was inclined to think that the pharmacist was almost a better judge of the general application and usefulness of medicines than the physician. The opinion of the physician had a sort of local value—it was a reflection of his own practice; whereas they knew that in a great many pharmaceutical establishments in London, Dublin and Belfast, perhaps a couple of hundred prescriptions of different medical men would be made up in each of them per day, and that would enable them at once to say whether particular medicines were in use by general acclamation or were dying out. Perhaps if the question were asked whether butyl chloral hydrate was dying out or not, two or three out of any half-a-dozen medical men would say that it was a most useful thing, because they prescribed it themselves, whilst the verdict of pharmacists would probably be that it was rapidly becoming an extinct medicine, and that there was no use in retaining it in the Pharmacopœia. He was therefore of opinion that the proper persons to give an answer to the first of the questions in the circular, namely, as to what were established drugs and what were not, would be the two Apothecaries' Halls and the two Pharmaceutical Societies. He trusted that Dr. Quain might be induced not to let their addendum go to waste, but to make some use of it; for example, it might be sent to the Pharmaceutical Society and the Apothecaries' Hall on the other side of the water. In America, as well as in England, they were revising the Pharmacopœia; and he found by an American publication, the 'Ephemeris of Materia Medica, Pharmacy and Therapeutics,' that a convention for that purpose was to be held at Washington in May, 1890, and that there were to be summoned to it delegates representing the Incorporated Medical Societies, the Incorporated Medical Colleges, the Incorporated Colleges of Pharmacy, the Incorporated Pharmaceutical Societies, the American Medical Association and the American Pharmaceutical Association, besides medical officers from the American Army and Navy. So that in that Convention pharmacy would be much more strongly represented than in the Committee of the General Medical Council.

On the motion of Professor Tichborne, seconded by Mr. Merrin, the Registrar was directed to reply to Dr. Quain, stating that the Council regretted the mistake that had occurred, and that they would have much pleasure in rendering any assistance in the direction specified in the communication of the Committee.

A letter was received from Mr. Eugene MacSweeny thanking the Council for having recognized the London City School.

A letter was read from Mr. George Brown, M.P.S.I., expressing his surprise that the Council should have recognized the London City School, as it would enable those who could not find a "happy hunting ground in England" to come over, pay their seven guineas, and pass examinations, which were already by no means difficult.

The Vice-President: We always like to protect our licentiates, but we have a higher object. We wish to afford to young men of education and standing an opportunity of obtaining our qualification. Mr. Brown himself happens to be a Scotchman. He came over here, went in for our examination, and we accepted from him a certificate of pharmacy from a Scotch chemist. Now he objects to our taking an Englishman's certificate. Immediately after he passed our examination he passed the Minor in Scotland, and he told me he found our examination was certainly stiffer than the English one.

The President: He is slightly mistaken in saying that we accepted the school in a great hurry. It was only after very serious consideration and postponement for the purpose of inquiry that we did so.

The Vice-President: At our last final examination there were eleven candidates, and I see only six certificates are to be given.

A letter was read from Mr. James E. Brunker, M.P.S.I., 68, Grafton Street, calling the attention of the Council to the fact that there was a resolution on their books with which the resolution passed at their last meeting in reference to the London City School was inconsistent.

The President: The resolution Mr. Brunker refers to was passed about two years ago on the motion of Mr. Allen seconded by Mr. Beggs, and was to the effect that it was not desirable to recognize private schools of chemistry.

Dr. Burnes: We should reply that we have examined this school, and found it suitable for our purposes, but that we will not accept every school.

On the motion of Dr. Burnes, seconded by Mr. Hayes, it was resolved that Mr. Brunker be informed by letter that after an inspection of the City School by a licentiate of the Society, and after careful consideration by the Council, it had been placed on the list of schools recognized by the Society. A letter was read from Mr. John H. Herley, asking whether one session of practical chemistry would suffice in his case, as he passed the Preliminary Examination in April, 1880.

On the motion of Mr. Whitla, seconded by Mr. Wells, the Registrar was directed to inform Mr. Herley, that having regard to the regulations affecting the chemistry lectures, the Council were unable to grant his request.

A letter, dated April 14, was read from Mr. William N. Allen, M.P.S.I., expressing his surprise that the Council had not printed the proceedings of the special meeting held on December 23, 1889. He found by the report of the proceedings of the Council, which appeared in the *Pharmaceutical Journal* of April 12, that "it was not thought worth while to have the meeting reported." He thought that the members should have had an opportunity of judging for themselves on that matter, especially if the subject as to whether the Society was to become a teaching body was discussed. He therefore now asked either that the proceedings of that meeting should be published, or that he should be furnished with a copy of the minutes of it.

The Vice-President: I should like to correct an error in the report with respect to myself. I am reported as having said "that it was not thought worth while to have the meeting reported." What I said was, that "it was not thought worth while to have the reporter present at the special meeting." At special meetings we do not usually have the reporter. At one of the ordinary Council meetings this matter was referred to a Committee, and the Committee made a report, which was adopted at the special meeting with very little discussion.

Professor Tichborne: There was no discussion, and the report was adopted unanimously. The subject had been thoroughly discussed at previous meetings.

The Vice-President: But I think that in the case of special meetings the Registrar should be directed to send notices of them to the journals.

Mr. Hodgson: Would it not be well to have the minutes of the special meeting in question read now!

The President: An imputation is made of secrecy. The establishment of the school was published in the Journals and daily newspapers; and a notice was sent out that a special meeting was called for that very purpose.

The Vice-President: At the two previous Council meetings the matter was discussed, and it was reported in the journals.

The Registrar then read the minutes of the special meeting as follows:—"A special meeting of the Council was held on Monday, December 23, 1889, to receive a report from the Committee appointed with reference to the establishment of a night school for practical chemistry, recommending that such a school should be at once established by the Council, at No. 11, Harcourt Street, to be conducted by Professor Tichborne, L.L.D., M.C.P.S.I., assisted by Mr. P. Kelly, M.P.S.I. Present—The President (Mr. C. Evans), the Vice-President (Mr. Wells), Dr. Burnes, Mr. McCormack, Professor Tichborne, Mr. Beggs, Mr. Hayes and Mr. Merrin. Proposed by Mr. Beggs, seconded by Mr. McCormack, and resolved that the report from the Committee appointed with reference to the night school be adopted. Charles Evans, President, February 5, 1890."

Mr. Hodgson: Should we be justified in giving a copy of our minutes to a gentleman who is not a member of the Council?

The Vice-President: I do not think we should do so. The minutes are for members of the Council, but I do not think we should furnish copies of them to licentiates.

Mr. Hodgson: To do so would be to establish a dangerous precedent.

Dr. Burnes said his recollection of what passed at the special meeting was that the resolution was unanimously passed. His impression was that the matter was so urgent that there was no question about it. The night school was an absolute necessity.

Mr. Hodgson said he had a strong feeling against the tendency to do away with night schools. These were of the greatest possible benefit to young men of the class they desired to assist. He knew, and Mr. Hayes could bear him out in this statement, that the evening tuition that used to be given in the College of Science had been a great benefit to those who used to take advantage of it, many of whom had made great progress in the world since. These men never would have been able to acquire chemical knowledge but for the evening instruction that used to be given by Professor Galloway. But the College of Science evening schools had been closed for a long time. The tendency of the College of Surgeons was to do away with evening instruction. One of the gentlemen connected with that college told them that they did not want persons who could not afford to learn their profession during the day; in other words, they did not want men who had to earn their bread during the day and study for a profession in the evening.

Mr. Hayes: And who are the best men.

Mr. Hodgson said he would do everything he could to put down the tendency to which he referred and give young men an opportunity of obtaining evening instruction. The young man who earned his bread during the day and devoted three or four hours in the evening to study for the purpose of advancing himself in life deserved the greatest possible assistance.

The President: And as Dr. Burne says, we really had no option in the matter.

The Vice-President: I have before me a document of the late President of the Society, Mr. Brunker, dated February, 1885, in which he states that the Council warmly sympathized with the proposal of such a school in connection with the Society, but that they had no funds available for the purpose of starting it; but that even if they had they would not be justified in investing them in a more or less speculative project. We are now only following out the wishes of the gentlemen who went before us. The gentleman objects to our having a private school; and an objection is also made to a member of our Council being the teacher of the school. But if we all formed a limited company, and established the school in that way, there would be more chance of unfairness where we were all interested in passing the candidates than where there is only one gentleman concerned about them with twenty members of the Council against him. I think it a pity that so much opposition should be given to what is a very desirable thing.

Dr. Burnes: No city in the United Kingdom is so badly provided with the means of night teaching as Dublin. In Glasgow, Edinburgh, and all the other great cities there are night schools in full swing.

On the motion of Dr. Burnes, seconded by Mr. Simpson, the Registrar was directed to write to Mr. Allen, stating that his letter had been carefully considered by the Council, and that they hoped he would consider it to be answered by the report of the proceedings of the Council.

Some financial business having been disposed of the Council adjourned.

Proceedings of Societies in London.

ROYAL SOCIETY CONVERSAZIONE.

The Conversazione of the Royal Society was held on Wednesday evening last, and as usual was made the opportunity of exhibiting a number of objects illustrating the latest advances in different departments of science. It followed from the conditions that most of them required the knowledge of an expert in the particular department for their full appreciation, but there was nevertheless plenty to interest the ordinary well informed visitor. Perhaps the exhibits that would have appealed most directly to the technical instincts of readers of this Journal, were two shown by Mr. Percy Newberry. The first of these consisted of three pages of an ancient Egyptian book on medicine written on papyrus, by a scribe named Usertesen Sen, in the twenty-sixth or twenty-fifth century before Christ. This papyrus, together with a number of others of the same date, referring to miscellaneous subjects, was recently discovered by Mr. W. M. Flinders Petrie, during excavations in a ruined town of the XII. Dynasty at Kahun, in Central Egypt. It contains directions for the use of midwives, written in black and red ink, in hieratic characters (a cursive or written form of hieroglyphics). The black ink is used in the body of the work for the symptoms, diagnoses, and prescriptions, and the red ink is used at the heads of the sections. The following translation of the last two and a half lines of the first page will serve to show the kind of directions given in this ancient work, the italics indicating the red ink portions:—"*Treatment of a woman*, who is pained in her legs and in all her limbs, as one who is beaten. *Say with regard to her*, it is the growth of the *at* (vulva). *Do thou with regard to her*, thus: let her eat grease until she is cured." The second exhibit is a facsimile of an unpublished papyrus preserved in the British Museum, containing medical prescriptions written in the Egyptian hieratic writing of the XIX Dynasty (B.C. 1400–1200). This papyrus is chiefly interesting from the fact that it contains prescriptions copied from an earlier work, now lost, which is said (by the ancient copyist) to have dated from the IV. Dynasty (*circa* B.C. 4000). It was stated that facsimiles of these two papyri, together with translations, notes etc., will shortly be published, under the editorship of Mr. F. Ll. Griffith and Mr. Newberry.

Nearly opposite to these was exhibited the apparatus used by Messrs. Thorpe and Tutton in the preparation of phosphorous oxide (P_4O_6), to the formation of which compound Professor Thorpe in his recent lecture attributed the "glow" of phosphorus (see before, p. 845 and p. 943). Sir Henry Roscoe exhibited a number of specimens of aluminium and alloys, manufactured by the Aluminium Company. Dr. Gladstone exhibited some specimens illustrating ancient copper and bronze from Egypt and Assyria. The principal point illustrated was the fact that the earliest metal implements were of copper, containing a very little arsenic and tin, probably as accidental impurities, and that afterwards tin was added to the copper in increasing proportions with the object of producing a hard alloy.

Professor W. C. Roberts-Austen provided an experimental illustration of the recent investigations of M. Osmond on molecular changes which take place during the cooling of iron and steel. It depended upon the indication of the changes of temperature in a small mass of iron as measured by a metallic thermometer passing through the heart of it and consisting of intertwisted platinum and iridium wires. In the case of mild steel, containing 0·5 per cent. of carbon, as it cools down from a temperature of 1,100° C., two points may be observed at which heat is evolved. The first of these occurs at 750° C., and marks the change of β (or hard) iron to α (or soft) iron. The second evolution of heat is observed at 660°, and is due to a change in the relation of the carbon and iron. M. Osmond, in continuing an investigation made by Roberts-Austen, has shown that the presence in iron of elements with small atomic volumes retards the change of β to α iron, and conversely elements having large atomic volumes hasten the change.

In connection with electrical science there were several very interesting exhibits. Mr. Shelford Bidwell showed the effect produced by the electrification of a steam jet. The shadow of a small jet of steam cast upon a white wall is, under ordinary conditions, of feeble intensity and of a neutral grey tint. But if the steam be electrified, the density of the shadow is at once greatly increased, and it assumes a peculiar orange-brown hue. The electrical discharge appears to promote coalescence of the exceedingly minute particles of water contained in the jet, thus forming drops large enough to obstruct the more refrangible rays of light. It is suggested that this experiment may help to explain the intense darkness, often tempered by a lurid yellow glow, which is characteristic of thunderclouds.

Mr. C. V. Boys exhibited a most interesting oscillating spark experiment. This is a modification of the method employed by Dr. Lodge to show the oscillatory nature of a spark formed under proper conditions. Six lenses are mounted on a disc, and are made to rotate. Each forms upon a screen an image of the spark, which is drawn out by the movement of the lens into a broken band of light. The lenses are not at exactly the same distance from the axis, so that the band formed by one is not overlapped by the band formed by the next. Thus the whole duration of the spark from the first to the last oscillation may be observed or photographed. Mr. Boys also showed some photographs illustrating the formation of drops. Water drops, half-an-inch or more in diameter, were allowed to slowly form and break away in a liquid of slightly lower specific gravity, namely, a mixture of paraffin and bisulphide of carbon. The drops were illuminated by an electric arc and large condensing lenses, a camera was placed in front, and the view was rendered intermittent by a card disc with one hole near the edge, made to rotate at from fourteen to twenty turns a second. The exposure was about one eight-hundredth of a second. Forty inches of photographic plate was arranged in a long slide which could be drawn past by hand. When a complete series of the photographs obtained was suitably arranged round a card disc, and viewed in a thaumatrope, it showed the gradual formation of the drop and the spherule, the oscillation of the pendent drop immediately afterwards, the rebound of the spherule from the pendent drop, the oscillation of the large drop as it fell, and its rebound from the water below into which it fell. Some photographic shadows cast by a water jet upon a moving plate by the intermittent light of an oscillating spark showed the movement of the separate water drops.

Some breath figures, exhibited by Mr. W. B. Croft, showed that polished surfaces placed near to bodies in low relief often take an impression of the detail, which is made visible by breathing upon the surface. The period of exposure varies in different circumstances. For instance, if a coin be lightly pressed on a freshly split surface of mica for thirty seconds, the mica takes a breath figure of the detail of the coin. If paper printed upon one side be placed for ten hours between two plates of glass, the print appears in white letters on both. Sometimes the print appears in black letters, or the same impression may change from white to black. Coins put on the two sides of a piece of glass and electrified for two minutes produce a perfect impression. The microscope shows water particles over the whole surface, larger or smaller as the effect is black or white.

Professor Silvanus P. Thompson exhibited an optical rotator, constructed by Messrs. Newton and Co., for rotating the plane of polarization of light, intended to be used in conjunction with polarizing reflectors which do not admit of being bodily rotated around the axis of the beam of light. The principle of the new rotator consists in the employment of two quarter-wave plates of mica, one of which is fixed at 45° across the plane-polarized beam of light, which it thus converts into circularly-polarized light. The second quarter-wave plate, which can be rotated by a simple gear, reconverts the circularly-polarized beam into plane-polarized light, vibrating in any desired azimuth.

Professor Thompson also showed an arrangement for some colour experiments. Two liquids, incapable of mixing, one consisting of water coloured by means of a mineral salt, and the other of fusel oil coloured by an aniline dye, are placed over one another in a flat bottle. The colours are chosen so that each absorbs all the rays that the other one can transmit. Though each is transparent, they become absolutely opaque when shaken up together.

Mr. G. J. Symons exhibited a brontometer, or thunderstorm-measurer. During some heavy rains, but not all, and during some thunderstorms, but not all, the barometer rises and falls rapidly and irregularly. In order to ascertain the cause of these variations, it is necessary to determine precisely the sequence of the various phenomena and the times of their greatest intensity, for which object this apparatus has been devised. The endless paper is carried under the recording pens at the unprecedented speed of six feet an hour, so that the time of any phenomenon can be easily read to half a second, each 60th second being automatically recorded. The velocity of the wind is continuously recorded by one of Richard's anemo-cinemographs, and the atmospheric pressure by a modified form of their statoscope, which is so delicate as to give 30 inches for each inch of the mercurial barometer, or about three times the scale of a glycerine barometer. There are also mechanical arrangements whereby the observer records the commencement, variation in intensity, and termination of rain, the instant of each flash of lightning, the commencement and duration of each clap of thunder, and the commencement, variation in intensity and termination of hail. All these phenomena are recorded on one paper, with a single time scale of 0·02 inch per second in their precise sequence and correlation.

Messrs. Richard Frères, Paris, exhibited a continuously recording hair hygrometer, depending for its action on the expansion and contraction of a bundle of hairs which raise and lower a pen so as to leave on a paper-covered cylinder a continuous record of the humidity of any position in which it may be placed. Some curves produced by the anemometers on the summit of the Eiffel Tower, and on that of the Central Meteorological Office at Paris showed that the average velocity of the wind on the top of the tower (994 feet) is about 3½ times that at 66 feet, and that the hour of greatest average velocity on the summit was 11 p.m., whereas at 66 feet (as at most observatories), it was 1 p.m.; so that the times of maximum and minimum are almost precisely reversed.

Among the articles exhibited by the Director-General of the Geological Survey were a series of specimens illustrating deep borings in the South of England, which present some interest in view of the recent discovery of coal in Kent. There were also some interesting series of specimens illustrating the dynamical metamorphism of rocks. The first series consisted of triassic and jurassic dolomites and limestones from Canton Glarus, showing the extraordinary manner in which these rocks have been squeezed and puckered, the fossils (*Belemnites*) having been stretched in some parts to more than twice their original length. The second series, from the south of Bergen, showed the presence of recognizable Silurian corals and trilobites in rocks which had been so much metamorphozed as to have acquired the characters of finely crystalline phyllite or micaceous schist. The third series, from the north-west of Scotland, illustrated how a massive quartzite, full of annelide-tubes, had been crushed and re-crystallized until it had assumed the structure of a quartz-schist, and all trace of the fossils had been obliterated.

Among the natural history exhibits, may be mentioned some seed and seedlings of the sugar cane (*Saccharum officinarum*), exhibited by Mr. D. Morris. There appears to be no authentic record of any really wild station for the sugar cane, and the fruit has not hitherto been figured or described. At Barbados, several times during the last twenty years, and more recently by Professor Harrison and Mr. Bovell, self-sown seedlings of the sugar cane have been observed. The subject was taken up systematically in 1888, and about sixty of the seedlings raised to mature canes. Many of these exhibited well-marked characteristics, differing from the varieties growing near them. Careful inquiry has shown that canes known as the "Purple Transparent" and "White Transparent," and possibly also the "Bourbon" cane, produced seeds in very moderate quantities. Spikelets received at Kew have been examined and the seed found *in situ*. It is anticipated that, by cross fertilization and a careful selection of seedlings, it will now be possible to raise new and improved varieties of sugar cane, and renew the constitutional vigour of plants that have become deteriorated through continuous cultivation by cuttings or slips. Great importance is attached to the subject in sugar-producing countries, as it opens up an entirely new field of investigation in regard to sugar-cane cultivation. Professor H. Marshall Ward exhibited a selection of transparent photographs, showing (1) the habits, etc., of various trees from different parts of the world; (2) the comparative structure and anatomy of several European timbers; and (3) some of the more prominent features of diseases of wood, etc., and fungi causing them.

Lastly Mr. Henley Grose-Smith showed a selection from the butterflies collected in the Great Equatorial Forest of Africa by Mr. William Bonny, one of Mr. Stanley's staff, a number of which are new to science.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society held on Thursday, April 17, Dr. W. J. Russell, F.R.S., President, in the chair, the following papers were read:—

Phosphorous Oxide. Part I. By T. E. THORPE, F.R.S., and A. E. TUTTON.—The authors describe a method of making phosphorous oxide in quantity by burning phosphorus in air. Pure phosphorous oxide melts at 22·5°, and solidifies at 21°. It boils unchanged in an atmosphere of nitrogen or carbon dioxide at 173°. Vapour-density determinations made by Hofmann's method show that its molecular weight corresponds to the formula P_4O_6. In this respect it is analogous to arsenious and antimonious oxides, which are respectively represented by the formulæ As_4O_6 and Sb_4O_6. A determination of the molecular weight by Raoult's method, using benzene, which has no chemical action on the substance as a solvent, also indicated the formula P_4O_6. On heating phosphorous oxide to about 300°, it is decomposed, and at 440° it is wholly changed into phosphorus and phosphorous tetraoxide, $2P_4O_6 = 3P_2O_4 + 2P$. Phosphorous oxide is readily acted on by light, and in bright sunshine its colour rapidly becomes yellow and eventually dark red. Observations by Captain Abney show that the violet rays are most active in effecting the change. Curves showing the results of the photometric observations are given in the paper. As first prepared, phosphorous oxide is obtained in minute crystals, aggregated into a snow-like mass. On allowing the melted oxide to cool, it solidifies in the form of thin prisms capped by pyramids; the crystals frequently attain the length of an inch or more. The crystals appear to belong to the monoclinic system. Contrary to the usual statement of the text-books, cold water has very little action on phosphorous oxide; many days elapse before even a small quantity is dissolved; it then forms phosphorous acid, H_3PO_3. Hot water acts upon P_4O_6 with explosive violence, forming the red suboxide, phosphoric acid and spontaneously inflammable phosphoretted hydrogen. Caustic alkalis act similarly. On adding ethyl alcohol to the oxide it at once ignites, but with care the two compounds may be caused to interact to form *diethyl phosphite* or *diethyl phosphorous acid* in accordance with the equation $P_4O_6 + 8C_2H_6O = 4P\left\{\begin{array}{l}OC_2H_5\\ OC_2H_5 + 2H_2O.\\ OH\end{array}\right.$ Ether, carbon bisulphide and benzene dissolve phosphorous oxide unchanged. Phosphorous oxide spontaneously oxidises to phosphorous pentoxide on exposure to air or to oxygen, and the process of oxidation is attended under diminished pressure by a faint luminous glow. No ozone is formed as the oxidation proceeds. On gently warming the oxide in oxygen, the glow gradually increases in intensity until it passes into flame. In warm oxygen the melted oxide at once ignites and burns with great brilliancy. Care, therefore, is necessary in distilling large quantities of phosphorous oxide to avoid the free access of air; otherwise dangerous explosions may occur. In contact with ozone phosphorous oxide glows at the ordinary temperature and pressure. A small quantity of the oxide thrown into a jar of chlorine at once inflames, but on leading a slow current of the gas over the cooled oxide it is gradually converted into phosphorous oxychloride and the metaphosphoryl chloride of Gustavson:—

$$P_4O_6 + 4Cl_2 = 2POCl_3 + 2PO_2Cl.$$

Phosphorous oxide has a well-marked physiological effect, and it is not improbable that the action hitherto attributed to phosphorus, especially as regards its influence on the glycogenic functions of the liver and on tissue change, may be really due to this substance. It is well known that persons employed in the manufacture of lucifer-matches are occasionally attacked by caries of the lower jaw; this is not due to the action of the phosphorus after absorption into the circulation, but to the direct effect of the fumes upon the bone itself: for it has been found that when a bone of an animal fed by phosphorus was exposed no carious change took place; but if one were exposed to the fumes caries was produced, and amongst lucifer-match makers it has been noticed that only those who have carious teeth suffer from necrosis of the jaw (T. Lauder Brunton, 'Pharmacology, etc.,' 771). The fumes from phosphorus consist largely of phosphorous oxide; by drawing air over phosphorus without allowing it to ignite, and passing the fumes through a narrow strongly cooled tube, a deposit is obtained which melts with the warmth of the hand and gives the reactions for phosphorous oxide. Moreover, the smell of the product is identical with that of pure phosphorous oxide, and it is also identical with the peculiar smell noticed in a lucifer-match manufactory during the making and handling of the "composition" with which the splints are "tipped" and which hangs about the benches where the "boxers" are at work. It is highly probable, as Schönbein long ago surmised, that phosphorus vapour as such is odourless, and that the smell which phosphorus ordinarily possesses is a mixture of that of ozone and of phosphoreus oxide.

The Action of Chlorine on Water in the Light, and on the Action of Light on Certain Chlorine Acids. By Professor A. PEDLER.—After referring to the somewhat discrepant statements on record regarding the action of chlorine on water in the light, the author describes a long series of experiments made in Calcutta, where the intensity of light is such that a strong solution of chlorine in water, when exposed to the full blaze of the sun during the hot season, is actually seen to effervesce very decidedly. The results show that interaction takes place only under certain conditions, and that more than one change is possible. In a first series of experiments, known volumes of chlorine and water enclosed in tubes were exposed to light, and at the conclusion of the exposure the tubes were opened under water: the contraction having been measured, the residual chlorine and subsequently the oxygen which had been produced were estimated. Using 83·5 c.c. chlorine and 4 c.c. water, quantities in the ratio $Cl_2 : 64H_2O$, practically no action was found to have taken place after exposure during a month to strong diffused daylight, and during a second month to the direct action of tropical sunlight; but the ratio being $Cl_2 : 88H_2O$, about 29 per cent. of the chlorine was found to have been active, 6·5 c.c. of oxygen being liberated. Supposing action to have taken place according to the equation $2H_2O + Cl_2 = O_2 + 4HCl$, 7 c.c. of oxygen should have been obtained, an indication that a very small portion of the chlorine had undergone oxidation. The general result of a number of experiments of this kind was that, even in very strong tropical sunlight, water and chlorine interact to but a very slight extent when there are about one hundred times as many molecules of water present as of chlorine; when the proportion is about $150H_2O : Cl_2$, action takes place to the extent of perhaps nearly 50 per cent. of the possible amount; and, when more than $400H_2O : Cl_2$, interaction takes place much more rapidly, but even then only to about four-fifths of the theoretically possible extent. As the proportion of water is increased the amount of chlorine which is oxidized becomes somewhat larger. Chlorine water saturated at 30°-32°, the average working temperature in a Calcutta laboratory, contains chlorine in about the ratio $708H_2O : Cl_2$. Experiment shows that, when exposed to direct tropical sunlight, such water undergoes decomposition practically entirely in the sense of the equation $2H_2O + 2Cl_2 = O_2 + 4HCl$, an exceedingly small amount of chloric acid being formed. On exposing it to strong diffused daylight inside an open south verandah, either hypochlorous or chloric acid, or both, were formed in somewhat variable amount, the proportion of oxygen being much below that obtained in the previous experiments in bright sunlight. On exposing the chlorine water to very moderate diffused light opposite the window in a room having a north light, very little, if any, oxygen was liberated, but the chlorine became oxidized to hypochlorous and chloric acids. In no case could chlorous acid or hydrogen peroxide be detected. On exposing dilute solutions of hypochlorous acid to light, it was found that both oxygen and chloric acid were produced, the proportion of oxygen being larger the greater the intensity of the light. Solutions of chloric acid underwent little or no change. The author concludes that in its first stages, at all events, the action of chlorine on water is quite similar to that which it exercises on dilute cold solutions of sodium and potassium hydroxides; and that in the subsequent stage it is very similar to that effected in the case of more concentrated and hot solutions of the two hydroxides.

Note on the Explosion of Hydrogen Sulphide and of Carbon Bisulphide with Air and Oxygen. By Professor A. Pedler.—The author finds that when a mixture of hydrogen sulphide, air and oxygen is exploded, a normal result is obtained, sulphur dioxide and water being formed. But when carbon bisulphide vapour is similarly treated, a not inconsiderable proportion of the nitrogen of the air becomes oxidized; and after the explosion contraction continues to take place, owing to the formation of sulphuric compounds (chamber crystal, etc.) under the combined influence of the moisture present and the oxide of nitrogen. The results of a large number of experiments are described, showing the effect of various proportions of oxygen and air.

The Action of Light on Phosphorus, and on some of the Properties of "Amorphous" Phosphorus. By Professor A. Pedler.—As part of an extensive series of experiments on the action of strong light on substances the author has studied its effect on phosphorus, and has thereby been led also to examine and compare the several forms of allotropic phosphorus, viz., that produced by the action of light only, that produced at moderate temperatures, the commercial form, and also rhombohedral or metallic phosphorus prepared by dissolving phosphorus in lead at high temperatures. The conclusion is arrived at that the term "amorphous phosphorus" is a distinct misnomer, and that, so far from commercial "amorphous" phosphorus constituting a separate allotropic modification of the element, it is in reality the same substance as the form called rhombohedral or metallic phosphorus, the very slight differences in character noticed between the substances in question being explained by the difference in the state of division and the slight variations conditioned by their mode of formation. Whether the term amorphous phosphorus can be truly applied to the forms made by the action of light is open to grave doubt; even in this case there appears to be distinct evidence of crystalline form, although, in some instances, a form which appeared to be amorphous was obtained. It is suggested that it would be better to altogether discard the use of the term *amorphous phosphorus*. The author finds that when phosphorus is exposed to light in contact with liquids containing oxygen, such as alcohol, it tends to enter into action with them. He arrives at the conclusion that neither *in vacuo* nor at ordinary pressures is there any change whatever of red into ordinary phosphorus at 260° as ordinarily stated; and that, practically, no change occurs up to temperatures of nearly 358°, above which, *in vacuo*, change takes place, but exceedingly slowly, even up to 445°. He also describes experiments which tend to show that red phosphorus is not permanent in air, as commonly supposed.

The Action of Phosphoric Anhydride on Fatty Acids. By F. S. Kipping, Ph.D., D.Sc.

CHEMISTS' ASSISTANTS' ASSOCIATION.

(*Concluded from page* 902.)

The President (Mr. T. A. Ellwood) said a paper by Mr. Holmes, an acknowledged authority on his subject, could not fail to be interesting. Considering the very long list of subjects requiring investigation, the thought passed through his mind during Mr. Holmes's recital of them, that he might very well have begun at the other end, and have told them of the drugs that did not require investigation, the list would certainly be much shorter. Proceeding to discuss some of the problems that had been touched upon, Mr. Ellwood said he had been doing some work recently upon lemon juice; his results had never furnished him with so large a percentage of citric acid as was indicated in the Pharmacopœia, although he had examined the lemons as imported month by month. A statement had been made that lemon juice decreases in strength and that it was due to the conversion of the citric acid into sugar, a statement he was unable to accept. He found that there was an occasional gain in the percentage of citric acid, and he had obtained at times a reaction with iodine, pointing to the presence of soluble starch. If the starch became converted into sugar, the juice might taste less acid, but it would not arise from loss of citric acid. He had published in a paper read before the Association some of his conclusions derived from a chemical examination of the official fixed oils. Absolute alcohol dissolved the vesicating principle of croton oil and physiological experiment demonstrated the presence of the purgative principle also. He would therefore reaffirm his conviction that these principles could not be separated by means of absolute alcohol. The same might be said of castor oil, it was impossible to separate this oil, by means of absolute alcohol, into its various constituents.

Mr. A. C. Stark thought the Association should feel much indebted to Mr. Holmes for his interesting paper. It was the work of a past master of his subject, and of one who had himself done so much towards solving the problems the paper suggested. He should like to ask Mr. Holmes for information upon a few of the points raised. In the first place he thought it was a mistake to include in the Pharmacopœia English aconite root; its cultivation was so limited and the supply so meagre that he thought it would be preferable to retain only the German grown root, which was the kind ordinarily met with in commerce. He was of opinion, too, that the retention of aconitine was inadvisable; it was rarely prescribed, and taking into account the immense differences which were said to exist in commercial specimens, he thought it best to remove it altogether from the Pharmacopœia. He had remarked the dirty greenish appearance which apomorphine assumed when kept for some time. With reference to castor oil, was it not possible that the purgative principle was due after all to the ricinoleic acid, and did Mr. Holmes know anything of the principle contained in the testa of the seeds, which gave them greater activity than the oil itself? He (Mr. Stark) could confirm the remarks of the President upon croton; there was no doubt that the vesicating and purgative principles were both soluble in alcohol. As to the action of *Cannabis indica* and bael, he believed that the disappointment occasioned by the action of these drugs in this country was due to the fact that their reputation had been made by preparations of fresh specimens, and that they were most active when freshly gathered. He was interested to hear Mr. Holmes say that *Cassia fistula* was such a good purgative. In a recent work on therapeutics, it was stated that it had little or no purgative property.

Mr. E. Richards said he was very much astonished at Mr. Stark's remarks upon aconite and aconitine. Having paid some attention to the subject himself, he begged to assure Mr. Stark that English aconite was by no means so rare an article as he would have them believe. It could always be had by paying the market price for it, and consumers had only to make known their wants to increase the supplies. If they wanted to make aconitine more reliable, let them introduce the crystalline alkaloid in place of the amorphous alkaloid which was at present official. Crystalline aconitine was doubtless much more powerful, but it was at least uniform and reliable when obtained under similar conditions, and the homœopaths were so much impressed with this fact that they employed the crystalline alkaloids (in extremely minute quantities, of course) in all cases where they could conveniently be employed. Aconitine in crystals was a common export from this country to France and Germany.

Mr. Philp said Mr. Stark was in error in stating that aconitine was rarely prescribed. It was a constant item in prescriptions which were presented in the West End, and no pharmacist who had a reputation to lose would dream of using anything but the crystalline variety. He had heard aconite described as the most useful drug in the Pharmacopœia.

Mr. W. Lloyd Williams said the Association was especially indebted to Mr. Holmes for his valuable and interesting paper. Mr. Holmes's reputation had been made upon the subject of materia medica, but it was not so generally known that he held an equally high place as a systematic botanist; he was probably the best all-round botanist in the British Islands. The problems which he had laid before them afforded abundant food for reflection and experiment for many a day to come. He would refer to only one of the problems—that which had reference to the coloration of apomorphine. The green coloration is due to traces of alkali which inevitably get into the solution sooner or later when preserved under ordinary conditions. Salts of sodium were of common occurrence in the air, and carbon dioxide was a normal constituent, and experiment had shown that traces of sodium carbonate speedily turned a colourless solution of apomorphine green.

Mr. Whitfield said there was no question as to the purgative property of cassia, but numerous attempts by a recent fellow student to isolate the principle had failed.

Mr. Holmes, in reply, remarked that he did not expect to get satisfactory replies to his queries that evening, though he had been enlightened upon several points. He did not speak from personal experience upon the lemon-juice question. The yield of citric acid from lemon-juice was stated to diminish from January to July, and he had been informed by one of the makers of West Indian lime-juice that precautions had to be taken to prevent loss of citric acid on the voyage, and small quantities of salicylic acid were often needed to preserve the juice. Some years ago Mr. J. Ince* suggested that lemons might be kept unaltered for a considerable period by coating them with shellac varnish. The question of soluble starch being present in lemon-juice was new to him, and if pursued would probably furnish valuable information. There was evidence of the presence of a narcotic principle in croton seeds, and the operation of powdering them had rendered the operator insensible. He did not think the purgative principle in castor-oil seeds was to be assigned to the ricinoleic acid; a small number (two or three) of the seeds themselves were powerfully cathartic. There need be no difficulty in obtaining English-grown aconite root; it was merely a question of price. The tincture officially directed to be prepared from English root was a most valuable antipyretic, and if it were prepared from carefully collected English root it would doubtless be much more largely used than at present. The argument in favour of a crystalline body as compared with an amorphous substance was overwhelming; a crystalline substance must of necessity be more definite, and the fact that it might be seventy times stronger than the amorphous variety need prove no obstacle. Bael and *Cannabis indica* did not furnish equally satisfactory results in this country as compared with India. The cannabis employed in India was in more cylindrical pieces than it was met with in this country, and preparations made from it were much stronger. *Cassia fistula* was unquestionably cathartic.

A vote of thanks was proposed to Mr. Holmes by Mr. Fawssett, seconded by Mr. Walmsley, and the proceedings then terminated.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, May 1, Mr. Edmund White, Vice-President, in the chair.

A paper was read on the "Steam Engine" by Mr. Thos. Irwin Hayton, who gave a historical sketch of its origin and development up to the present time, and then by means of models and diagrams explained the mechanism and working of the principal varieties of engine and boiler. A brief description of air and gas engines was also introduced.

The paper was followed by a discussion in which the Chairman, Messrs. Fairburn, Browne, and the Secretary took part.

A report on Inorganic Chemistry by Mr. L. W. Hawkins was then read by the Secretary in the author's absence.

LABORATORY NOTES.

BY L. W. HAWKINS, F.C.S.

Liquor Ammonii Acetatis Fortior.—According to the British Pharmacopœia, 1885, this solution is made by neutralizing a definite weight of ammonium carbonate with acetic acid and making up to a definite volume. In this respect it differs from the 1867 edition, where the reverse action took place, a definite amount of acetic acid being neutralized with ammonium carbonate. Although the British Pharmacopœia requires ammonium carbonate to contain 32·5 per cent. of NH_3, it is well known that this salt varies to some extent in neutralizing power. By the old method, therefore, the product would be fairly uniform, for provided the acetic acid taken was of B.P. strength, the neutralized solution would always be the same. By the present process, however, this uniformity cannot be expected, for as the ammonium carbonate varies, so will the solution formed by neutralizing it. This being so, it is not easy to say exactly what the strength of the present solution should be. But taking the ammonium carbonate to be of full strength, the liquor ammonii acetatis, B.P., should contain 33·25 grains of ammonium acetate in 1 fluid ounce, and the liquor ammonii acetatis fortior, B.P., 166·29 grains per fluid ounce. The specific gravity of the stronger solution is given as 1·073, but this is apt to vary slightly by the amount of carbon dioxide in solution.

The wording of the British Pharmacopœia does not yet seem to be read rightly by all. It distinctly says that 1 fluid part of the stronger solution should be diluted so as to *produce* 5 fluid parts, but several wholesale price lists give the strength of liq. ammon. acet. fort., B.P., as 1 to 5, and on their labels direct 1 fluid part to be *added* to 5 fluid parts of water. This is an error which should be guarded against.

The strength can scarcely be said to be a convenient one for dispensing purposes, and many prefer to use a solution eight times concentrated instead, so that 1 fluid drachm will represent 1 fluid ounce. This preparation requires the use of a certain proportion of glacial acetic acid in making so as to get it within the required volume. It was largely in use before the introduction of the concentrated solution in the British Pharmacopœia, and is in my experience more frequently demanded than the B.P. solution. Most wholesale houses supply both concentrated solutions.

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* *Pharm. Journ.*, [2] viii., p. 19.

Having had occasion some two years ago to examine some commercial samples of solutions of chemicals for making official syrups, and finding considerable variation in them,* I thought it worthy of investigation whether the solutions of ammonium acetate were all that they should be.

Six samples of each were obtained from well-known London wholesale houses. In three cases the same preparation was given for both strengths, although the different strengths were distinctly labelled on each, and a different price was charged. In two of these cases the strength was between the B.P. and the 1 to 7. This would appear as if they were made so as to do double duty. If used as B.P. the product would be rather too strong, if as 1 to 7 it would be rather too weak. In the other case the strength was even lower than the B.P.

All the solutions were practically neutral and free from anything but mere traces of impurities. The ammonium acetate was estimated by distilling a known volume of the solution with excess of liquor potassæ into excess of volumetric solution of oxalic acid. The amount of free oxalic acid remaining was then ascertained by volumetric soda solution. From these data the amount of ammonia given off was calculated, and from that was reckoned the equivalent of acetate of ammonium in solution.

In the following lists the corresponding numbers represent the same wholesale house.

Liq. Ammonii Acetatis Fort., B.P.

	Sp. gr. at 60° F.	Grains of ammonium acetate in 1 fluid ounce.
Standard strength.	1·073	166·29
1	1·077	191·49
2	1·074	175·53
3	1·060	136·52
4	1·082	205·67
5	1·066	147·80
6	1·073	166·67

Liq. Ammonii Acetatis Conc., 1 to 7.

	Sp. gr. at 60° F.	Grains of ammonium acetate in 1 fluid ounce.
Standard strength.	1·100	266·07
1	1·077	191·49
2	1·092	242·90
3	1·060	136·52
4	1·082	205·67
5	1·096	255·32
6	1·100	267·73

Concentrated preparations of this description are certainly of advantage to the pharmacist if the strength can be relied on. To ensure this it would be advisable to take the specific gravity before taking into stock, as this will give a good indication of its strength. The 1 to 7 is the more convenient and is largely used, and if an authorized formula were given for making it, it would most likely give more satisfaction than the present B.P. formula.

Carbo Animalis Purificatus, B.P.—This is of great use for decolorizing and deodorizing certain solutions. As these solutions are sometimes acid and sometimes of a strongly saline nature it is obvious that the less the amount of ash the charcoal yields the less the liability of getting foreign matter into the solution. The B.P. allows about 2 per cent. of ash, and gives the yield of the pure charcoal from the crude as about 10 per cent.

One of my solutions having suffered damage from the use of some so-called pure animal charcoal I was led to examine seven different specimens. These were obtained from London wholesale houses, and all were labelled and invoiced Carbo Animalis Purific., B.P., and charged for as such. Six of the samples were the same price, No. 4 being slightly more than the rest.

The results are very interesting. Only two samples can be said to approach the B.P. standard, and these contain six or seven times the amount of impurity allowed. The others contain about two-thirds their weight of ash. If the yield of pure charcoal from the crude given in the B.P. is correct, these are not impure enough for the crude but they are much nearer to that than to the pure variety.

	Ash per cent.
1	14·31
2	68·18
3	67·60
4	69·53
5	11·55
6	68·82
7	61·65

The ash of No. 1 was of a reddish colour from the presence of iron, no doubt derived from the use of impure acid in the process of purifying.

Although animal charcoal is not much used as an article of medicine, a dose of 20 to 60 grains is given for it, and it is doubtless prescribed occasionally. Most of the above samples would scarcely have the effect desired by the prescriber. And as their decolorizing power is reduced to about a third, the results are a long way from being satisfactory. In any case it is of little use to have a standard degree of purity if no means are taken to come near it.

Carbo Ligni, B.P.—The B.P. allowance of ash, namely about 2 per cent., was also exceeded in each case with a few samples of wood charcoal.

The results were :—

1.	4·13 per cent.
2.	3·58 „ „
3.	7·42 „ „
4.	7·06 „ „
5.	1·83 „ „
6.	2·39 „ „

As these are the natural ashes of the wood, no process of purifying being ordered, they are perhaps as low as can be expected. The excess is by no means so important as in the case of the animal charcoal, but the B.P. standard is not reached.

After a short discussion, in which the Chairman, Secretary, Messrs. Browne and Shepheard took part, the meeting adjourned.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The Annual Business Meeting was held in the Pharmaceutical Society's House, 36, York Place, on the evening of Wednesday, May 7, at 9.15, Mr. A. Russell Bennet, President, in the chair.

The minutes of last meeting having been read and adopted, the Secretary read the report of the Prize Committee on the "Ainslie" Pharmacy Prize Competition, from which it appeared that the "Ainslie" prize had been gained by Mr. William Smith, 119, George Street, with 89·5 per cent. of marks; the second prize by Alexander Cruickshank, 56, Newington Road, with 78 per cent.; and the third by Mr. Andrew Gilmour, Burntisland, with 66 per cent.

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[*] *Pharm. Journ.*, [3], xviii., 718.

In the absence of Mr. Ainslie, Mr. William Aitken, the donor of the second prize, then presented the first prizeman with Bentley's 'Botany,' Bentley's 'Organic Materia Medica,' Balfour Stewart's 'Physics,' and also, from Mr. Peter MacEwan, London, 'The Art of Dispensing;' the second prizeman with Attfield's 'Chemistry;' and the third prizeman with a copy of the British Pharmacopœia, 1885.

The Treasurer read the financial statement, showing a balance of £6 19*s.* 4*d.*, as against £1 6*s.* 4*d.* last year.

The Secretary then read the annual report, from which it appeared that the membership remained the same as last year. The report was very satisfactory, but recommended that an effort should be made to increase the membership.

On the motion of Mr. Duncan, seconded by Mr. Gillies, the financial statement and report were unanimously adopted, and a vote of thanks awarded to the retiring office-bearers.

After discussion, the following scheme of botanical excursions was agreed to:—

Date.		Place.	Meet at	Time.	Return.
May	14	Botanic Gardens	Garden Gate	6 a.m.	By road.
,,	28	Colinton Dell	Caledonian Stat.	8.35 p.m.	,,
June	11	Duddingston Loch	Loch	8.45 p.m.	,,
,,	25	Blackford Hill	Blackford Hill Station.	9 p.m.	,,
July	9	Craigcrook	Caledonian Stat.	5.50 a.m.	8.1 a.m.
,,	30	Poet's Glen, Currie	,, ,,	6.10 a.m.	7.58a.m.

The office-bearers for the ensuing session were then elected as follows:—President, Donald McEwan; Vice-President, Jeremy Blenkiron; Secretary, John Findlay; Assistant-Secretary, Alexander Leys; Treasurer, James H. Hoseason; and as members of Committee, Messrs. Cowie, Dey, Findlay, Gillies, Macdonald, Parker, Robertson and Wright.

The following were also elected members of the Prize Committee:—Messrs. Bennet, Boa and Duncan.

It was moved by Mr. Gillies, seconded by Mr. Hoseason, that in future the election of office-bearers should be taken by ballot.

After some discussion the motion was withdrawn, and the meeting then closed.

The first botanical excursion of the present season took place on Wednesday, the 14th inst. The morning was beautifully fine, and a company of thirty assembled at the Botanic Gardens at 6 a.m.

About two hours and a half were devoted to a most interesting and practically useful walk round the garden. It was remarked that notwithstanding the openness of the winter, flowering plants did not appear to be very much earlier than usual, a result due, perhaps, to the comparatively cold and dry weather prevailing during the month of March. It was observed that the holly, *Ilex aquifolium*, showed an unusual abundance of flower buds which were just about to open into full bloom. About a dozen of the official medicinal plants were met with in the course of the ramble and received full attention. The most interesting specimens were perhaps some fine plants of *Podophyllum Emodi* in fruit on the rock garden and two flowering specimens of the curious New Zealand plant *Aciphylla squarrosa*, belonging to the natural order *Umbelliferæ*. The whitish, long, narrow, stiff and very sharply pointed grass-like leaves bear very little resemblance to the ordinary umbelliferæ, but there could be no mistake about the dense spike of yellowish flowered umbels which seems to rise from the side of the pyramids of prickly leaves.

The next excursion is an evening one, to Colinton Dell on the 28th inst., by Caledonian train at 8.35.

Parliamentary and Law Proceedings.

BILL TO AMEND THE PHARMACY ACT (IRELAND), 1875.

Whereas it is expedient for the safety of the public that all chemists or druggists keeping open shop for the sale of poisons should be registered, and that the Pharmacy Act (Ireland), 1875, should be amended:

Be it therefore enacted by the Queen's Most Excellent Majesty, by and with the advice of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same as follows:

1. *Short Title.*—This Act may be cited as the Pharmacy Act (Ireland), 1875, Amendment Act, 1890.

2. *Extent of Act.*—This Act shall apply to Ireland only.

3. *Interpretation.*—In this Act—

"The principal Act" means the Pharmacy Act (Ireland), 1875.

"The Society" means the Pharmaceutical Society of Ireland.

"The Council" means the Council of the Society.

"The Registrar" means the Registrar of the Society.

"The Treasurer" means the Treasurer of the Society.

"Poisons" mean all articles deemed to be poisons within the meaning of the Act thirty-three and thirty-four Victoria, chapter twenty-six, intituled "An Act to regulate the sale of poisons in Ireland."

Words importing the masculine gender shall also include the feminine.

4. *Repeal of Section 15 of Principal Act.*—Section fifteen of the principal Act, and all other provisions of that Act empowering the Pharmaceutical Society of Ireland to create a grade of chemists and druggists legally qualified to dispense medical prescriptions are hereby repealed.

5. *Register of Chemists and Druggists.*—The registrar shall, in the manner by this Act provided, from time to time make out and maintain a complete list to be called "The Register of Chemists and Druggists in Ireland," of all persons by this Act authorized to be registered as chemists and druggists, and the provisions of the principal Act with respect to the registers thereby authorized shall *mutatis mutandis* extend and apply to such register, except so far as such provisions are altered by or are inconsistent with the provisions of this Act. All persons so registered shall be entitled to keep open shop for the sale, retailing or compounding of poisons: Provided that nothing in this Act shall be deemed to confer on such persons any right to compound medical prescriptions.

6. *Chemists or Druggists Practising as such on their own account prior to January* 1, 1889, *entitled to be Registered.*—Every chemist and druggist, or chemist or druggist who has been practising as such in Ireland as a principal on the *first day of January, one thousand eight hundred and eighty-nine*, or who has practised as such as a principal during a period of not less than *five years* at any time previous to the *first day of January, one thousand eight hundred and eighty-nine*, shall be entitled to be registered as a chemist and druggist under this Act on complying with the following provisions:—

(1) He shall, within a year from the *passing of this Act*, make application in writing to the Registrar to be registered under the provisions of this Act.

(2) Such application shall be accompanied by a statutory declaration of the applicant in the form set out in Schedule A. to this Act or to the like effect: Provided that it shall be lawful for the Council to require from any such applicant such evidence as they may think fit of the truth of the statements contained in the statutory declaration

so made by him, and to require such other confirmatory evidence as they shall think sufficient.

(3) He shall pay to the Treasurer of the Society a fee of *half a guinea*.

7. *Certain other Persons entitled to be Registered.*—Every person who shall have gone into business as a chemist and druggist, or chemist or druggist, as a principal, after the *first day of January, one thousand eight hundred and eighty-nine* and before the *passing of this Act*; or who shall duly have completed a term of service as apprentice or assistant of not less than four years to a person or persons who shall have become a registered chemist and druggist under this Act, or to a pharmaceutical chemist, shall be entitled to be registered as a chemist and druggist under this Act on complying with the following provisions:—

(1) He shall make application in writing to the Registrar to be registered under the provisions of this Act.

(2) Such application shall be accompanied by a statutory declaration of the applicant in the form set out in Schedule A. or B. to this Act, or to the like effect, with, in the case of assistants or apprentices, an additional declaration in the form set out in Schedule C., or to the like effect.

(3) He shall be examined with respect to his knowledge of English orthography and composition, arithmetic, the appearance of the various drugs, and the usual tests for poisons in general use, and shall obtain from the examiners appointed by the Council to hold such examination a certificate of having satisfactorily passed the same.

(4) He shall pay to the treasurer of the Society, on presenting himself for such examination, a fee of *two guineas* and a further fee of *half a guinea* on being registered.

Provided always that if he shall fail to satisfy the examiner, he may present himself for a second examination without further payment.

(5) A person who shall have duly completed a term of apprenticeship as aforesaid (commenced before the *passing of this Act*) to a person or persons who shall have become or who, had he or they survived, or continued to carry on business would have been entitled to become a registered chemist and druggist under this Act, shall be entitled to make application, and to present himself for examination, and to be registered under this section.

Provided that evidence shall be adduced to the satisfaction of the Council that the applicant has completed a term of apprenticeship such as hereinbefore described; and provided also that if the term of apprenticeship be continued after the expiration of one year from the *passing of this Act*, it shall not entitle the applicant to present himself for examination unless the term shall have been completed with a registered chemist and druggist under this Act.

(6) A person who has prior to the *first day of January one thousand eight hundred and eighty-nine*, served as an assistant or apprentice and assistant, for a full period of *seven years* to a chemist and druggist who has registered under this Act, or who, had he survived or continued in business, would have been entitled to register under this Act, shall be entitled to be registered as a chemist and druggist without examination on complying with the other provisions of this section.

8. *Examinations of intending Chemists and Druggists.*—It shall be the duty of the Society to provide for examinations being held at which applicants for registration as registered chemists and druggists may present themselves for examination. Such examinations shall be held at not greater intervals than the examinations of persons desirous of being registered as pharmaceutical chemists under the principal Act, and shall be held at Dublin and Belfast, and such other places as may be convenient.

Provided that it shall not be compulsory on the Society to cause any such examinations to be held outside Dublin unless at least twelve persons make application for examination thereat.

9. *Apprentices having passed Examination entitled to Registration.*—Every person who shall have served an apprenticeship of *four years* with a registered chemist and druggist shall be entitled to present himself for examination under the principal Act and this Act, and shall be entitled on passing his examination to be registered as a chemist and druggist under this Act, and every person who shall have served such apprenticeship and who shall have passed the Preliminary examination of the Society, and in addition shall have served an assistantship of *one year* to either a pharmaceutical chemist or a licentiate of the Apothecaries' Hall keeping open shop, shall be entitled to present himself for examination under the principal Act as a pharmaceutical chemist, and shall be entitled on passing his examination to be registered as a pharmaceutical chemist.

10. *Provisions of Principal Act as to Examinations to extend to Examinations authorized by this Act.*—The provisions of the principal Act with respect to the examinations therein mentioned shall extend and apply to the examinations by this Act authorized, except so far as such provisions are altered by or are inconsistent with the provisions of this Act.

11. *Persons who may be elected Associates of the Pharmaceutical Society.*—Every person who shall be registered under this Act as a chemist and druggist shall be qualified to be elected an associate of the Pharmaceutical Society, subject to any regulations made in pursuance of the principal Act and this Act, and every person so elected and continuing as such associate, being in business as a principal, shall have the privilege of attending all meetings of the said Society and of voting thereat and otherwise taking part in the proceedings of such meetings in the same manner as members of the said Society. Provided always that such associates contribute to the funds of said Society the same fees or subscriptions as members contribute for the time being under the regulations thereof.

12. *Election of New Council in* 1891.—At the annual election in *October one thousand eight hundred and ninety-one*, under the principal Act and this Act, the Council of the Society shall go out of office, and a new Council shall be elected consisting of twenty-one members, not less than nine of whom shall be registered chemists and druggists, and the right of voting for members of Council at this and all subsequent elections, shall be common to both pharmaceutical chemists and chemists and druggists duly registered. Provided nevertheless, that the President and Vice-President shall remain in office to conduct the election of October, one thousand, eight hundred and ninety-one, and declare the votes, but no longer unless duly elected.

13. *Subsequent Elections.*—At all subsequent elections of members of the Council, the retiring members shall be one-third of the pharmaceutical chemists and one-third of the registered chemists and druggists or chemists or druggists, then on the Council, but retiring members shall be eligible for re-election, and should any vacancy by death or other cause occur, the same shall be filled up by a pharmaceutical chemist or chemist and druggist, as the case may be, to replace the person who occupied the vacant place, so that the balance of the Society may be preserved at twelve pharmaceutical chemists and nine chemists and druggists.

14. *Annual Fee to be paid by Registered Chemists and Druggists not being Associates of the Society.*—

Every registered chemist and druggist who is in business on his own account, or is acting as manager in charge of any establishment open for the sale of poisons, who is not an elected associate of the Society contributing the prescribed subscription, shall, on or before the *first day of December* in every year, commencing with the year *one thousand eight hundred and ninety-one*, pay to the Treasurer a fee of *ten shillings and sixpence*, and unless such fee is paid on or before the date aforesaid, it shall be lawful to erase the name of such person from the register: Provided that on payment of all fees which may be due and of such additional sum, not exceeding *one guinea*, the Council shall restore such name.

15. *Annual Fee to be paid by Pharmaceutical Chemist not being a Member of the Society.*—Every pharmaceutical chemist registered as such under the provisions of the principal Act, after the passing of this Act who is in business on his own account, or is acting as manager in charge of any establishment open for the sale of poisons and compounding of medical prescriptions, and is not a member of the Society, shall on or before the *first day of December* in every year pay to the Treasurer a fee of *ten shillings and sixpence*, and unless such fee is paid on or before the date aforesaid it shall be lawful to erase the name of such person from the register: Provided that on payment of all fees which may be due and of such additional sum, not exceeding *one guinea*, the Council shall restore the name.

16. *No person to assume title of Registered Druggist or Chemist and Druggist or sell Poisons unless registered.*—From and after the *first day of January one thousand eight hundred and ninety*, it shall be unlawful for any person to assume or use the title of a registered druggist or chemist and druggist in any part of Ireland, unless such person shall be registered as a chemist and druggist under this Act, and notwithstanding the provisions of section thirty-one of the principal Act no person shall be entitled to sell or keep open shop for selling, retailing, or compounding of poisons by reason that he was a chemist or druggist practising as such in Ireland on his own account at the time of the passing of the principal Act, unless he shall be registered as a chemist and druggist under this Act, and any person acting in contravention of this enactment shall for every such offence be liable to pay a penalty not exceeding *five pounds*.

17. *Printed copies of Registers to be sent to Inspectors of Weights and Measures, who shall report any person infringing Act.*—In the month of *January* in each year, the Registrar shall send printed copies of the Register of Pharmaceutical Chemists and of the Register of Chemists and Druggists to the inspector of weights and measures in each constabulary district in Ireland, and it shall be the duty of such inspector to report to the Council any offences against the provisions of the principal Act or this Act or the Act thirty-three and thirty-four Victoria, chapter twenty-six, entitled "An Act to regulate the sale of poisons in Ireland," committed within his district, and *one-third* of every sum of money recovered as a penalty against any person so offending shall be paid to any such inspector who shall be the means of bringing such person to justice.

18. *Shop for sale of Poisons or compounding Medical Prescriptions to be personally managed by Owner or Qualified Assistant.*—Any person or persons lawfully keeping open shop for selling, retailing, or compounding poisons shall personally manage and conduct such shop and the retailing and compounding of poisons therein, or shall employ for the purposes aforesaid, as an assistant or manager in such shop, a duly registered chemist and druggist; and every person or persons lawfully keeping open shop for selling and retailing poisons, and dispensing and compounding medical prescriptions, shall personally manage and conduct such shop and the retailing, dispensing and compounding of poisons and medical prescriptions therein, or shall employ for the purposes aforesaid as assistant or manager in such shop, a duly qualified pharmaceutical chemist or licentiate apothecary, and any person or persons acting in contravention of this enactment, shall for every such offence be liable to pay a penalty not exceeding *five pounds*.

19. *Registrar may require name of Proprietor of premises where Poisons sold or Medical Prescriptions compounded to be furnished to him.*—It shall be lawful for the registrar at any time to write a letter addressed to the proprietor or proprietors of any premises where open shop is kept for the selling, retailing, dispensing, or compounding of poisons or medical prescriptions (such letter to be delivered on the premises, or to be forwarded by post as a registered letter according to the post office regulations for the time being in force), requiring such proprietor or proprietors, within seventeen days from the delivery of such letter, to furnish in writing to the registrar a statement of the name and address of the *bonâ fide* proprietor or proprietors, of such shop, and if such proprietor or proprietors do not personally manage and conduct such shop, the name of the duly qualified manager or assistant managing or conducting the same, and the description of his qualification; and in case such proprietor or proprietors neglect to furnish such information to the registrar within the time aforesaid, he or they and each of them shall be liable to pay a penalty not exceeding *one pound* for every day during which such default shall continue, and so long as such default shall continue it shall be unlawful for any person to sell or retail, dispense or compound poisons or medical prescriptions on such premises, and every person or persons acting in contravention of this enactment shall for every such offence be liable to pay a penalty of *five pounds* unless he or they shall prove to the satisfaction of the court or justices having jurisdiction in the case that he or they did not know of such default. Every person who shall make a false statement in writing with intent to mislead in reply to any inquiry addressed to him by the registrar under this Act, shall be held to have made a false declaration, and shall be liable to the penalty provided under section twenty-eight of the principal Act.

20. *Amendment of* 38 *and* 39 *Vict. c.* 37 *s.* 11.—Section eleven of the principal Act shall be read and have effect as if the words "the second monthly meeting" were substituted for the words "ten days" in that section.

21. *Application of Moneys paid to Treasurer.*—All sums payable to the treasurer under this Act shall be applied by him under the direction of the Council to the purposes of the principal Act and this Act.

22. *Penalties.*—All penalties recoverable under this Act shall be recoverable and applied in the same manner as penalties recoverable under the principal Act.

SELLING METHYLATED SPIRIT ON SUNDAY.

In the Justice of Peace Court, Glasgow, on Thursday, the 8th inst., Robert Wilson, licensed retailer of methylated spirit,* 353, Garscube Road, was charged with contravening the Revenue Act, 1889, section 26, by selling one half-gill of methylated spirit to Thomas Devine, moulder, on Sunday, February 16 last, whereby he was liable to forfeit a penalty of £100. He pleaded not guilty, and evidence was led.

Mr. Hodge, supervisor, said Wilson's licence did not authorize him to sell methylated spirit on Sunday. Complaints had recently been made in regard to the consumption of this obnoxious liquor as a beverage. To the best of his belief the spirit cost 2*s.* 5*d.* per gallon.

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* In some newspaper reports the defendant has been erroneously described as a "druggist."

Constable Cruickshank said that on the Sunday in question he observed Devine coming out of the shop, and, being suspicious, stopped him, when he admitted having purchased 3*d.* worth of methylated spirit from Wilson, and produced the bottle containing it.

Mr. Stewart, for the defender: Did Wilson say that he sold the spirits as a mixture of gum resin?—I think he said it was a mixture of gum resin.

Serjeant M'Pherson gave corroborative evidence.

James Cameron, analyst, said he analysed the liquor purchased from Wilson, and found it to contain a trace of gum resin.

Mr. Stewart: Do you know what the gum resin is put in for?—I know the purpose for which it is permitted. It is permitted as an indulgence by the Commissioners of Inland Revenue to be in the proportion of 3 ounces to the gallon, in order that the methylated spirit may be sold then without any licence as "finish."

Mr. Stewart: Then it is "finish" when it contains gum resin?—No.

Mr. Stewart: Are you aware that a mixture of gum resin with methylated spirit renders the spirits quite unsuitable as a beverage?—Not the quantity that was in this case. The gum resin was scarcely appreciable.

Thomas Devine admitted having gone into the shop on Sunday and asked for 3*d.* worth of methylated spirit. His intention was to drink it that morning.

Mr. Stewart: Are you fond of gum resin?—I do not know what gum resin is.

Mr. Stewart argued that the presence of gum resin in the methylated spirit was sufficient to constitute a new substance, known in the trade as "finish"—used for external application and commercial purposes.

The Court found the charge proven, and imposed a fine of £25, with the option of two months' imprisonment.—*Glasgow Herald.*

Obituary.

Notice has been received of the death of the following:—

On the 12th of April, Mr. David Goodger, Chemist and Druggist, Wimpole Street, London. Aged 76 years.

On the 21st of April, Mr. Charles Croyden, Pharmaceutical Chemist, Wigmore Street, London. Aged 85 years. Mr. Croyden was one of the Founders of the Pharmaceutical Society, having joined it in 1841.

On the 22nd of April, Mr. Charles Smith, Chemist and Druggist, Heywood, Lancs. Aged 36 years.

On the 7th of May, Mr. James Veitch, Pharmaceutical Chemist, Dunse, N.B. Aged 64 years. Mr. Veitch had been a Member of the Pharmaceutical Society since 1853.

On the 7th of May, Mr. Benjamin David Gall, Pharmaceutical Chemist, Woodbridge, Suffolk. Aged 77 years. Mr. Gall had been a Member of the Pharmaceutical Society since 1853.

On the 11th of May, Mr. Edmund Player, Pharmaceutical Chemist, Park Street, Bristol. Aged 67 years. Mr. Player had been a Member of the Pharmaceutical Society since 1853.

On the 14th of May, Mr. Robert Gardner, Chemist and Druggist, King's Road, Chelsea. Aged 33 years.

BOOKS RECEIVED.

PHARMACOGRAPHICA INDICA. A History of the Principal Drugs of Vegetable Origin met with in British India. By WILLIAM DYMOCK, C. J. H. WARDEN, and DAVID HOOPER. Part II. London: Kegan Paul, Trench, Trübner and Co., Lim. 1890. From the Authors.

SELECTA È PRESCRIPTIS. By JONATHAN PEREIRA, M.D., F.R.S. Eighteenth Edition. London: J. and A. Churchill. 1890. From the Publishers.

EXERCISES IN PRACTICAL CHEMISTRY. By Dr. W. R. HODGKINSON, F.R.S.E., F.G.S. London: G. Kenning. 1890. From the Publisher.

THE PRACTICE OF PHARMACY. By JOSEPH P. REMINGTON, Ph.M., F.C.S., etc. Second Edition. London: Burroughs, Wellcome and Co. From the Publishers.

THE WORKHOUSE AND ITS MEDICAL OFFICER. By ALFRED SHEEN, M.D., M.R.C.S. Second Edition. Bristol: J. Wright and Co. 1890. From the Publisher.

AGENDA DU CHIMISTE. Par MM. G. SALET, CH. GIRARD et A. PABST. Paris: Hachette et Cie. 1890. From the Publishers.

TRANSACTIONS OF THE ROYAL ACADEMY OF MEDICINE IN IRELAND. Vol. VII. Edited by WILLIAM THOMSON, M.A., F.R.C.S. Dublin: Fannin and Co. 1889. From the Editor.

NATIONAL HEALTH. Abridged from "The Health of Nations." By BENJAMIN WARD RICHARDSON, M.D., F.R.S. London: Longmans, Green and Co. 1890. From the Publishers.

TERMINOLOGIA MEDICA POLYGLOTTA. Compiled by THEODORE MAXWELL, M.D., B.Sc., F.R.C.S. London: J. and A. Churchill. 1890. From the Publishers.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE COUNCIL ELECTION.

Sir,—A careful perusal of the "Trade Interests' Circular" suggests a variety of considerations. In the first place it affords very strong evidence that the Government visitors are perfectly justified in insisting on a higher standard of general knowledge in the Preliminary examinations. The same may also be said of the letter of "Apprentice" in the Journal of the 10th inst. Let us hope that this youth may during his "six months at the Square this October" acquire some modicum of respect (however slight) for the English language.

The "Circular" reminds one very forcibly of the conduct of the man who heard the story of the crucifixion for the first time and then rushed out and soundly thrashed the first Jew he came across. The candidates must either be totally unaware of the course of pharmaceutical politics during even this year, or they must give us all credit for an alarming state of ignorance. Is the selling of methylated spirit a trade question or not? Is the dispensing of prescriptions a matter of trade or of purely educational interest? The most rabid opponent of the present Council can scarcely say that the proposition to admit Minor men in business to the full benefits of membership of the Society has been dictated by "that narrow-minded clique" in its own interest. Then, again, the extension of the poisons schedule rests, not with the Council of the Society, but with the Privy Council, which has resisted the attempts of our Council to enlarge the borders of the schedule. Now, sir, these are matters not of ancient history, but matters which have occurred, some of them within the last few days, others within a few months. Whose fault is it that we have not every one of these items as we would wish. Certainly not the Council's fault, but the fault of men such as those who now seek to represent us—men who have either stood aloof or have stood in the way. I admit the Council does not come up to what I should like in many things (in fact we are all inclined to the opinion that if we were there everything would be different), but when I see men like Cross and Harrison at the head of affairs—men who have like interests and sympathies with myself, I come to the conclusion that where they fail it is useless for me to attempt, and I am quite content to leave matters in their hands, knowing full well that if I cannot get all I want, there is some obstacle in the way that for the present effectually bars their progress.

Two other items in the platform of the interested, I mean, of course, "interests" candidates, viz., representation in Parliament and a 10s. subscription to the Society. With regard to the former, I would ask every voter to read Lord Salisbury's pithy remarks at the Royal Academy a few days ago, and with respect to the latter I would point to the utter collapse of a Society devoted *entirely* to trade interests.

Now after carefully reading all these new candidates have to urge let every member of the Society consider well and ask himself the question, will the presence of these men tend to mend matters or no? Let each answer this question according to his judgment.

For myself, I feel they are a very long way behind the present men; the Council of the Pharmaceutical Society never contained a better man than Michael Carteighe, one who has worked harder for the best "interests of the trade," or who was more in touch with the retail trade, in spite of all his opponents say. When a better man than he is presented for my vote, I shall (notwithstanding my great respect for Mr. Carteighe) vote for him. Until then I prefer to bear with the evils I have than fly to those I know not of. Whatever may be the result of the election (and it may possibly prove the most important one that has taken place for years) there can be no doubt that the votes given for the president and retiring members of the Council will represent the intelligence of the trade.

131, *Embden Street, Manchester.* J. HART.

Sir,—As the annual election of the Council approaches, pharmaceutical politics are again submitted to the electors; and it is well to consider the position assumed by those who offer themselves for election. The "interests of the retail trade" is the title under which certain gentlemen solicit the support of the electors. Their programme of procedure is thoroughly of a political nature, the clauses in it dealing with protection, and the abolition of the present "Patent Medicine Stamp Act." I would ask, how would they proceed to introduce a Bill, and upon what lines? It is a difficult and delicate matter to assail the Inland Revenue; the source of any revenue is always zealously guarded, and I maintain that the whole strength of any Government would be against us in this direction, and expose us to certain defeat. I believe we cannot meet the fierce competition of the present day by Parliamentary legislation, which I think is the object of these gentlemen. We must observe that we are not alone in the struggle; nearly every profession and trade feels its influence. It is an external influence at work that is difficult to regulate or diminish by legislation. We cannot annihilate the law of supply and demand which is the basis of the competition we feel.

Another point, the decision of the High Court of Justice regarding the sale of poisons by qualified men, is a step calculated to improve the positions of those already qualified, and we are bound to accept this decision if we wish to cope with unqualified men outside our body.

I think the Society should prosecute in cases of non-compliance with the provisions in this section of the Pharmacy Act. By so doing the sale of poisons would be eventually confined to the hands of qualified men, and the safety of the public greatly enhanced.

I should now like to mention a few internal matters which I think would tend to improve our community. The Preliminary examination is not a sufficiently qualifying examination to admit to the ranks of pharmacy. It is the cause of many men passing into the pharmaceutical world totally unfit for the calling, and yet, simple as it is, over 50 per cent. fail to pass. I would quote from this year's Council report: "The rejections still constitute more than 56 per cent. of the candidates examined, and exhibit in a marked degree the absence of systematic training among those presenting themselves." The examinations ought to keep abreast of the times, and ought to be so constructed that only youths with a first-class education would be able to obtain admission to the trade.

I may be asked, what remuneration can you give for all this expense and trouble?

My reply is, in time you will have a more select body of men, and fewer than at present.

Then we come to those on the Register. What is our position to the Society? Why, we are totally isolated; totally inactive in respect to the true interests of our calling. There is no healthful intermingling among ourselves. We are not united. We are discontented and urge complaint after complaint against the Society about matters in which it has no remedy, and because of sundry discontent the number of its supporters is decreasing. I even know a great many who profess stolid indifference whether the Society exists or not. This state of things is very unpatriotic. We must support and help if we desire improvement, and not hamper and place more difficulties in the way than already exist. If we live and express our opinions more with the desire to improve than to retard; if we show the public that we are united and determined for their welfare as well as our own, striving to keep ahead of the times from a higher pharmaceutical standard, then I firmly believe in time we shall become recognized as a stronghold, not only by the public, but by Parliament.

In conclusion, I sincerely trust that this year of our Society may be one in which each and all of us may show a determination to do our very best in helping and doing. That, and that alone, is the surest and best method of helping forward not only ourselves, but the Society to which we belong.

195, *Brompton Road.* E. G. LINCOLN WANSBROUGH.

Sir,—I have watched with keen interest the skirmishing in the arena of pharmaceutical politics, and have looked in vain for a definite policy possible of attainment. This being the case, my feeling is that the electorate will show its wisdom by going for "men" rather than "measures," and if the fourteen most capable men are chosen, our safety will lie in the clearness of their vision when a policy is before them. Our leading men would then place before us a fair issue for future elections. The controversy and the heckling of the last few weeks have let us know more of the men, their judgment, and in some instances their taste and their temper.

For my part, I shall vote only for those of whose wisdom and disinterested love of the craft I am assured, and if others do the same we shall have the best possible Council, whatever happens.

No one who has been in touch with pharmacists during the year can have failed to notice how the President has improved in favour with his constituents, and I trust we shall see him at the head of the poll, where he so well deserves to stand.

Newcastle-on-Tyne. T. MALTBY CLAGUE.

Sir,—A study of the statement of attendances of members of Council on committees and at Council meetings might give the electors some idea of the devotion to their interests displayed by the different members. Making all due allowance for country members, we find the President, with sixty-four Committee attendances, an easy first, and Mr. Evans, with nine, a good last. Whatever views different electors may take as to the policy that should be adopted to advance their interests, there cannot be two opinions as to the necessity of devoted work and steady and continuous interest in their affairs from those whom they elect to serve them.

On the whole I think we may feel ourselves well served. I have instanced the highest and lowest attendance, but between these there are many most praiseworthy instances of assiduous work, the average attendance being high. It is much to be desired that the candidates rallying round the cry of "trade interests" will not be satisfied with such a measure of service as their present representative shows.

28, *Tulse Hill.* WM. WARREN.

Sir,—According to the statement of attendance of members of Council published last week, it appears that Mr. Gwilym Evans, of Llanelly, has been present at only six Council meetings and nine Committee meetings. The latter may possibly have been held on four days.

Can Mr. Evans consider this consistent with his promise to care in a special degree for "Trade Interests?"

Sheffield. JOHN HUMPHREY.

Trade Interests.

Sir—I think the thanks of the whole trade are due to the President for the prompt and energetic manner in which he acted in regard to the proposed stipulation in the Customs Bill with respect to the sale by retail of methylated spirit, by which he obtained from the Chancellor of the Exchequer the withdrawal of that stipulation, and thereby relieved the trade of a considerable difficulty.

I think also that the action of the President and Council in that case shows that they are fully awake to, and quite capable of taking care of, "trade interests."

I would like also further to say that but for the information given in the *Pharmaceutical Journal* of May 3 the trade would have known nothing whatever of the proposed legislation, as none of the special trade journals had any notice of it, and had not the Council acted as promptly as it did, this objectionable provision would certainly have become law.

Note this all whom it may concern and act accordingly.

Manchester. W. Wilkinson.

Proprietary Preparations Containing Poison.

Sir,—"Alpha," in his letter of the 10th, seems to assume that the Council of the Society and I share a common right of prosecution, else why should I "bell the cat?" In the next sentence he says "paregoric must have the red label affixed." Why red? Are we not a little mixed in our notions? Opinion is perhaps most clearly and succinctly stated in the form of propositions. With your permission I will state the following:—

That the Pharmacy Act, "for the safety of the public," exists for the benefit of some thirty million people, and not for the advantage of a few thousand chemists.

That the Council, or any corporate body, entrusted with the duty of enforcing the Act, would be recreant to duty if they made use of one section to prosecute the grocers, and suppressed another section in the interest of chemists. Like unjust stewards, they would be liable to be called to account by the high authority of Parliament, whose members are very much influenced by votes, and the majority of voters might not (possibly) side with the few and feeble.

That within the meaning of the Pharmacy Act, "patent" and "proprietary" medicines are entirely distinct.

That retailers of stamped or unstamped proprietary medicines containing poison are (with the reservation below) as liable as if they sold the simple drugs or chemicals themselves.

If these things are so, and justice is, as we pray, "indifferently" administered, it follows that a man must not merely think that he knows, but must assure himself as to the composition of every proprietary article he hands over the counter, or must sell at his peril.

The question I reserved above is this—Is a medicine, into the composition of which a "poison" enters, therefore itself a poison? I have a strong opinion on that point, but I wait for the decision of Her Majesty's judges. They know all the law—and nothing of the business.

Henry H. Pollard.

Sir,—My letter in your last issue having drawn many inquiries upon myself which I have not the opportunity of answering individually, will you kindly permit a few lines in explanation. I do not cast any reflection upon the Society; but neither the public nor the trade is satisfied with the insufficient administration of the Pharmacy Act. This Act has been too much regarded as a trade interest, but it was really passed in the public interest.

Is it not true that more fatal cases of poisoning have been caused by the sale of so-called patents of late years than by crude drugs?

Is it not also true that they have been mostly sold at the shops of unregistered men? Is it not true that mixtures of chloroform, morphia, and prussic acid are freely sold by them *and no questions asked or cautions given*?

Can the Legislature have contemplated that any fool might put up a six ounce bottle of laudanum covered by a patent medicine stamp, and having labelled it Snook's Healthy Sleep Promoter, escape all responsibility thereby?

I will simply state that I have purchased and sent to the Crown Solicitor a bottle of a mixture confessedly containing morphia, etc. Let others go and do likewise and we shall soon hear of dovecots being fluttered.

202, *Caledonian Road, N.* E. Warrell.

State of Teeth in Prehistoric Skeletons.

Sir,—One point in Mr. Powell's letter of the 5th April, is of special interest, and is the first time I have seen it in print, the *oblique wearing down* of long-barrow teeth. I met with similar, but evidently less frequent, examples amongst the teeth from the Harborough (Derbyshire) long-barrow, to which I referred. I could not account for the peculiarity, but in the few cases where such teeth were still attached to fragments of the upper jaw, appearances seemed to indicate some deformity of the alveolar region. I have some recollection of similarly worn teeth from neolithic burials in a local cave, but pressure of business prevents me looking up my notes upon them. The former examples were confined to molars.

There is, I think, no reasonable doubt that the attrition of prehistoric teeth was due to coarse tough food—flesh imperfectly cooked immediately after it was killed, coarse meals, with particles of grit from the quern. This grinding of the teeth was by no means peculiar to neolithic or bronze races, it is found in the far older remains of pleistocene cave-men.

The proportions of caries in the following examples (chiefly culled from Greenwell and Rolleston's *British Barrows*) will interest your readers.

In 68 Wiltshire long-barrow skulls (Dr. Thurnam's collection), 2 cases of caries.

In 60 Yorkshire long-head skulls (presumably chiefly from long-barrows), 24 cases.

In 44 prehistoric skulls, chiefly from Derbyshire and Staffordshire (Bateman), 9 cases.

In 24 skeletons from long-barrow at Park Cwm, Gower, 2 cases.

In 10 lower jaws from long-barrows, Gloucestershire, 1.

In 6 lower jaws from Nether-Swell, Gloucestershire, 1.

Add to these my Derbyshire example (5 or 6 in about 150), and Mr. Powell's Wiltshire one (2 in 200), it would seem that caries were more prevalent in the north than in the south.

Caries are more frequent in the round-barrow burials; 32 Wiltshire skulls of this period furnished 7 cases, and just recently I examined a Derbyshire example and its skeleton, 25 of the teeth were found, and of these 3 had caries (the teeth were not much worn).

I may add that I have a few reprints (from the Derbyshire Archæological Society's Journal) of the Harborough diggings left—post free, 7 stamps (the proceeds going to the Excavation Fund of a local bone cave); they have plates and full descriptions of the skeletons found.

Derby. John Ward.

Gender of Pharmacopœia Nouns Ending in as, atis, is, itis.

Sir,—It was with great pleasure that I read in the Journal Mr. Ince's paper on the genders—for they appear to be hermaphrodite—of pharmaceutical nouns ending in *as, atis, is, itis.*

It had often struck me that it was very ridiculous that *carbonas* should be feminine in England and yet masculine on the continent, and I had been totally unable to account for it until Mr. Ince, the student's best friend, came to enlighten me. There are also other *minutiæ* in the construction of some of the sentences of the B.P. which are difficult of understanding.

Amongst the tests of the carbonates (*e. g.*, those of lithium, sodium, etc.), we find that "the carbonate dissolves with effervescence" in a certain acid. The very fact of the effervescence occurring conclusively proves that it is not the carbonate which dissolves, but a new salt formed by the reaction. Therefore I should suggest that it would be better to say: Added to dilute acid effervescence occurs and the solution of the salt formed gives precipitate, etc.

Granted that these are but small affairs, but surely that which comes to us by authority should be as correct as possible.

Bosny.

Communications, Letters, etc., have been received from Messrs. Brown, Dymock, Read, Pickering, Kisinmost, Robb, Williams, Lex, Struggling, Vanilla B., A Beginner.

THE ANNUAL DINNER.

The Annual Dinner of the members and friends of the Pharmaceutical Society took place on Wednesday evening at the Freemason's Tavern, the President, Mr. Michael Carteighe, in the chair, the attendance being more numerous even than usual. Amongst the guests were:—Dr. James Bell, C.B., F.R.S., President, Institute of Chemistry; Mr. W. J. Bell, LL.D.; Dr. T. Lauder Brunton, F.R.S.; Thomas Bryant, F.R.C.S., President Harveian Society; Dr. G. Buchanan, F.R.S., Medical Officer of the Local Government Board; H. J. Chaney, Esq., Superintendent of the Standards Department, Board of Trade; Wyndham Cottle, M.D.; Wm. Crookes, F.R.S.; Dr. Curnow, Dean of the Medical Faculty, King's College; Dr. W. H. Dickinson, President, Pathological Society; Sir Dyce Duckworth, M.D., Treasurer, Royal College of Physicians; W. F. W. Eckell, of Christiania; T. A. Ellwood, President of the Chemists' Assistants' Association; Dr. R. Farquharson, M.P.; E. Ferrand, of Paris; Professor E. Frankland, F.R.S.; Christopher Heath, F.R.C.S., President, Clinical Society; A. Braxton Hicks, Esq.; Timothy Holmes, F.R.C.S., President Medical and Chirurgical Society; Dr. H. W. Hubbard; Jonathan Hutchinson, F.R.C.S., President, Royal College Surgeons; Dr. R. J. Lee; G. H. Makins, M.R.C.S., Master of the Apothecaries Society; Professor W. Odling, M.A., F.R.S.; Professor Pedler, of Calcutta; E. E. Pinches, B.A., College of Preceptors; Dr. R. Quain, F.R.S., Chairman of the Pharmacopœia Committee, General Medical Council; Professor F. F. Roberts, M.D.; Dr. W. J. Russell, F.R.S., President of the Chemical Society; Dr. T. Stevenson, Privy Council Visitor to the Society's Examinations; Knowsley Thornton, M.B., President, Medical Society of London; J. Smith Turner, M.R.C.S.; James Watson, M.P.

The PRESIDENT having proposed the health of "The Queen" in appropriate terms, the National Anthem was sung with enthusiasm.

The PRESIDENT next proposed "The Houses of Parliament," and in so doing referred to the suggestion which had been made at the annual meeting that afternoon that a "pill roller" would be a great addition to the members of Parliament, and that that person should be the President of the Pharmaceutical Society, especially bearing in mind that one important qualification of a member of Parliament was that he should not talk too much. He thought they owed a great deal of gratitude to the House of Commons for the work it did, and also for that which it did not do. There was such a thing as over legislation; there were a great many things Parliament could do, and a great many others which people could do better for themselves, and he hoped the time was far distant when the Legislature should attempt to interfere with personal freedom in order to carry out some of the social whims of the present day. It seemed to him that individuality was the very essence of the Englishman's birthright, and to take away that individuality by legislation would be to make him the passive instrument of every person who chose to address him. It was distinctly understood that no one was to make long speeches, and therefore he would conclude by coupling with the toast the name of Dr. Farquharson, a Member of Parliament who was always ready to aid in advancing the cause of pharmacy and science, and whose presence they were very, very glad to welcome.

Dr. FARQUHARSON in responding said the only drawback he had felt to the pleasure of being present was the consciousness that he would have to respond to this toast. He could not say, as a friend of his once did, that though he had been two years in the House he had never had the temerity to address that august assembly, but he and his medical friends in the House, as a general rule endeavoured to keep aloof from party disputes, and to devote themselves more to questions connected with their own professions, and with science, and he hoped they would continue to do so. Too often when such questions came up they were treated with hostility or indifference, and the only way he could see of getting over that difficulty was by having a greater number of scientific men in the House of Commons. He was therefore very glad to hear that the President was considering the propriety of entering the House of Commons, and he should much rejoice if the result were to send a man to Parliament who evidently would be the right man in the right place, and who would be of great service to the country. He had to return thanks for the Upper House, a mysterious body, of whose proceedings he knew little, but whose rapid method of getting through their work he much envied, and on their behalf and that of the members of the House of Commons, he acknowledged with gratitude the kind way in which the toast had been received. In the House of Commons they had attempted to do something for pharmacy, and he regretted that the Pharmacy Act Amendment Bill had been withdrawn, but he hoped it was only for a time, and that it would be reintroduced under more auspicious circumstances.

The PRESIDENT next proposed "The Medical Profession," associated with the names of Mr. Jonathan Hutchinson, President of the College of Surgeons, and Sir Dyce Duckworth, Treasurer of the Royal College of Physicians.

Mr. JONATHAN HUTCHINSON said it was only by courtesy that the surgical profession was connected with this toast; but when he recollected what pharmacy was thirty-five years ago, he might say that the whole medical profession had reason to be grateful to the Pharmaceutical Society of Great Britain and to those who had elevated what was at one time a mere jumble into a science. They were especially grateful for the simplicity which was being introduced, and for the zeal with which pharmacists applied themselves to the elucidation of the action of drugs, and to affording the doctor the best means of prescribing them. In thanking the gentlemen present for the kind way in which they had received the toast, he could not help being reminded of a reply he once heard given by the then Mr. Robert Lowe, when his health was drunk by the College of Surgeons; he said he felt specially honoured, for he could not conceive why the College of Surgeons should drink anyone's health. He could not say that to this assembly, because obviously if the higher department of medicine did not take many drugs themselves, they induced other people to take them, and the surgeons were no less intimately connected with the advancement of pharmacy, and no less grateful for the assistance they derived from pharmacists.

Sir DYCE DUCKWORTH said he felt highly honoured in being called upon to respond to a toast which was not very often proposed at a festive board. The pharmaceutical profession had been spoken of as the fourth estate of medicine; he did not know whether that was the real position which the Pharmaceutical Society occupied, but by its energy and by its efforts in a scientific direction the Society was rapidly coming to occupy a very definite and important position with regard to medicine. He had been trying to think what would be the condition of things in 1990; whether there would then be a Pharmaceutical Society and whether anyone would then have to respond to this toast. The vast majority of those who would be present on that occasion were not yet born; but if he could come back in a ghostly form and look on at that dinner he fancied he should find Mr. Carteighe still in the chair as the chronic or perennial President, and very possibly representing in Parliament the constituency of Bloomsbury, having kept up his marvellous condition of health and energy by the simple process of taking walks in the spring over the hills of Cumberland; and in the autumn over the heights of the Andes and Himalayas. And he thought he should still find him exercising his beneficent rule, the successors of the present members of the Society not having been able to find anyone better to put in his place. Be that as it might, he heartily congratulated the Society on the high standard it maintained in its examinations, and particularly on the excellent work done in the Research Laboratory, not only in pharmacy, but in the whole science of therapeutics with which physicians had more particularly to do.

Mr. SCHACHT, in the absence of the Vice-President, Mr. Bottle, proposed "The Learned Societies," representatives of most of which were present, coupled with the name of Dr. W. J. Russell, F.R.S., President of the Chemical Society.

Dr. RUSSELL, F.R.S., said the learned societies were very numerous, and the societies which would like to enjoy that appellation were still more numerous. It would be interesting to speculate what the state of science would be without the learned societies, which had done an immense amount of good in publishing and recording the discoveries which were constantly being made, in criticizing what was brought forward, and in enabling men of like interests and feelings to meet together and discuss matters of importance. The Chemical Society was perhaps most akin to the Pharmaceutical Society, and he was, therefore, especially pleased to take part in these proceedings. In connection with the Chemical Society he had been much struck with the fact that there were a large number of people who, though not members of it, were very anxious that the public should think they were, and accordingly used initials which designated fellows or members of the Society. This was a compliment to the Society, no doubt, but it was one they did not desire, and a movement was now being initiated which he hoped would enable them to put a stop to such titles being employed deceptively. At the same time it would be well for the public to know that such initials did not imply a degree; that a man might be a F.C.S. or F.G.S. without having a large knowledge of chemistry or geology. It simply meant that he was interested in the particular science, and that he would do his best to promulgate and extend it.

Dr. QUAIN next proposed "Prosperity to the Pharmaceutical Society and the Health of the President." Mr. Hutchinson had referred to a period of thirty-five years ago, but he could remember the time, fifty years ago, when Jacob Bell took up the question of the advancement of pharmacy, and set a good precedent by going into Parliament, and it was by so doing, at considerable sacrifice, that he was able to do what he did in founding the Pharmaceutical Society. The great object of the Society had been to promote pharmaceutical knowledge in its widest sense, and an institution had been founded in which every department of science connected with it was cultivated. Todd Thompson, Pereira and Fownes were the first professors, and when those men joined the majority their places had been taken by others of equal distinction, and the result could not fail to be all that the most earnest well-wisher of the Society could desire. The Society had created a body of pharmacists second to none in Europe. It had brought up what was but a trade to the dignity of a profession, and physicians looked to its members not merely to discover new remedies, but to tell them the merits of those they already possessed, and to make them more certain in their action. It had been proposed to add certain things to the Pharmacopœia in the shape of an addendum, and 130 substances had been suggested, almost enough to form a Pharmacopœia by themselves; but when they came to inquire further, only some twenty-five obtained a recommendation beyond a bare majority, and therefore he hoped pharmacists would be spared crowding their shelves with things which would only have to be thrown out after a short time. They looked to the pharmacists to provide remedies which, like an express rifle, would go straight to the desired point. The physician had to combat disease, and he often thought when the remedy failed that the fault was his own and not that of the remedy, particularly when this was properly and scientifically prepared. He had in his possession a prescription containing no less than seven articles, each one of which might counteract the action of the other. It contained quinine, arsenic, nux vomica, manganese, and two or three other substances, and it reminded him of the old weapon called a blunderbus, which some of his younger friends would hardly remember. It was a brass tube with a funnel-shaped aperture, into which was put a handful of nails, and when it was fired off it must hit something. That was somewhat the principle of polypharmacy; it must hit something; it might hit the disease, or if not it might kill the patient. That was what they wanted to avoid, and to get clear, well-defined remedies on which they could rely; and he was confident they would get them from this Society. Mr. Carteighe had been President of the Society for eight years, and though he might not live to see it, he hoped the prophecy of Sir Dyce Duckworth would be fulfilled, and that if one hundred years hence the same identical Mr. Carteighe did not fill the presidential chair, it might be occupied by one of his descendants.

The PRESIDENT in responding said it was true that in its corporate capacity the Pharmaceutical Society had endeavoured to do something for the advancement of medicine. According to the original charter the Society was founded for the advancement of chemistry and pharmacy, and by the Act of 1852 they were specially precluded from practising certain branches of medicine. His friend, Mr. Makins, the master of the Apothecaries Company, said that was a relic of the warfare which existed in times long gone by, when a physician's prescriptions had to be filtered through a rival medical man, who might possibly infuse rival medical theories into the patient. He need not say that was not the object of the founders of the Society. Advanced education in all branches of knowledge which tended to make a man a good pharmacist simply prevented him from attempting the cure of disease, because it taught him that he knew nothing of therapeutics. Pharmacists did not desire, but on the contrary discouraged any encroachment on the noble profession of medicine. They acted as the handmaidens of medicine in the strictest sense of the term, and the advanced physician of to-day could no more advance therapeutics or the duration of human life by the application of remedies without the pharmacist than he could years ago. It was as essential for the physician as it was for the pharmacist that he should be perfectly *au courant* with everything going on about him, and be able to distinguish between that which was false in the scientific sense of the term, and that which was false in the popular sense. He would beg all who had listened to Dr. Quain's admirable words to remember what polypharmacy meant; it meant death to true scientific medicine. The business of pharmacists was to devote their best energies to the preparation of drugs and remedies in such a state as might be ordered, and which would enable the physician to combat disease and prolong life, and at the same time in their corporate capacity to advance pharmacology in the widest possible sense. They were particularly honoured in having Dr. Quain present that evening, and he begged to thank him most cordially for the kind manner in which he had proposed this toast. In regard to the body which he represented, he could only say that he hoped it was not in a less efficient state than that in which he found it. After a song,

The President again rose and proposed "The Guests," coupling with the toast the names of Professor Odling, and M. Ferrand, of Paris.

Professor Odling, F.R.S., said the guests that evening were something like the learned societies of which Dr. Russell had spoken; the number of actual guests was considerable, but those who would like to be included in the number were still greater. He believed all those who were present were in very cordial sympathy with the Pharmaceutical Society, being mostly members of the medical profession or of those learned societies with which the studies of the pharmacist brought him most in contact. He was proud himself of being an honorary member of the Society and was always glad to have the opportunity of bearing public testimony to the regard and esteem in which he held the President, an opportunity which he hoped might often be repeated.

M. Ferrand said he regretted that he was not able to express in English his high sense of the honour which had been conferred upon him, and the pleasure which he felt in being present. He thanked those present heartily for the kind manner with which he had been received, and desired also to express his sense of the honour which had been conferred upon his friend Professor Planchon, director of L'Ecole Supérieur de Pharmacie in Paris, in giving him the Hanbury medal.

The musical arrangements were under the direction of Mr. John Foster.

THE CONVERSAZIONE.

A Conversazione was held in the Society's premises, Bloomsbury Square, on Tuesday evening. The visitors, who numbered about eight hundred, entered through the new building, 16, Bloomsbury Square, and were received in the Examination Hall by the President and Mrs. Carteighe, the Treasurer and Mrs. Robbins, and other members of the Council and their ladies. For the entertainment of the visitors a glee company, under the direction of Mr. John Foster, sang selections of glees, part songs and ballads at intervals to successive audiences in the Lecture Theatre, whilst in the Examination Hall a programme of music was performed by the band of the Coldstream Guards.

In the Research Laboratories were exhibited specimens illustrative of some of the work that has been carried out in them, as well as various laboratory appliances, arrangements for rapid filtration and percolation, an apparatus for showing the formation of hydrogen peroxide during the slow combustion of ether in contact with cold water, and an apparatus for drying liquids by agitation with solid desiccating agents. In the Balance Room attached to the Laboratories Professor Dunstan and Mr. Dymond exhibited an apparatus devised by them for purifying mercury by distilling it in a vacuum, and utilized it also for illustrating the character of the electric discharge through mercury vapour at different temperatures. In the same room Mr. W. A. Shenstone exhibited an apparatus devised to illustrate the different forms of electric discharge. In the Director's Room Mr. W. Lloyd Williams was in charge a large polariscope, by Laurent, on the half-shade principle, and there were a number of standard thermometers, and an instrument for calibrating thermometers. In the same building on the first floor were shown the seed and seedlings of the sugar cane, brought from Kew by the Assistant-Director of the Royal Gardens, Mr. D. Morris, M.A., F.L.S. There was also a microtome for cutting extremely thin sections up to 1-40,000th of an inch, and Mr. T. Shepheard, of Chester, kindly contributed a number of interesting illustrations of pond life. In the old building, No. 17, the Library was devoted to demonstrations of the capabilities of the Phonograph, which excited considerable interest throughout the evening. In the ante-room Mr. Percy Newbery exhibited, by the kind permission of Mr. W. M. Flinders Petrie, the curious leaves from an Egyptian book on medicine, written on papyrus, about the twenty-fifth century before Christ, which were exhibited at the recent Conversazione of the Royal Society and described in this Journal (before, p. 941.) In the next room, the present Council Room, Mr. Boys's wonderfully ingenious thaumatropic representation of the formation and fall of drops was exhibited, and there were a number of microscopes in which various objects of interest were exhibited under different powers, under the superintendence of Mr. H. D. Fuge. In the Materia Medica Museum, besides the innumerable specimens of drugs and other medicinal substances, there were some very interesting medicinal plants, including aconite, belladonna, mandragora, etc. Refreshments were served in the handsome rooms on the first floor at No. 16 and on the first floor at No. 17.

The following, among others, accepted the invitation of the Council:—J. Bassett, F.C.S.; Dr. A. J. Bernays; T. Lauder Brunton, M.D., F.R.S.; Dr. G. Buchanan, F.R.S., Medical Officer, Local Government Board; Mr. Gainsford Bruce, M.P.; Mr. Cassal, F.I.C.; Mr. H. J. Chaney, Superintendent of Standards Department, Board of Trade; W. I. Church, M.D.; Dr. T. Copes; Professor Curnow; F. C. Danvers, India Office; W. H. Dickinson, M.D.; T. S. Dowse, M.D.; A. Doran, Secretary, Obstetrical Society; Dr. Japp; D. Morris, Assistant Director of the Royal Gardens, Kew; Professor R. Meldola, F.R.S.; Professor Odling, F.R.S.; B. E. R. Newlands, F.I.C.; E. E. Pinches; Professor S. U. Pickering; J. H. Peters; Professor A. Pedler, Calcutta; Professor F. T. Roberts, M.D.; J. Burdon Sanderson, M.D., F.R.S.; Sir E. H. Sieveking, M.D.; Professor W. R. Smith, M.D.; Morton Smale, F.R.C.S., Dean of the Dental Hospital College; Thomas Stevenson, M.D., Privy Council Visitor to the Society's Examinations; James Startin, F.R.C.S.; Dr. F. Taylor; Dr. Teed; Professor Thorpe, F.R.S.; J. Smith Turner, M.R.C.S., and E. Willett, M.D.

The Pharmaceutical Journal.

SATURDAY, MAY 24, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

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THE COUNCIL ELECTION.

The result of the election of members of Council announced at the adjourned general meeting last Thursday is in every respect highly interesting and instructive. In the first place it furnishes evidence that the interest which has been excited in various ways with regard to the reconstitution of the Council has not been confined to a few members of the Society, but has been widely spread as well as active. Comparing the returns of the scrutineers with those of last year, it appears that with a voting power in the Society slightly in excess of what it was last year, the number of voting papers returned were nearly fifty per cent. in excess of the number received last year. That is in itself a most satisfactory feature of the present election, since the fact of nearly three-fourths of the voters having taken part in the election shows that a very general interest is taken in the work of the Society. It is also satisfactory to note that the number of voting papers disallowed on account of some informality has been comparatively much smaller than on former occasions, or only sixty-seven as compared with one hundred and five last year. The effective voting this year represents the opinions and the wishes of more than 70 per cent. of the Society's members, and consequently the results arrived at acquire proportionate significance. As will be seen by reference to the report presented by the scrutineers, those results amount to an emphatic and indisputable endorsement of the policy and action of the Council. Notwithstanding the energy with which opposition has been stimulated by apparently plausible electioneering war cries, it is evident that the Council has the confidence of the Society. Those results give a distinct negative to the charge that the material interests of the trade have either been disregarded by the Council or that they might have been better cared for. They also give a distinct negative to the monstrous assertion that the members of Council ignore, or are indifferent to, the interests of the trade in which they are individually engaged. It may therefore well be said that the anticipation of this being the most important election that has taken place for years has been actually realized. Of course we do not omit to consider that the opinion thereby expressed is the prevailing opinion of the Society, and that it may be said the Society fails to represent the trade as much as it has been asserted that the Councils fails to do so. If there be any ground for that statement, we can only say that it is so much the worse for the trade, and for those who still persist in refusing to take any other part in the Society's work than that of sharing in the benefits resulting from it.

In addition to those general features of the present election, which indicate so unmistakably that the policy and past action of the Council is approved by the greater part of the Society's members, the details of the election as they affect individual candidates are not less instructive. We do not find that sixty men have been found to complete what has been termed the good work commenced by last year's election; but in place of that predicted discovery we find that the re-election of Mr. Carteighe has been signalized by his return at the head of the poll by nearly three-fourths of the total number of votes registered, a number much exceeding the total number of voting papers sent in last year. This is an honourable compensation for the affront that had been put upon him last year by a misdirected "jelly fish" activity, and while it justifies the indications of what was due to Mr. Carteighe in the form of reparation for last year's mistake, it proves that those indications were not too "dictatorial" to meet with a hearty acquiescent response from most of the Society's members. The re-election of Mr. Carteighe shows that he commands the active support of more than half the Society's members, and the return of all the other members of Council who stood for re-election also shows, by the large number of votes given in favour of most of them, that there is a sound appreciation of the services they have rendered: that the expressions of opinion to that effect which have lately appeared in our correspondence columns are not to be ascribed to impotent assumptions by an insignificant group of people, but that they are a true representation of the intelligent judgment of the body. It may also be pointed out that the only new member of Council elected is the one who preferred to retain his independence of action rather than fetter himself with pledges to adopt a line of action that might hereafter prove to be impracticable or impolitic. There has been but little fulfilment of the prophecies that appeals for support, and the public expression of views as to the policy to be pursued in contingencies that are unknown, will be the guiding influences with voters. There seems to be much greater reason for believing that such proceedings are held by the majority to be both senseless and undesirable, and that the only basis for forming a sound estimate of any candidate's claim to occupy the representative position of a member of Council is an intelligent acquaintance with the work he has done in promoting the objects of the Society. It is on these lines, we believe, that the members of the Society have decided to uphold the Council in its policy, and it is for those reasons that the consequences of their action are to be regarded as constituting a "survival of the fittest."

The Conversazione, by which the inauguration of the Society's new premises was celebrated, has been in every respect successful. In addition to a large number of members and associates resident in London, it was attended also by many country members who had come up to town for the purpose of being present at the Annual General Meeting. There was also a considerable number of distinguished guests, a list of whom will be found in the detailed report at page 955. The opinions expressed in reference to the Society's new buildings were highly satisfactory and their fitness for the purposes of the Society's business was generally recognized. The circumstance of the Conversazione being held on the evening preceding the annual meeting appears to have been found convenient for those who desired to have an opportunity of discussing pharmaceutical affairs with their friends and it may be inferred that this contributed in some degree to augment the attendance at the annual meeting. It was a matter of regret to many present at the Conversazione that, owing to a family bereavement, the Vice-President was prevented from being there.

* * *

The annual dinner of members of the Pharmaceutical Society and their friends has been this year a more numerously attended gathering than on any previous occasion. From the report at page 953 it will be seen that many distinguished guests were present, among the number being Dr. Quain, who, in proposing the toast of the Pharmaceutical Society and its President, referred to the contemplated publication of an addendum to the British Pharmacopœia, and bore testimony to the good service that the Society had already rendered in advancing the position of pharmacists, and in assisting the medical profession to arrive at such a determination of the merits of medicinal preparations as is requisite for effectually combating disease without risk to patents. For further assistance in that work he expressed confidence that the Pharmaceutical Society might be relied upon, and that under the guidance of its President it would continue usefully to promote pharmaceutical knowledge in its widest sense. The toast of "The Learned Societies," which was to have been given by the Vice-President, was, in his absence, proposed by Mr. Schacht, and responded to by Dr. Russell, the President of the Chemcial Society.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 21, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

Messrs. Allen, Atkins, Cross, Evans, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Robbins, Schacht, Southall and Watt.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

The order of proceedings at the Annual Meeting was settled, and the Council adjourned.

FORTY-NINTH ANNUAL GENERAL MEETING.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The forty-ninth annual meeting of the Pharmaceutical Society was held at Bloomsbury Square, the chair being taken at 12 o'clock by Mr. Michael Carteighe, President. After the Secretary had read the notice convening the meeting, the report was agreed to be taken as read.

The President: I now beg to move—

> "That the report and financial statement be received and adopted."

In doing so I propose not to detain you very long. I understand that one of the future members of the Council thinks there ought to be a closure applied at most of the meetings of the Society, and perhaps it would be as well if I were, as far as possible, to be brief to-day. On the other hand, gentlemen, it is a source of pleasure and personal gratification to see so many of you here, and perhaps one may be pardoned for being a little bit garrulous and verbose. There is some excuse for this observation, because I find that whilst there is much complaint from time to time—not well-founded complaint, allow me to say—that the proceedings of the Society and of the Council are not reported, and that members do not know what goes on; I find, although there is that complaint, that when we have devoted ourselves with considerable and commendable care to have a very long report, and have contributed very materially to the columns of all the journals that are interested in our calling, our own members do not read the report, and so it comes to pass that at the annual meeting I often have to give a short *résumé* of some of the proceedings that have taken place during twelve months, which have all been previously reported, and which politeness only prevents me from saying everyone ought to know. Well, gentlemen, with regard to the detailed work of the Society I do not think it is necessary for me to say much. You have had before you for a fortnight or thereabouts the financial statement and the report, and you have had the advantage of a certain number of criticisms from the outside point of view, so that I do not think it is necessary for me to say very much with regard to finance; but perhaps I might lay myself open to the charge of gliding over things if I did not just refer to one or two points, and I will do so very briefly. In the first place, our income for the last year with regard to the various classes of subscriptions was £200 less than in the previous year, and in the next place our fees from candidates for examination were £520 less. Now that looks a tremendous sum, and when I first saw it, interested as I am in the finances of the Society, I said, "Thank God, there is a diminution in the number of candidates." But when I went into it a little, I found there is no such comfort for us. I take it the perfection of the Pharmaceutical Society in regard to the protection of trade interests would be, and may be possibly some day, when a future President shall announce that in consequence of the intelligence, activity and ability of all those already on the register, no persons have presented themselves for examination during the previous year. Now I am sorry to tell you that this diminished figure does not mean very much. It is more a question of account than anything else. The candidates for the Preliminary pay their fees at various times, according to the particular date of the month at which the Preliminary examination is holden. That is to say, it is on the second Tuesday, and if that second Tuesday is late we do not get the fees, in fact, until a month later. So it happens that we have this year received a number of fees on the first day of January, which come into this year's account, and I am sorry to tell you—you may honestly believe me in this—that at present, notwithstanding these figures, I see no chance of a diminution in the number of persons who present themselves for examination. Then with regard to the expenditure. I have nothing much to say about that. It would be very difficult for me, or for any President, to talk to you about normal receipts or expenditure, for after all the condition of things in this house is extremely variable. The question of law costs for instance, and the cost of certain proceedings which go on from time to time, which are perfectly normal, but which vary very much at different times, render it difficult to lay down any general rule. But I am anxious to point out that the gratification which one might feel at supposing we were to have a reduced number of candidates is not borne out by this financial statement. We have a larger number of candidates, in fact, than we have had before or than we ought to have had. I do not think the number of persons who may present themselves for examination during the current year or during the next will seriously affect the trade interests of those already on the Register. With regard to the capital account, we have spent certain sums of money upon No. 16, Bloomsbury Square, and upon No. 15, and, as mentioned in the report, it is proposed that the business of the Society shall in future be carried out in No. 16. No. 15 we propose to let, and to use that house as a source of revenue. We propose to let it under such conditions that when the Pharmaceutical Society is more prosperous—everybody says it is going to be less prosperous, though I do not share those views, because the prosperity of the Society does not depend on money only, it depends on the individual members, and I have every confidence in it—but as I say No. 15, Bloomsbury Square, will, for the time being, be let on lease until such time as we want it. Of course if a decayed president and his wife wanted a habitation it would be quite open to the members that that house should be used by them for the term of their natural lives, and I might make the suggestion that the President who is associated with the Council in spending the money might be the most fitting recipient of that beneficence. Of course with regard to these new buildings we have spent a good deal of money, or rather we have converted it. We have not spent it in the sense of having got rid of it; we have converted it into another form of property. I admit that in the conversion into this form of property we have not at command a saleable commodity that would bring in precisely the same sum of money we spent upon it, as it would do if we left the money as originally invested in the funds, but I object, and do strongly protest against the assumption that the money is wasted and lost. There is something definite which gives strength to the hand of the Council; it may be very surprising to their critics, but there really is, if they have in this house a theatre and in the whole house above a complete school of pharmacy, with its museums, with its library, with its laboratories and its lecture rooms, and all the rest; they have on the one side a definite property of a very valuable kind, and, on the other hand, they have in the next house a place to carry on their business. There must be a Council and a committee room and secretaries and clerks' offices, and an examination hall behind; all those duties, gentlemen, are imposed upon us by statute, and whether we like it or not they must be carried on. Now I say if we should be very hard up, I think in the redistribution of our property we are in a better condition for realization than we were when we commenced to rebuild. Then let me say further a word on "trade or professional interests." What man who talks about trade interests keeps his shop-front in a miserable state and does not put his best foot forward to create some little interest in the outside world? Why, gentlemen, I venture to think our establishment in Bloomsbury Square is worth something to us in public interest. You may perhaps look astonished at that, but I may tell you that the Pharmacy Act of 1868 was prevented from being wrecked, and was practically passed by the simple coincidence that sundry members of the Council, of which I was then one, brought down the four Members of Parliament to this house who were objecting to give powers and rights to a corporation, and we showed them we were spending our subscribed money in education; that we were not a purely trade union, simply having regard to ourselves, but were doing good work for the public, and they withdrew their opposition in a moment, and the Bill passed. I say that was good business. Now, with regard to the other paragraphs dealing with the detailed work of the Society as a voluntary body, I need not detain you; nor with regard to the Library and Museum, and the other clauses referring to the evening meetings, and so on; but I will pass on to the paragraph with regard to the Research Committee, and remind you that I think that paragraph shows certain trade advantages are obtained by the establishment of the Research Laboratory. Some years ago you remember we felt that it was a very objectionable thing that chemists and druggists, who are educated men and examined men, should be at the mercy of every analyst who might come upon them and claim that a preparation sold by them was not of the strength of the B.P., notwithstanding the fact that the B.P. had in some cases, through its authorities, given a strength which was impossible of attainment under the conditions prescribed. I remember a good deal about that. I remember resolutions being passed. I remember taking an active part myself in opposing a medical Bill in Parliament with regard to it, and we did not succeed. Well, gentlemen, we went to the back of the mountain, to a path by which it was more easily attacked instead of going right up the face. We established a Research Laboratory, and we invited the gentlemen who composed the Pharmacopœia Committee of the Medical Council and many of the Medical Council themselves to go into this building and look at it. We called their attention to the work that was done, and before the Laboratory has been established more than two years we have the result mentioned in this paragraph. What does this mean? It is not merely the satisfaction of our *amour propre* by being associated in the formation of an addendum to the Pharmacopœia, that is really a simple thing, but I take it that is an earnest of what will happen with regard to the preparation of a new Pharmacopœia in due course. Is it a small trade advantage that we, who do know something about the strength of preparations, and are liable to be attacked with regard to them, should form part of the body who shall [illegible] n compiling the Pharmacopœia? I do not think it is. think we have always held that we were the persons vho knew more about the nature and strength of reparations which were practical, and which could e kept in stock, than any other branch of the ommunity; and I am glad that we may congratuate ourselves on the fact that the Chairman of he Pharmacopœia Committee of the Medical Counil and his colleagues have asked us to do work n association with them in this direction. When that Research Laboratory was started what a talk there was about money; and we may have to give it up now. It was said it was a waste of money, but, gentlenen, trade interests are not always to be obtained by mmediate action. A business is not got up in a day, and he who takes a house in a fashionable neighbourhood and starts as a pharmacist must be prepared to wait before he gets a profit from the business. The Pharmaceutical Society in its corporate capacity keeps a big shop. It must be patient and it must be ungrudging in many respects in the work it does, in order to get certain advantages, and I think in regard to this matter I may fairly say we have obtained them. Then there are certain paragraphs here with respect to the Executive of the North British Branch and the Divisional Secretaries and the Local Secretaries, about which probably several members in the meeting may have something to say, and so I myself will pass these over; but I will just refer to the next paragraph, which mentions the cases of infringement, and especially certain cases of infringement by limited liability companies, as well as the appeal in the Wheeldon case. These things run to some extent on all fours and they have an importance. You will be good enough to understand that in making the observations I do, I make them as your President, and I do not think it is fitting that I should suggest any form of persecution of any kind whatever. If I stood in this room as an ordinary member of this Society, it would be perfectly competent for me to make certain suggestions to the incoming Council as to what they might fairly do, or what they should not do. But I do not conceive that is now my place, because until I am actually turned out of the Council I am your President, and in that capacity I occupy a semijudicial position, and I hope you will bear with me if I do not go very much into detail on these legal matters. Now, in the first place, I beg to call your attention to the fact that you have had for many years what we all know—I say you, but I mean we in London, for I am sure that those in the country think that we in London do not know much about bogus companies, because we have borne our grievances without making too much noise about them. It is assumed that we have not got any; but I beg to say that we in London know as much about it as the men in the country. We know very well that it is a monstrous thing and looks a cruel thing, and I believe it to be a wrong thing, but that is another question, that when a person is trading as a grocer or a drysalter, or an ironmonger, and when he infringes the provisions of the Pharmacy Act, he gets out of the meshes of the Act of Parliament with regard to keeping an open shop if he associates himself with six other persons and becomes a company. Therefore, if I use the words "bogus company," you will understand I mean a company of that kind. In law they are lawful companies, but you will understand that I mean, when I use the term bogus company, a company in which one man becomes substantially the proprietor of the establishment, simply getting six other persons to take so many sixpences or so many pounds with him. It is obvious that in equity that is not a satisfactory proceeding, quite apart from us as pharmacists. It is unjust in every form of trade. I hold that limited liability of that form in retail trade is injustice in the highest degree. I admit the difficulties of dealing with it, but it is an injustice. The principle of trade in this country and of commerce has always been the integrity of the seller and the liability of the seller down to the very last sixpence, but unfortunately of course that has been thrown to the winds as far as we are concerned, and as far as many other retail traders are concerned. Well, it so happened that certain cases in the midland counties we had some difficulty in dealing with; but we were able to institute proceedings, and obtained against the unqualified sellers in these cases, who happily for us were at the same time principal shareholders, a conviction or the payment of penalties. In one case we succeeded in getting the sum of £50 or £60 in one *coup*, which I think ought to be a salutary lesson to any ordinary man, so far as money goes. In others we obtained sums of money varying from £20 to £30, and generally, as far as our duties go in that direction, we were particularly fortunate. Now you will say, why did you go at these particular persons? Why did you go at John Jones, the unqualified seller, in this case; why did you not go against the corporation? We went against them because we took advice, and because we were obliged to open our eyes to the fact that on one occasion the Council had attempted unsuccessfully to fight a corporate body as to whether it could keep an open shop for the sale and dispensing of poisons when the conductor of the sale was a qualified man. That was the London and Provincial case. As to doing that, I do not say whether it was right or wrong. I do not think the Council had any choice in the matter, because gentlemen representing the members outside drove them to do it. I do not say whether you were wise or not. I pass no opinion upon it. All I know is, that the Council proceeded to fight in a certain case, and they carried that case to the House of Lords, where two things were made very clear and decided upon. The point actually before the House of Lords was whether a corporation could keep an open shop for the sale and dispensing of poisons, and the law lords in the House of Lords decided that they were outside the Act—in other words, that they could. It may be that some of you in this room will say it is a quibble, and that a corporation cannot keep an open shop; but the law says that if they cannot, at least they cannot be prevented, and I think it comes in practice to much the same thing. The same law lords told us that clearly the seller was the person who handed over. In this case clearly the public were most concerned in the person who handed over, and so when we were ordered to proceed by the Council, I mean by the Law Committee, in those cases at Birmingham, it was on those lines. Our friends in the country say why do you not shut up those bogus companies? Why do you not stop them? We say we are very sorry, but we cannot. Then they say: they do not keep qualified assistants, and you can proceed against them in this direction; why do you not do it? Well, we do. We proceed against the unqualified assistant of the corporation, even though that assistant may be a large shareholder, and we have him fined. But we find in the process that what is sauce for the goose is sauce for the gander; that the law cuts both ways, and that the qualified man who leaves his place of business to the charge of an unqualified assistant is rendering him liable to a penalty. That is what we find to be the law. I will say nothing about any question of expediency until later on, but I think I have made plain the condition of things. It has been said: you have let certain proceedings lapse for twenty-one years. Granted. A body like this, gentlemen, is not a body that is going to send private detectives into every chemist's shop throughout the country to see that he carries on his business properly. It can only prosecute when its attention is called to the proceedings when some serious calamity arises. And when some serious calamity does arise; when some public officer calls the attention of the Council of this Society to its duties with regard to the 15th section, and that the onus of prosecution lies upon it, I say that a Council of educated men would be scouted by its own members if it refused to place the matter before a court of law. The Council of our body, gentlemen, no matter what you may think of it, no matter whether you turn every one of its members out and put twenty-one new men in, pledged never to prosecute in certain cases—if you did so, why half a dozen of our examined men who have an eye to the future, as well as those who have businesses, have simply to go to the Courts of Justice and without the slightest difficulty get a mandamus to compel you to prosecute, and I prefer as your President that we should do what is right in the interests of the public rather than be compelled or coerced from outside into doing it. Now, gentlemen, the only further observations I will trouble you with in regard to the report are those with reference to the Pharmacy Act Amendment Bill. This Bill has a certain amount of interest, because I observe in many of the recent discussions as to the claims of certain of us to have seats on the Council the questions of certain trade privileges and a certain consolidation with regard to the Society have been made very prominent. With regard to that, I have only to say that the Bill was an honest attempt to do as much as the men you sent to the Council thought it practicable to do. If I say a word or two on this point it is simply to prevent continued repetition. If you and all those connected with the Society who are not here to-day should do me the honour to read my remarks—I am afraid very few of them will if; you will only consider the position of things, I think you would agree with me that no honourable man can become a representative of yourselves on the Council of this Society without having distinct views as to what is practicable and what is feasible. If you ask me what I am in favour of, I can tell you very distinctly that I think for the qualification our men have to undergo they ought to have very much greater privileges. I quite agree in that, but you do not send me to the Council or any of my colleagues to talk to the gallery and say that; you send us there to do some work, to make progress. Why, even in the House of Commons they can talk. We have not descended so low as that. When we say that a thing is not practicable we do not mean to say that it is not desirable, but we have adopted the policy of feeling the pulse of the persons with whom we are concerned in a professional attack on the public. You must remember that our privileges in the future with regard to trade are dependent upon a House of Commons unwilling to give us those privileges, and it is simply a question of tactics whether we go for a big thing or a little thing. I know, from the experience I have have had since I have been your President, and before, that I have found it better, and I may say our predecessors found it better, to go in for piece-meal legislation, bad in principle as I admit it is, rather than for what is vulgarly known as "the whole hog." It is very pretty for a new Council to promote a Bill, and to put it on the table—the Council table—and then pose in an arm-chair, and say, "There is your Bill—exemption from jury service, and all the rest of it." That is what happens sometimes, and the final resolution is that the Trade Bill be left in the hands of the President, and that he communicate with the members of the House of Commons and the House of Lords. That is just about the most difficult part of the process. When he comes back and says he cannot do it, you think he is a donkey, and when he ventures to give you the reasons which are imparted to him by the Legislature, most of the members think they are his own views. I mean to say it is the most absurd thing that in the inevitable correspondence I have to answer and to deal with, many of the observations I have made at these meetings and at the Council table, when I have been quoting the observations of members of the Legislature, have been put down to be the views of the President himself, and of Michael Carteighe—no, not Michael Carteighe, because he has ceased to exist for eight years; when he became President he became a responsible person, and he ceased to be Michael Carteighe. In another fortnight I will have the opportunity of getting into the fresh air again. In this Bill we propose, in regard to the consolidation of the Society, that every associate in business shall become a member of the Society. If any of you gentlemen and those outside had taken the trouble to read the observations I made in introducing that proposal to the Council on the part of the Law and Parliamentary Committee, I think you would have seen that I said our desire was to make the Society, as a Society, a grand commonwealth of pharmacy; that in this Society we recognize no distinction; the man who is qualified, no matter what his qualification, shall join hand in hand, and we shall be all one Society, working for a common object, leaving the registers to mark the distinction between the pharmaceutical chemist and the chemist and druggist. But in the Society itself every privilege which it is possible for any pharmaceutical chemist member to have we proposed to pass on to the associate. Now, further,—as a matter of committee, I say this for the benefit of some of my young friends who have written to me,—we desired that every person who passes the Minor examination, without reference to any other consideration, should become a member of the Society if he likes. The only consideration that weighed with us in not actually drafting it into the Bill was that a very large number of our young men who pass the Minor examination hesitate somewhat whether they will or will not go up for the Major. They hesitate also on this ground: they have an idea that they would prefer to be associates for a time, not always for a financial reason. I am sorry to say, and some of you may be sorry to say, though perhaps in a sense it is a good thing for them, they take very little interest in our so-called pharmaceutical politics, but they take a good deal of interest in our educational system, and they have an idea that if they become full-fledged members when they go into business, or are twenty-five or thirty years of age, that is enough for them. Our difficulty therefore was, whether on the one hand we should gratify the man who has passed the Minor who wants a vote, and who must pay the same sum of money as every other person who has the same privilege, or whether we should retain the grade of associate for such men without a vote until he got into business. You will understand what I mean. In future, if this Bill became law, all the associates in business would be members, and the only associates we should have would be persons who had passed the Minor, and who were not in business. That is the important point. Now as far as the present Council is concerned, I say at once they are anxious to keep up interest in the affairs of the Society on the part of every class, and it seems to us irrefutable that when once a man has passed the Minor he has as much right to have all the privileges as when he goes into business; that is to say the qualification of this Society is training and examination—it is not the mere accident of going into business. Then we proposed that certain alterations should be made in the clauses of the existing Act, and to attack dispensing. Now why did we attack the dispensing of medical prescriptions? We attacked the dispensing of medical prescriptions because our friends of the Irish Pharmaceutical Society have that privilege, and there was some basis for it. In fact, in 1868, or just before that, we should not have had the slightest difficulty in obtaining it, only there was a trade interest that was adverse to it at the time. The trade, gentlemen, about which we have heard so much lately, said, we do not want a Pharmacy Bill, but we want a Poison Bill. They got what they wanted, and now they do not like it. We proposed to attack it on these grounds; and to attack it further because we thought that in connection with the curriculum we had a fair claim to ask for an exclusive right to compound these prescriptions. It might be held by an arrant freetrader that it was possible to sell an ounce of certain drugs over the counter without danger to health, but we thought that probably we could persuade the Legislature—and I had privately ascertained that the views of the Government were in favour of the proposition—that there was justice in the view that in the compounding of medicines qualification was an important element in the interest of the public. And then we thought further, as my friend Walter Hills has very clearly stated in some observations he made, which have been published, we thought further, although I do not think we have expressed it in terms, that having got the compounding of prescriptions we might fairly call the attention of the Legislature a little way on to the fact that the preparation of any compound in the Pharmacopœia was the compounding of a prescription, and should be so restricted. Well, gentlemen, these were the general lines on which we approached this subject, and I hope you will consider that there was something like a definite policy in it. Now I pass on at once to the paragraph with regard to the deaths, and with regard to the Benevolent Fund. There is a rather long death roll, and with regard to the Benevolent Fund we can fairly congratulate ourselves upon the fact that we have maintained our position. On this subject I would just venture to urge on those of you who are here to-day, representing various parts of the country, many of you justices of the peace and influential men in your districts—we poor beggars in London have not any such influence—that in many districts we have comparatively small subscriptions to this Fund, or none at all, and that it is surely an unjust thing to punish the needy chemist and druggist, because we, the Council of the Pharmaceutical Society, have done something which is not to the taste of the persons who are asked to subscribe. I do feel, when I read some of the letters of those who retire from this Society, inclined to sit down and cry. I think it sad that an educated man can visit the sins of the Council of this Society—which are merely the reflex of the sins of the body corporate—upon the poor, the needy, and the innocent. With regard to the deaths, I would just call attention to the fact that our dear old friend, Mr. Radley, for many years a member of the Council, and always very genial and earnest, has passed away, and that Mr. Slipper, who was for a time a member of the Council, and was well known to many of us in London in early days, has passed away, with a number of other well known men, William Smeeton, of Leeds, for instance, I remember very well in my early days, and lastly a venerable pharmacist of the olden type, Charles Croyden, of Wigmore Street. Ever since I have been in London he was an old man. I met him three months before his death, and was surprised to find how active he was, and how interested he was in the professional aspect, as he always persisted in calling it, of the chemist and druggist's occupation. Well, of course time will tell on us as it does on other bodies, but I think that if a pharmaceutical chemist who has been in harness is able to do his work with satisfaction to himself, and all around him, until the age of 85, we may very well think that he has fought a good battle and may very honourably retire from this world. In conclusion, before I move this formal resolution, let me say just a word with regard to the great difficulty and the misconception that exists with regard to the consolidation of the Society. We are told that we are anxious to keep the trade outside the Pharmaceutical Society. Now I must ask you to remember that the Society and the Council have been a most unselfish body ever since the days of Jacob Bell. In 1858 Bell tried to get a proper Pharmacy Act, and you all know what I mean by that, not a Poisons Act, but a properly defined Pharmacy Act. You all know that he went to Parliament with that object, and spent large sums of money in getting there; that he succeeded in getting an Act that was of great use to us. But it was not a compulsory Act, it was an educational Act, and it simply restricted the title of pharmaceutical chemist to certain persons. Now there are many in this room who have forgotten, and there are a still larger number of young men outside, and those young men are coming, I am happy to tell you, into the Society, and mean to affect its policy in the future, who do not know that in 1853, when the bye-laws were passed, every person engaged in the business of chemist and druggist was invited to come into the Society and become a member of the Society, and many would not do it. In 1868 every person was invited in the same way, and still many have not done it. They say, Well, there must be something radically wrong. Well, gentlemen, there is something radically wrong in this. Everyone who comes into a society or a club, or any other body, has to pay a subscription, and if every member of the trade wants a definite amount of pounds, shillings and pence put to his credit, as they do at some stores, before he gives us a sixpence, I am afraid he cannot come in. We are here as a corporate body to advance the interests of the whole of the body politic. In a sense we cannot advance the interests of our own body politic without the man who is outside getting some advantage, in fact, I was going to say, very nearly all the advantages; that has been the unselfish policy of the Pharmaceutical Society from the commencement, that it could not get a single advantage for any one of its members which did not give a like advantage to the persons outside engaged in the same calling, and I think it is due to the memory of our founders that the statements made during the last three or four months should not go uncontradicted. I say this Society has dealt generously by the trade from its foundation; I say that it proposes to deal generously by the trade now; but the trade must take the trouble to understand our constitution, and must not expect us to say we will guarantee a man an increase of £100 a year in his profits if he will come into the Society. We must ask you to trust us, your Executive, to do the best we can for you; to come in, and to form a really grand band of educated men, and then we can do some good. But if you wait outside and raise the question, *cui bono*, what will it do for me?—all the talk in the world will never affect anything. I beg to apologize for having detained you so long, and I will now ask Mr. Atkins to formally second the resolution. I believe he desires to say something later on, but I ask him to do this in the absence of my friend, Mr. Bottle, the Vice-President, whose absence I am sure you will all regret. It is due to the fact that he has lost his father, who died yesterday afternoon at the modest age of 96, and, therefore, our Vice-President is unable to be present to-day. It is pleasing to know that our friend Mr. Bottle this year himself completes his fiftieth year of business as a pharmacist.

Mr. ATKINS: I am sure we shall all deeply regret the absence of the father of the house, our friend Mr. Bottle, the Vice-President, and all the more from the cause of his absence. It is true his father had reached a mature age, more than a mature age, a wonderful age, but we deeply regret Mr. Bottle's absence from this meeting, as for years we have been accustomed to see his portly form, and have always listened attentively to those terse, thoughtful and well-considered utterances of his. In his absence the President has suggested that I should just formally second this motion, and as he has intimated that I may like to say a word further on, I will say that if it be the pleasure of the meeting, and there is time, I should like to make a departure from my practice of the last ten years or more, and to-day say a word or two. We are always reaching a crisis, of course, in our life, but I think we have now reached a juncture, and it is well, possibly, that one or more of the Council should say a word or two. We have always felt it better to leave the declaration of our policy in the hands of our President—we are his satellites—and to leave him to explain what we think, but to-day, gentlemen, I shall hope to have an opportunity further on of saying a word. I now formally, but most heartily, second the motion.

Mr. Long: As Mr. Atkins has said, we have just reached a crisis, this being the beginning of our jubilee year. We meet in this house, the original home of pharmacy, which was selected by our forbears in the profession, and which has never been changed. Our President is now seated on the very spot where the laboratory was first established, and it is a matter of very great congratulation to think how stable and how secure the Society is after such a period of existence. It has made wonderful progress, as everybody admits. There were two other Societies, one based in opposition to us, the United Society of Chemists and Druggists, and the Trade Association, which was formed to help this Society; but they have both passed away from the want of trade interest among the chemists themselves. Now, being a disciple of Paul, I have been reading his epistle to the pharmacians. This year we have a little excitement, a little strife. It fluctuates; some years it is very quiet; there is nothing to talk about; but this year we have a little excitement, which is good—stagnation means putrefaction. I am quite loyal to the President and to the Council, for they are jolly good fellows, and so say most of us, but I have always contended that the third clause in the charter has been neglected. The Society has done good work for its members; it has done them good; without the Society we could not have had this educated body of men now before us, but we have been too much engrossed in science. We have been like a ship without a good lookout. We ought to have had a man on the forecastle to see where the enemy was, and directly there was anything inimical to the trade as well as to the profession we ought to have said, we will not have it—that is it. I hope, gentlemen, that will be the case in the future, but Mr. Carteighe says we can't. Now I do not believe in the word "can't," I think it is cant, with all due respect. Look at Monday last in Parliament; did not Dr. Tanner—did not he propose that the duty should not be charged on spirit used in medicine? Is not that our interest? I say it is. I say the Chancellor of the Exchequer, in a most foolish speech, called it a tippling Bill. I say that the poor chemist is kicked on every side, and he is so modest that he never retaliates. I say, gentlemen, if you only band yourselves together you can have what you like. Do you tell me that 30,000 chemists—

The President: 14,000.

Mr. Long: Well, 15,000 chemists then—cannot get what they want? It is all nonsense. It is not the fault of this Council. It is the fault of the Society in the past, that is what it is. Now, gentlemen, I know what are trade interests; in the first place, as Mr. Carteighe and everybody says, it is education. When you fit the man to really prove to the public that he is the right man to do the work you may depend upon it they will be very dubious, even with all their desire for getting things cheap, about buying from anybody else. Science is progressive, and a great many want an increase in the Preliminary examination. I think so too. I think the candidates want to be better prepared. It is no earthly use inveigling youths into this business with an idea that there is nothing to do, that they have only to pay the premium, and that then they will be launched and floated out into the ocean of success. What Mr. Deane used to say was this, if youths cannot pay a premium sufficient to pay their expenses, and if they have not got the brains for it, it is cruelty to induce them to come into it. The Society wants to get the curriculum. That is what it wants to do for trade interests. It is no use going forward into trade details, but one of the great difficulties the Society has to contend with is this. Let everybody conduct his own business on his own principles. I do not want to interfere with them, but when so many chemists are going over to the enemy and cutting, what can the Society do for us? The fact of it is, as long as chemists kept their prices up, the public thought it was right; but when some chemists begin to cut prices themselves then they think the others are pirates, and they are charging for nothing. Some of these gentlemen put down that they do not charge for the water. I tell them that I do not, but I charge them for the brains. Now there is another thing in our trade interest that we ought to try, and that is to shorten the hours of business. If you were to go round as I do to my constituents—

The President: Mr. Long is a divisional secretary, gentlemen.

Mr. Long: I go round to them and say, are you coming to the meeting to-night, and they say I cannot get out, and they cannot. They have no assistant, and they have got the slavish idea that they are compelled to stop there from 1 o'clock on the 1st of January to midnight on the 31st of December. They ought to have a little more spirit. Here is one great mistake—our noble President and the Council, and Mr. Bremridge, and a great contingent of the Society, ought to have gone to the demonstration on the Eight Hours Bill in Hyde Park.

Mr. Spink: Mr. President, I should like to say a few words after the very remarkable address we have been indulged with by yourself. You stated at the onset that you would favour us with a brief address. I will endeavour to be equally brief, or very much more brief. You shadowed forth in your cynical way something about the Poison Bill half a dozen times. I am inclined to think there are no bones to be broken by hard words, and the correspondence in the various papers pertaining to the profession has hardly thrown much light upon it, because one section appeared to think very differently from the other. I have the highest possible respect for the President and the Council generally. I think they have done good work; but I think they have run on one set of lines only, whereas, they ought to have run on parallel lines, material prosperity and educational advantages. Education is all very well, and most of the gentlemen here know that I am a firm educationalist. I believe thoroughly in real education, but if we are to have education, and education only, then we must of necessity fall to the ground, because, as is shown by the report to-day, the numbers of the Society are gradually diminishing. What does this show? It shows that the Society, by some means or other, rightly or wrongly, has not had the confidence in the Council that it should have had, the Council being the figurehead, the representative body for the profession. Many say that the Council has not during the past year made any progress. I think there is one little item of progress I can congratulate the Council upon, and that is the starting of the meetings of divisional secretaries here from time to time. We have been amused by the brain sauce of our friend Mr. Long, whom we all recognize as one of those divisional secretaries in common with myself, and one or two members of the opposition camp are also local secretaries. I think we may assume that the Council, in its wisdom in advancing and calling together various members of the business, and calling them divisional secretaries, has really meant it as a sort of preliminary examination to Council honours by and by. That appears to me, sir, to a very great extent likely to be the result, whatever the intention may have been. So far as I am concerned, I do not desire to be taunted as to my ignorance, because I happen to be a chemist and druggist only, because I was in business in 1868, and qualified to carry on business on that account. I consider I am just as good a man as one who, being some years younger, has been able to come in after the usual examination and pass his degree. If I had been only born some twenty years later, in all probability I might have done that also, but that is not so now. With regard to the Poisons Bill I am very strong on that point. We know the amended Pharmacy Bill that was submitted some little time ago. Among other things that Bill said that instead of eight chemists and druggists being eligible for the Council there should be ten. What an absurdity to put that in the Bill, because we have not had a chemist and druggist on the Council for very many years. There seemed on every occasion to have been a stand made against advancing any one but a pharmaceutical chemist to that honour.

The **President** : I think that is ungenerous, Mr. Spink, and as you are not ungenerous I should be sorry for you to make it appear that you were. As a matter of fact, there is one chemist and druggist on the Council now, and Cornelius Hanbury, a chemist and druggist, was a member for years, and so also was Mr. Owen for many years. But practically you have really no case, because the number of chemists and druggists nominated has been extremely small, and in proportion to the number there has been an average of elections.

Mr. **Spink** : I accept your correction. My idea, as you know, is that it seems to be a question in our trade whether we shall be educated to death, or whether we shall be starved to death. That appears to me to be the exact position. Enemies are rising up on all hands, and as far as I can see the only safety valve is a Poisons Bill with extended schedules. There are poisons sold by grocers and oil shops in every poor neighbourhood, and as I have the honour of living in a poor neighbourhood they touch me up, equally with the stores, and the medical men with open surgeries are all on the same tack. The stores we all have a certain amount of affection for, and I always had, so that between the whole of them we stand as a business or industry between the Devil and the deep blue sea. We cannot go this way, and we cannot go that. My contention is that something must be done, and I do not care whether it is by a new Council or the old Council, to save the Society. You read the obituary notice of two or three of our eminent brethren who have passed away, but my contention is that unless something be done, and at no distant period, you will have to read the obituary notice of the Pharmaceutical Society. The report shows that in every direction it is diminishing year by year. Then I say let us all be thoroughly united. Without unity we can do nothing, by unity we can do everything. Let us frame something to make every man who shall be qualified to carry on business either as a pharmaceutical chemist or chemist and druggist a member of the Society. Let him subscribe his half guinea a year for that membership, and with 16,000 or 17,000 members that would be a very good income. Then petition the Government to increase the patent medicine licence, if you like, to make it 10*s.* 6*d.*; let each man pay his guinea to the Society, and let the Society be responsible to the Government for the whole of the patent medicine licences throughout the country, and let the Inland Revenue authorities issue no licences but those that come from the Pharmaceutical Society; that is how it might be done with very little difficulty. I notice the merriment of my brethren in the trade; no doubt they appreciate the joke as they think it, but it is not. That is what I would go for, a Poisons Bill with a largely extended schedule. Our President would make a very good figure head, and, as I stated at one of our divisional secretaries meetings, an admirable member of Parliament. I do not know any man more able, I am sure, who would be more fitting to occupy so responsible a position as a member, and watch in the House of Commons the interests of the trade in which he has taken so much interest for many years. I say it would be perfectly simple and easy for a man like yourself in that House to button-hole the various members who would ask you for a vote on this, that, or the other, and say "Yes, on condition." I am only laying down my views; if you do not believe in them, there is an end of it, but I have a right to state my policy. We have been accused of having no policy. If you think mine is a bad policy—still, I have one, and I have the courage of it. Under conditions you would support this, that, or the other, and you would sink your political individuality.

Mr. **Giles**: I do not think we want politics, and I think this is immorality.

Mr. **Spink** : I am very glad that our friend in front is so moral as to give me credit for immorality.

The **President**: I hope, gentlemen, you will listen to Mr. Spink, who is quite in order. I happen to know that there is a good deal of excellent common sense in his views, and some advantage in them, but I want him to put them in his own way. I may differ from him as to the way of carrying out his views, but I hope you will allow him to express them, because I admire him for his frankness.

Mr. **Spink**: I will be as brief as possible. I say you would approach members in that way and button-hole them. It is a very serious question to us, and it will be ultimately a question for Parliamentary legislation. You simply want, for the protection of the trade, a Poisons Bill with an extended schedule that shall render it a crime for any man not qualified to sell or vend drugs, or to sell medicines either by prescription or under a stamp, or any other label, anything that shall contain any portion of the poisons that may be scheduled. Then I take it that before very long we shall have a general election. This lot cannot stay much longer.

The **President**: You must withdraw that, Mr. Spink. Say there will be a general election before long.

Mr. **Spink**: Then I think, sir, that we have our members in every town, in every constituency throughout the kingdom, and I think it would not be attended with serious difficulty to appoint one or two members of the Society who take great interest in it, and who may have time on their hands, to go down to the various constituencies and draw the chemists and druggists together and say we will approach the members who are soliciting the honour of a seat for that parliamentary borough or section of a county, and put this question to them, Would you be willing to support a Bill in such and such a direction? If they say, Yes; then we will go for you; if they say, No, then we will go for the other fellow, and he will be sure to support us. You see, sir, in a short time we should get a considerable number of members who would support such a measure. I would not approach you for one moment to ask you as men of business in going for this Bill to say, Will you support this for the benefit of your particular trade or industry, for the good of the chemists and druggists; I should not be such a fool as that; but they will do this for the public protection as well, that the public shall know they can rely on the people who vend these deadly poisons. We see from time to time notices in the press and articles commenting on this very thing, and my opinion is that the people are getting ready for legislation of this kind, and without saying that the Council has lapsed in its duty, at least I may say without fear of contradiction that it has paid a vast amount of attention to the increase of pharmaceutical education, which not only deserves the thanks of the trade, but of the whole community, and as a return for such education, I think we have a right to demand material prosperity and some sort of remuneration for such education.

Mr. **Barnard**: One would gather from the last speaker that members of the Pharmaceutical Society and chemists and druggists were about the only people that Parliament had to consider. Why, we had a coroner's inquest ten days ago in London, with regard to the sale of carbolic acid. It has been suggested that that acid should be added to the schedule of poisons, and there is no doubt there are more suicides with that than with any other poison; but whether you observed it or not, I read the fact, that the jury appended a rider to their verdict, not that carbolic acid should be added to the scheduled poisons now sold by chemists and druggists, but that all poisons sold by oilmen and others should come under regulations and conditions in the same manner and form as those sold by chemists. That is to say, this particular jury have already advocated to the House of Commons that a new regulation should be created for poisons sold by oilmen. Here we have a suggestion which would confer a benefit upon the community and not create a monopoly to 14,000 men out of the people of Great Britain. But is it not more likely that Parliament will acquiesce in such a measure as that rather than add to the schedule of poisons for the benefit of private and individual chemists? I was very glad, Mr. President, to hear you refer to the great generosity of the founders of this Society, and my opinion is simply this, that the present members of this Society will have again to defend us before we get any Act conferring great benefits on chemists and druggists. It has not been observed, but it is a fact, that in the new Draft Bill sent by this Society, which would have secured the right of dispensing all prescriptions and compounds by chemists and druggists, no existing interests whatever were considered. Now we have an examining body known as the Apothecaries Company; they examine and grant certificates, and those certificates of the Apothecaries Company have been recognized by the Local Government Board as a qualification for dispensing and compounding medicines. But not one word was said with regard to these strong interests in your Bill. It must be admitted, however much you may refer to the legality of the question with regard to unqualified assistants selling poisons, although that has been permitted by the Society for twenty-two years, it has never been questioned that these same men who have now been declared in a court of law to act illegally, were selling poisons for the registered proprietor of a chemist's shop—it has never been suggested that they were acting illegally when compounding prescriptions if they did not contain a scheduled poison, and yet you would go to Parliament and ask Parliament to grant us something which we really have no claim to unless we are as generous as our forefathers were. This is the only opportunity we have got of expressing our approval or disapproval of the action of the Council for the past year, and throwing out suggestions for their guidance during the next year. I do hope, as I gathered from you, that the new powers which have been granted to this Society will be used with kindness and caution, for the simple reason that I see great rocks ahead for the trade. I know there are many now acting as unqualified assistants, who have wives and families depending upon them, and they must live. We may rest assured that if we take away from these men the means of obtaining a livelihood as our assistants they will set up in business themselves: they will have drug stores, and we shall have established in London and in the country drug-traders and compounders of non-poisonous prescriptions. I simply throw out the suggestion that you must be careful. I for one have always held that we must be generous all round before we can ever expect Parliament to grant us any consideration, and we must consider all existing interests, however slight they may be.

Mr. **Percy Wells**: I regret very much that the Pharmaceutical Society, in the person of its President—I am not attacking Mr. Carteighe or the President, because he is simply the slave of a tradition, and it is a custom which has been practised here, which I submit would be more honoured in the breach than the observance—I allude to the fact of the President, whoever he may be, making a lengthy speech in introducing the report. Now the report ought to be exhaustive in itself, and practically to demand no explanation, and I submit also that in all public bodies and companies the president or chairman, whoever he may be, waits until everybody has spoken.

The **President**: Excuse me interrupting, but that is not correct.

Mr. **Percy Wells**: All I can say is that the three-quarters of an hour in which you favoured us with your remarks have naturally curtailed those that I and others might have made, and perhaps your action has conferred a benefit upon my hearers. I am pleased at least to find that you called this extensive establishment, on which you have just spent £13,427 and some odd shillings, a shop. I must confess it is a very expensive establishment, and I submit also that with a decreasing revenue and a decreasing number of members, if you think by this expenditure that you are going to woo them back by continuing the same policy you have hitherto pursued, you are making a very great mistake. I find that, not taking into consideration the deaths, and adding also the new members who have joined the Society every year, that is, those who have passed their examination, there is a steadily decreasing annual income of the members and associates. Now there must be some cause for that, and I regret to find that the annual report is perfectly silent on that very important subject. Why is it silent? Why, because they would be bound to give a reason for it. Have they got a reason? can they assign a reason? From all the conversations I have had with various members who have seceded from the Society, by not paying their subscriptions, I find this: they all shrug their shoulders and say they have no faith in the Square; they will not have anything to do with it. You say that it is wrong; I say also it is wrong too, because if they had remained and exerted the powers and influence they would have possessed as members of the Society, perhaps you would not have occupied the position you now do. You will please to understand that in speaking of you I am speaking of what is called the figurehead, and from your position you lay yourself open to attack as the representative of the Society, because you are surrounded, as one speaker said, by satellites, and if a man has satellites you know he must occupy a very exalted or superior position. Now what have we to thank the Society for in the last year? Some people may say, "Well, we must thank God for small mercies." I say they are so small that they are practically infinitesimal. The only thing I can find the Society has done, at the very last moment, which you, I presume by slip of memory did not care to mention or take credit for, was that delightful methylated spirit affair; that is giving chemists the privilege of selling less than a quart of methylated spirits. If that is the only outcome of the action of the Council for the year ending March, or whatever it is, 1890, all that I can say is that the mountain that has been in labour so very long has finally produced a very hypothetical and infinitesimal mouse. Now, sir, allow me to say that I join my friend Mr. Spink in the remark that if you would only condescend or deseend, whichever you may like,—I take it from your remarks it would be really a descent—to go into the House of Commons and advocate the cause of the chemists there, and adopt something like the policy which has been showed forth by my friend on the left, from your well known ability and from your energy, your presence there would be productive of a great amount of good; so that you see while I condemn your policy as President, and the satellites who surround you, I am bound to give you credit for that which you deserve. You alluded to the talking capacity of the House of Commons, and there I maintain, sir, you will pre-eminently shine. I must also express my great regret at one remark which fell from you because it reflects anything but credit upon the Council—I will not in future call them your satellites but your colleagues. It appears that there is an amount of inanition, or atrophy you may call it, and perhaps we understand that term better, I will not say of the Council, but it appears from your own statement that you personally are sent to do the work—sent to the lobby; at all events they let you do it. I can understand a man of your energy dominating those who have not got the same amount of energy and will as yourself, but I maintain that is wrong. I am willing to shut up directly.

The President: With all due deference to you, Mr. Wells, I think you are wandering a little wide of the mark. You belong to vestries and other public boards, and I understand you are going to one now. When they send a Bill to the House they do not send the whole body of the vestry into the lobby to deal with it. They are men of business; they send one man.

Mr. Percy Wells: If you will allow me to correct you, they do send delegates. I am going as a delegate to-day to consider a very important matter connected with the quinquennial valuation.

The President: You are not going to the House of Commons.

Mr. Percy Wells: The meeting allows you to say things, but when I endeavour to respond I am met with cries of "time," though I have only been a very few minutes on my feet. I maintain that if you were conjoined with several other members of the Council, each one of whom I presume has, or ought to have, his circle of influence, that a great number of members going there must necessarily have more influence than the President himself. Whatever may be the result of the present agitation—in which I personally have taken no part whatever, I have been simply quiescent during the whole affair—whatever may be the result, I sincerely trust, if it is the retention of the Council's friends on the Council, or if they be replaced by others, that it may be productive of future good for the chemists of Great Britain. It is my opinion, whatever it may be worth, some may say it is absolutely worthless, and others may, perhaps, think it may have some little weight, but all I can tell you is this, that if you persevere in your policy of good intentions you will inevitably be landed—I will not say in the usual place which is recorded for good intentions—but you will be landed with no Society to conduct, for the simple reason that you will not have sufficient members to carry it on. I am sorry to be obliged to go.

The President: I think it is very cruel of you, Mr. Wells, to go before I reply.

Mr. Percy Wells: All I can say is, I have an engagement, and that is a debt I must pay.

Mr. Fitch: Mr. President and brother members, I am not going to find fault with anyone. There is a deal too much of that, but I was about to make a suggestion which I think has been overlooked. We do not want any fresh Poison Bill, we can get more out of the one we have. In the decision we had the other day of the Pharmaceutical Society *v.* Wheeldon, the judge ruled, and very properly, that no man could delegate his own title, or employ an unqualified assistant to sell poison. It also follows that if an unqualified person may not sell anything that is in the schedule of poisons, it is illegal for any grocer or oilman, or others, to sell a stamped medicinal article in the schedule of poisons; there is no exemption for that in the Act. If you read the 16th Section, you will find that it is patent medicines that are exempt, and not stamped medicinal preparations. I believe in the present century very few patents indeed have been taken out for these stamped medicinal preparations. I believe that the various chlorodynes, most of them, have no patent whatever connected with them, and they are selling their prussic acid, Indian hemp, and morphia, and so on. I contend that it is our duty to open the eyes of the Government to this, and let them see that the Pharmacy Act is being interfered with, and for the safety of the public some member should call the attention of the House to it, and compel the Society to take action. The proof of this is very plain. I obtained last year a licence for patent medicines, as it is termed, but it is not. It is a licence to utter, vend, and expose for sale, and so on any medicinal preparation, or composition chargeable with stamp duty. It does not say one word about patent medicines. I believe Bateman's drops and James's powder have patents, but they have no sale now-a-days. If you really say, as a body, we must stop this, you can do it. The only thing we want is that no one may dispense prescriptions of any kind without passing an examination in these halls. Another thing I wish to direct your attention to is the frequent sale of carbolic acid. It is appalling that our Government should be so blind and neglectful that they will not put it in the schedule. Immediately opposite my shop a little child last Friday drank carbolic acid out of a saucer and died on the Saturday, a child two and a half years old. That was followed on Sunday morning by the death of a policeman on Hackney Common, with a bottle of carbolic acid beside him, and I have been annoyed by the goody goodies coming into my shop, and saying, "I am sorry to hear, Mr. Fitch, you have had an accident." These things are sold by oilmen or anybody, and we get the discredit. It is a fearful state of things, and not only can they buy this poison, and have it put into any vessel they like, without any label, but our vestries give it away to anybody who asks for it. At Hackney Town Hall they give it away, and at Bethnal Green too It is something shocking that so deadly an agent, that admits of no treatment, can be sown broadcast over the land. I should like to see a law that it should only be placed in certain bottles. If a person brings to me a half quartern bottle of a publican and demands carbolic acid in it I am obliged to put it in or I am abused and told I am too particular, and that not in the politest language, and if I do it and it is misused, the coroner abuses me. With regard to poisons being scheduled for oilmen, I do not object to it. They sell muriatic acid now, they sell carbolic acid now, and they will do no more then; but let us have a law that they shall have to put the label on just as much as we. With regard to the work of the Council and our President, there is one thing we have to thank him for, and I for one thank him very much, that we have got rid of that noxious clause in the budget Bill about methylated spirit. It does not pay me to sell it, but it pays me to oblige my customers, and in that light I require to sell it. If that clause had been carried and not less than a quart could have been sold I should have discontinued my licence, for people do not want a quart. But there was one thing I do not think you did quite look into. There is a part of the budget before the House that enacts that in order to buy up public houses drink is to be taxed to form a fund to buy them up, and the argument of the Chancellor of the Exchequer and his satellites is this, that it is right to tax drink and to make the drinkers pay for buying up the surplus public houses, and the remaining public houses will get the benefit of it. But I fail to see how Robert Owen Fitch will get the benefit, because he is taxed 10*d.* on spirit of 60 per cent., and I say the attention of the Government ought to be drawn to that matter, and that that extra duty ought to be withdrawn. We have nothing whatever to do with it, and I hope it is not too late now to call attention to the measure. I do not believe for one moment it entered into the Chancellor's head that every other sale we make there is some spirit in it, and that really we are called upon to pay this tax which we have no right to pay. With regard to the poisons, again, I was in the Edgeware Road the other day, and a blacksmith bought some spirits of salts. He took it away in a half-quartern bottle and put it on his mantel-piece in his parlour or drawing-room, or whatever it was, and when he had done his work he went to reach his little whisky-bottle to have a drink, and being both of a somewhat pale colour he drank the spirits of salts and died. Now it is a very wrong thing to allow that article to be put into such a bottle; it ought not to be permitted. There was the Lee tragedy again. Observe how different the case is. That is not a case of suicide, or accidental death, but by wilful violence, and what did the young man say in his diary? "I bought a pistol, the man behind the counter did not notice my agitation, and supplied me with the necessary cartridges; found them fit admirably." Had we done such a thing, given poison to anyone who was in a state of agitation, what an outcry there would have been upon us in such a case as that. It has taken twenty-two years to find out that a man who is unqualified cannot sell scheduled poisons, and I do not want twenty-two years hence for this Society to find out and have to act on their own authority to avoid a mandamus and to keep up their dignity, we must prosecute that assistant because he has no qualification and sold Freeman's chlorodyne, which contained a scheduled poison. I think you ought rather to begin with the outsiders, and not wait and reserve all the terrors of the law confirmed by this Act in the interest of the public, for the men who are trying to protect the public in every shape and way.

Mr. GUYER: I will not detain the meeting very long, as there are many others who no doubt wish to speak. I would first say that if you were not the President of the Pharmaceutical Society, I think you would make a first-rate barrister, and I should like you to be my special pleader in any important law case I might have. You, Mr. President, and all gentlemen here, must be almost all weary and tired of hearing about the Poison Act, but you, Mr. President, said we wished for the Poison Act, and we have it; but I was always antagonistic and in opposition to that Poison Bill. I felt that it was hampering the trade without giving any benefit to the public, in the true sense of the word. What security, what protection from danger, has the public derived from that Poison Bill? True, things are slightly altered now, but why not put a penalty on the buyer, as well as on the seller? Anyone can go into one of your large establishments in Bond Street or Oxford Street, and can buy chlorodyne or hydrate of chloral, and dose themselves and their wives and families and friends. There is no penalty for that, and they can go and recommend it to their friends and give it to their household servants; yet a poor unfortunate man in the present day is absolutely prohibited, with all his intelligence, though trained up in the business and in the last year, perhaps, of his apprenticeship, from dispensing or selling a poison. The draft of that Bill was before us as a Poisons Bill; it was put in all our hands: we had time to scrutinize it and we got that Bill passed, and now we see the result. As the President said, you wanted a Poison Bill and you got it. What is the result? It is not the action of the Council, it is not the action of the Society in any form, but there is the decision of the judge, and you cannot alter that decision, that no unqualified man, even a young man who is able to pass the Minor and Major examination, but cannot do it because he is not twenty-one, although he is competent to do so, can dispense a prescription with a poison in it, and an ignorant nurse can go and use that poison in every nursery in the length and breadth of England. It is a perfect anomaly. What is the remedy? That is for you to consider. I do not see the remedy. There is the law laid down and you have to accept it. You cannot go on year by year amending an Act; the Legislature would not hear of it. You cannot pass bye-laws without the sanction of the Privy Council, and without an Act of Parliament. We have to find a remedy, and that remedy (there is no hurry about it), I think, the Council will have to find in a new Bill. We do not want too much legislation, we do not want too much Government about our business. Why should we as chemists and druggists—I am not speaking of the very high class of chemists—but why should we as a trading community always be agitating for Government to interfere? Other businesses do not do it. We have not a monopoly, and never shall have a monopoly, and therefore we must try to do our best individually and personally to meet the opposition and competition of the times. Some people talk about prices, and several times they have come to me to know my price and say, "Oh, you are very dear; you are the dearest chemist in the town." I say "Yes, I am proud to be; and I never mean to be the cheap and nasty chemist in Torquay." Now just one other little thing. In your report you talk about education, and I should very much like there to be, not a legal examination, but an honorary examination of our assistants, so that they might have a certificate of competency to act as assistants under the jurisdiction of their masters, which would in some way be a satisfaction to the general public and to medical men that they come in contact with. That examination might take place here by the central Board of Examiners, or it might be in centres throughout the kingdom, so that a young man from twenty to twenty-one, when he is debarred from entering into business, might show at any time he is called upon that he has a certificate of competency. One last thing, as I do not want to detain the meeting. There is one paragraph in the report which no one has commented upon, which I think the Council might give more attention to in the future, and that is the statement that it is intended to prepare an addendum to the Pharmacopœia of 1885, and giving the names of gentlemen who have been appointed a committee to co-operate in that measure. A better selection could not have been made if it had been made by the general body of pharmacists outside; they could not have formed a better committee to act in that matter. Is not the Pharmacopœia supposed to be the text-book of the medical profession—to be their guide and our guide? The British Pharmacopœia wants a good deal of revision. There are some things which are most mechanical, some things which ought never to have been in it, and some which now want to be added; but what I feel is that the Council might by moral suasion and coming in contact with medical men, ask them o adhere to the Pharmacopœia. Why should we be hampered so much as we are by a lot of combinations and preparations outside the Pharmacopœia? I do not mean for one instant to refer to certain preparaions, such as one which is now in the Pharmacopœia, owing to the work of a man whom we all honour and espect, Mr. Schacht, who gave years of labour to the development of liquor bismuthi. The Pharmaceutical Committee grabbed that without any acknowledgment of the man who worked for years at t. I do not mean those preparations which chemists in their own laboratories cannot make on a small scale; but I do distinctly object to a medical man ordering a number of compounds which ought to be in the Pharmacopœia, and if they are not, why cannot they write it out in its proper proportions hemselves. I could name, for example, Fellowes's syrup; there are a score of such compounds. Why could not they as well write out their own medical prescription instead of all this quackery. I wish to speak highly of medical men, for the medical staff in Torquay are of the highest class, and better terms between medical men and business men there could not be in any town; but I was speaking of them as a body, especially some of the young men, who know very little. They are advocates of these private and semi-quack medicines, which we as a body cry out against. I have done, Mr. President. You have been President in the past, you are President now, and I hope you will be President in the future. To you and to Dr. Paul, the editor, and to members of the Council and the examiners I feel that we as pharmaceutical chemists owe a debt of gratitude, and I hope you will work in the future as well and as successfully, if not more so than you have in the past.

Mr. **HYSLOP**: I rise to invite your attention to a few considerations on this report, on the motion that it be received and adopted, to the effect that the Council and our worthy President especially deserve our most sincere thanks for the way in which they have attended to the interests of pharmacy, and the interests of the trade generally, during the past year. I think, whether we regard the careful and earnest attention which has been given to legal matters, whether in these large decisions in the Law Courts, or in smaller cases, or whether we think of the Society and the care bestowed upon the disbursement of the resources of the Benevolent Fund, or the splendid results which have arisen from the Research Laboratory, or whether we look to the conduct of the evening meetings, which for the first time in my life I have had the advantage of following up personally with great advantage indeed, or in the maintenance of the library and our splendid museums in their present condition, I do say that taking a general survey of the matter all round, the Council and the President deserve our most sincere thanks and congratulations on the success of their labours. A friend of mine says, "I do not believe in can't," and he would seem, although I think he does not, to back up those who say the Council ought to have done so and so, and so and so, and that we want a Council who will do so and so, and so and so. But when one says to them, "Do you say so and so, and so and so could have been done?" they say, "We do not believe in can't." Now, gentlemen, I do not believe in "can't" any more than I do in cant, but I know this, and you all know, that the wise man is very much distinguished from the foolish man in the knowledge of what he can do and knowledge of what he cannot do, and that "can't" is not after all a case of belief, but a case of going to work and doing it. Then, again, I am glad to see that the divisional secretaries are mentioned in this report. I have kept my seat longer than I should have done, because I have had the pleasure of listening to one or two divisional secretaries, and I wanted to hear some of the members speak from the country districts, but if the Council have, as I know they have, because they say so, received some assistance from the divisional secretaries collectively in these conferences which they have done us the honour of calling together, I am sure that I, speaking for one, and I know many others have mentioned the same fact to me, have certainly received very great advantages from them, and I should be very sorry to know that the advantages we received are not, to some extent, at least, reciprocated. The fact is, that since I had the honour of being appointed a divisional secretary, a little more than twelve months ago, my general sphere of pharmaceutical vision has been immensely expanded. I have not seen yet anything of those rose-tinted spectacles that I hear the gentlemen keep upstairs in the Council room, and put on when they go to the Council. They tell me so, but I have seen nothing of that sort of thing. But I tell you I have made a discovery, and it is one on which that rumour, false as it is, may proceed. Bye the bye, if my visual ray has to be toned down at all, I would certainly rather have it toned down by rose-coloured spectacles than by murky-black ones, or blue ones such as this (holding up a circular). I was going to say I had made a discovery, and it is this, that every time I have been to these conferences, and I did not miss one, nor do I mean to, I have had put into my possession something like this—a sort of binocular field glass, of very approved construction it seemed to be, for one could sweep the field of action right out to the outer skirts better than he could before and see right round the whole campaign. I think that that is the appliance which the Council has upstairs, and that it is that which has given rise to the fiction which I referred to. For it is a fact, whenever gentlemen do go fresh into the Council and are going to do as one gentleman says here in another circular I have in my pocket, "Only put me on the Council, and see what I will do for you." Yes; you would find even that gentleman change his mind when once he got there. It is because of these improved optics, you may depend upon it. If it is not given to the private soldiers to see what is going on over all the field; at any rate we ought to know the colours we are fighting under and take care that it is pharmacy! pharmacy! pharmacy! not trade! trade! trade! They are incompatibles; they will never mix. An explosion will result by and by if you try to mix them. A little experience at this establishment will tend I am certain as it tended in my case. After being engaged for nearly forty years in the science and art of pharmacy and the multifarious business of a chemist and druggist, I have knocked together a variety of experience which I want to use now for a few years for the benefit of others; I believe it will act in every case as it has acted in mine. If gentlemen will but come here and see what is going on, and take part in these deliberations when they have the opportunity afforded them, I think there will not be so much grumbling, and there will not be so many firebrands thrown into our midst, as some seem inclined to do at the present time. I should like, if time permitted, to criticize all these documents which have come to me by post during the last three weeks, and I could tear them up and show the absurdity of the lot. I can say with respect to that blue manifesto that is thought so much of in certain quarters, the whole burden of it seems to be, "Oh, dear! dear! things are coming to such a desperate plight, it has become a desperate struggle for existence." He has just found that out, and the chemist must be kept from that, although it affects everybody else. Why should he be kept from it? The desperate struggle for existence has been undergone by the Pharmaceutical Society ever since its establishment, and, like every sound constitution, and every sound individual, it has been immensely the gainer in consequence; and those who would shirk and minimise this struggle for existence—this desperate struggle, however desperate you like to make it— forget that it is better for them and for all of us. No, we, I hope, will go on pegging away at our own proper calling and our own proper business. We do not belong

> "To that vile crew
> That see no beauty in the sun,
> Whose praise is but for what is new,
> Or over, or not yet begun."

We belong to a chartered institution that was originally drawn on the good old lines of British permanence and stability. You cannot overturn us if you try. It would take twice as long as the Pharmaceutical Society has been in existence to do it. We have the advantage of having been founded by self-denying men, as has been lately referred to, and this institution there is no question will continue to attract men, men that are worthy the name. You see in the dictionary that man means a thinking animal, a being that thinks. Now do think about it, gentlemen. Press upon these poor wretches that are bound down and trammelled behind their counters from morning to night, and can never turn from their books and customers for fear of losing the few pence, who are always crying out that somebody or something else does not look after them enough, and that another body is trying to crush them, and so on. Do remember that man is a thinking being. This institution will continue to attract men who are worthy the name, who are animated by the same spirit that its founders were—self-denying men, benevolent men—not those who can scarce afford or will not give 5*s*. a year to support their poorer brethren. It will continue to attract those men to the last, and whilst the Councils of this institution can muster one or two of those—and every one is worth a hundred of the others, British pharmacy is safe, and if chemists and druggists choose to either envy us so much, or to cut themselves adrift, they must bear the consequences.

Mr. LOMAS: Mr. President, one member complained of your opening address and said that everything connected with the Society should appear in the report, but I differ from that, and I say that a meeting is the proper place for the interchange of opinions, and also for the President to give us an address or *résumé* of what has been done during the past year, and then we can complain or otherwise as we think necessary. But what I do think is that we ought to keep to the business as much as we possibly can. I consider in the first place that this meeting is a farce, and I will tell you why. We come here to discuss the affairs of the Society, and what have we done? I brought my voting paper in my pocket and the others have sent them in, and what I say is that we should have this discussion before we send in our voting papers. If I alter my opinion in any way about anyone I voted for, have I the means of going and correcting it? No, it is done. Then I say it is a farce. And what I suggest is that we should be reasonable in these matters. If you go to any meeting you have a discussion and the power of voting to put men in office, where we have no power here. We have a palaver, but can do nothing. I appeal to everyone of you can you make up your voting papers now? I say they are all delivered. Mine is in that box, but many of them are sent by post beforehand, and I am certain you have not got a hundred papers in the box when it is counted over. They have all been forwarded beforehand and I say it is a farce, and I suggest that the voting papers should be sent in to-morrow or the next day, so as to give the members time when they get home to think over what has taken place, and to endeavour to get the best men in, not to allow these trade interest men to carry their point to the detriment of the Society. There was a gentleman who suggested that we have dissension in our Society and that it is not so with medical men. I beg to differ from him. I say there is as much cutting with medical men amongst themselves as there is with us. If you doubt it there is a select committee of the House of Lords sitting now and taking evidence as to the management of the metropolitan hospitals, and what does Mr. Balfour, no mean authority, say? He says there is a low class of medical men starting bogus societies called Provident Institutions, who charge 6*d*. for visit and medicine. I say that those are the class that we want to look after in our Society, men that are doing a cutting trade, that take a shop in a dilapidated state, put an unqualified assistant in, and cut the prices. What I say is that those are the ones who are always crying out, "Do something for us; give us protection." They want you to shut up the co-operative stores that really some of them keep qualified men, whereas they do not keep qualified men, and they cut their neighbours so that he cannot live. Some seven years ago I was living in a neighbourhood with that class of people and had to do with two of them. Of course, it made me look about. I found my takings were something about £1, £1 10*s*., or £2 a week, but I stood my ground, and I saw one shut up after eighteen months, and the other one died in abject poverty, and this Society provided for the orphans of that man. I had no sympathy with the man, but you did right for the orphans. If you want to prosper you must be true to yourselves. You have more power in the present Act than you think. You have found that out after twenty years. I had no doubt about it myself. I appeal to many who have heard me say that in this room. I have said protect these examined men, or what do they come up here for? We thought you would protect them when they were examined, and not allow interlopers to come in: that is, unqualified assistants. At the last meeting when you were formulating the Bill to protect these examined men there was a gentleman got up and spoke in favour of these interlopers. He said he had three shops, and that he had unqualified assistants in two of them.

A member here rose to order.

The CHAIRMAN: I think Mr. Lomas is in order.

Mr. LOMAS: I know what I am about. I say I have spoken in this room about these unqualified assistants before; they have no right to sell poisons, and any chemist who has respect for himself, if he cannot provide a qualified man, will not have one at all, as I did and would again if necessary, and my business prospered, and people came in and they got used to me, and that is the reason I shut up those two opposition shops I told you of. Put your own houses in order and then the public will respect you, and in any future legislation you may seek you will find it much more easy when you go with clean hands, but you must not go to Parliament and say, "Protect us from these stores," and yet want to carry on your own business in an irregular way. I say it is unbusiness-like. Every unqualified assistant that you put in a separate business that you do not superintend is injuring an examined man: you are the true enemies of your own Society, and until you put your own affairs in order you can never hope to progress as a Society. Then there is another thing. Many people find fault with the President and Council of the Society at the present time, but what would your position have been had it not been for the Society? I can tell you; common sense tells me what it would have been, and medical men would have been very glad—you would have been simply general dealers and oil shops. You would have been on a par with them. Some do a great deal to put themselves on a par with them now, nd go in for cutting and make people say "Look what profits these chemists get." A man says to me 'I can get iodide of potassium for so much a drachm, and you charge so much." I say, "If you have faith in that man's drugs, go to him." It does not stop with me; it gives the whole body a bad name, because they think you make such immense profit, and f you try to persuade them that they have to pay for grains they do not believe in it. They believe in low prices. We live in radical times, and you must put up with radical treatment. You must not go to Parliament asking for this and that, and expecting the President and the Council to do this and the other. You will find that those trade men when they get a seat on the Council will not be near so good as the present ones, because they will not set to work to put their own place in order. It is unpalatable to a man who has got two or three shops, and is only looking at the main chance, and not considering the position and honour of the Society to which he belongs; but how can you expect respect if you do not respect yourselves? What I advise you to do is to respect yourselves, and your progress is certain, and nothing can undermine the position of the Society. Your case is no worse than that of the medical man. There is competition everywhere, and if you think over it calmly you will find your case is no worse than that of others.

Mr. **Urwick**: I have only one or two observations to make as to the report which has been furnished, which I consider is the best report we have had for years, and I think one particular line of it is worth much, and that is that we have now a Committee of our own body selected to consult with the Medical Committee on the Pharmacopœia. I think that is what many strove for in the first formation of the Society, and what they have always had in view, and which is now accomplished. If there was only that one paragraph in the report the Council deserves our best thanks for what it has done. But it is not only so. There is also an attempt to get a new Bill, for which they deserve our thanks. They have not been successful, and why has that been? Simply because there has not been cohesion amongst ourselves—the members of our own body. Hence the complaints, and principally through that, I believe, the Bill had to be withdrawn. That Bill would have given us a far better position than we at present occupy—at least, that is my belief, and the Council which was reproached for neglecting outsiders in the Bill, made a way for them to come in. It was liberal, and I believe our President generally is, and also the Vice-President, and several others that I know of. Then I say, what right have outsiders to complain? I do not think they have any. Have they not had the same opportunities as the pharmaceutical chemist? Was it not open to them originally when Jacob Bell founded the Society? Was it not open to them again in 1858, and has it not been open to them to go forward the same as the others and to qualify? and now they complain that the Council has not got them exempt from serving on juries. If you try to exempt them, there would be so many others seeking exemption, that the pharmaceutical chemist would not remain exempt. Do you wish to drag them out of that? if so, it is an unworthy motive. These gentlemen who are complaining have had opportunity after opportunity, but have they not been like the foolish virgins who refused to take oil in time, and now they want to beg the oil at others' hands. They seem to be more like those foolish characters than any other bodies, because they have had the same opportunities which all have had, and they have neglected to take of the oil which the Pharmaceutical Society supplied. Gentlemen, there is just one other thing I may say a word about, as it has been touched upon, and that is this. I see that our invested funds are going rather low, but I think the money invested in the reserve fund, from the result that we have in the report, has been well expended. I do hope that if there is time to pass a Bill in the present state of things that chemists will act together, and that you will build up funds for action when the time for action comes Should a Bill be introduced by the Government it is probable that our assistance will be called for, and we, by giving advice, would stand in a far better position than if we introduced a new Bill of our own. Those are my simple views. I differ from the trade interest gentlemen in one thing; I am surprised to see men who in other respects call themselves Liberals, and I might say almost Radicals, that they forget that this country is a free-trade country, and that every man must, more or less, stand upon his own energy, his own determination to get on, or sink. I am sorry for those who sink; but, still, that is the position of the country. I feel it would be an act of folly to increase our schedules of poisons. Why, the few poisons we have now are quite enough to annoy us, and I only say if you increase them, the annoyance would be still greater; and not only so, but you would so familiarize the public with the word poison that it would cease to have the meaning which it now carries with it. The reason why carbolic acid is given away so freely is because, upon the average, it saves more lives than it destroys; and, therefore, I think it would be a pity to curtail the sale of it. There is a great deal of sentimentality in everything. You have poisons sold in a worse way, namely, in the shape of brandy and such like, and little children are allowed to drink spirit; they can get it even in ha'porths, and while people are driving at the pharmaceutical chemists for selling poisons, they allow hundreds to be ruined by the sale of things in the other direction.

Mr. **Balkwill** (Plymouth): I think we have a happy augury for the future in the good temper which prevails at this meeting, for, when everyone is in such good temper, I am sure we are on the right road. I rose to speak on the point of want of loyalty of our community to our Society. That, I think, is the question of the day. If we can have a united power, we shall be able to command what we want. It is our want of union that creates all our difficulties. Now I ask myself what does this want of union come from? And I put it to myself something in this way; that we are a hard-worked class; we are closely engaged with the interests of our physicians and the responsibility of our own business. We are a hard-working class, and the worst-paid class, as an educated mass, in the community; and I am thankful for it. I would rather do good for the community and be badly paid, than be well paid for bad work. I am not a debtor to the community; the community is my debtor. As you have said, the speeches are not read; the reports of the work of the Council are not read; the interests of our cause are not familiar to the members of our community just on this account, because of the constant strain and pressure of details of our responsibility bearing upon us. I have been thinking of that in coming to this meeting and how it could be met. I conferred with our local president and local secretary before I came up, and they both concurred with me that the following suggestion was a possible one to commend to the Council—that there should be deputations of a couple of gentlemen to the large centres of industry in the country; that they should go down and have a conference and just such a talk as we have been having to-day in the different places, and then very likely finish up with an "at home" or a dinner, or something like that. If out of the members of the Council, there could be a dozen such visits paid in the course of the year, it would cover three dozen places in three years, and such a triennial visit throughout the country would knit the Society together, and would gather up a loyalty to the Society that would give us the power which we want. Unity is what we want, for that would give us power, and I suggest to the Council that there is a possible means of gaining that union.

Mr. **Vizer**: I came to this meeting because I thought it would be of an important character; but after the numerous addresses which we have listened to, I am sure you will not want me to say much, and more particularly so because the subjects upon which I intended to speak have been more or less touched upon already. The subject of trade interest we have often been flooded with, and I must confess that, knowing in years gone by we have not hesitated to call our Council to account, I fail utterly to see on what ground we are having such an agitation made on trade interest at the present time. Now I am generally in the habit of keeping myself up with the debates of the Council in our Journal, and I constantly see facts being brought out in which our President is called upon and invited by the Council to take active measures with regard to this, that, or the other. For instance, in the stamp duty on medicine, he was called upon to act, though he was not successful, but, of course, we cannot help that, as one is not successful in everything that he is called upon to perform. Again, with regard to medicated wines, we are in a position which we were ignorant of at one time, and I congratulate the editor of our Journal upon what he has written in connection with this matter of chemists becoming wine merchants. I regret that there are so many chemists taking out a wine licence, and I do think it is degrading to our business and injurious to the public. But it just occurred to me that the gentlemen who are speaking so much about trade interests should put the question the other way. They come to us members and say that we ought to turn out this gentleman and that gentleman who have been working upon our Council, because they are not studying trade interests; we are the men, send us in and your businesses will flourish, and all the trade interests will be considered. But if those gentlemen would only put the question the opposite way and ask themselves, What am I doing to promote trade interests? how vastly different would be their answer. I look round and see what we are doing at the present day. Take the cutting system. It grieves one's heart to see men of education, the men who have passed the examinations, and men who profess to have the interests of our standing at heart, degrading themselves by cutting down their labour to starvation price. If they would but ask themselves what am I doing in that direction. Why, sir, as a mass, the majority of those who are cultivating that class of business are those very men who are crying out about trade interests. What are they doing? They are doing the very best to injure our business, and yet they come and say we are the men to make your business a fortunate one. And there is another point, namely, union. The very policy to which you have alluded this morning is admirable in most ways, and I am heartily glad with the general tenor of it, for I concur with it very fully. With regard to the Pharmacy Bill—and I anticipate a Bill will be brought forward again—when it comes forward by what means are we to carry it? What do I find in the registers? 14,000 registered chemists and druggists; 2000 and a few odd pharmaceutical chemists, and 4000 members. But where are the 10,000 who ought to be upholding the hands of the Council? They are outside; they are opposing us, and, naturally, the Government say is it likely we are going to carry a Bill which is supported by such a small minority? If they want trade interests, let them come into our Society, for the doors have been opened and opened again. I have urged, over and over again that the doors should be opened as widely as possible, so that everybody who has passed the examination might come in and so strengthen our hands, when, no doubt, the Government will pay attention to our wants. I heartily congratulate you, personally, on the position which you hold, and I congratulate our Society still more upon having the privilege of having such a President.

Mr. **Schacht**: May I be permitted to say a few words, and in doing so I shall speak with the utmost deference to my fellow councillors. I cannot allow it to be thought that I agree with what has fallen from our President with reference to one matter, which I think of very great importance to the Society and to the trade generally. I mean the indefinite allusion in the report to the proceedings connected with the prosecution of Mr. Wheeldon and what has followed. It may have escaped the notice of members generally that I unfortunately stood in the position of being almost the single dissentient to the proceeding of the Council in that matter. I am sure it will be easily admitted that it was natural I should feel very great regret in finding myself in that unfortunate position of differing from eighteen men whose opinions I generally agree with; but the fact remains, and it was necessary I should say what I thought was true and correct, and give expression to an opinion which I thought would be generally echoed by the members of the Society whom I have the honour to represent. I candidly admit that at this moment I feel a little disappointment, that among the several speakers scarcely any allusion has been made to that which I think is one of the most important features in your report; for it is clear to my vision at least—and therefore I say it is clear, though I say it with humility—that within this last year, through the action of the Council, you have produced an absolutely new Act of Parliament—practically a new Act of Parliament. That is a very strong fact in our organization. We cannot so much as alter a single line of the bye-laws, not so much as to make an alteration in the time of meeting, and so forth; no practical bye-law can be altered by us, except by having it passed through open Council meetings, confirmed once or twice, and again ratified by a public meeting of the Society, and then there is a chance of getting it modified; but it appears from the current of events that an important alteration (which I consider almost equivalent to a new Act of Parliament) can be passed not only by the Council in open Council, but by a Committee of Council, who came to a conclusion on one certain evening to reverse the whole antecedents of the Society's action in this particular direction: to reverse the general interpretation of the Act, and the next day to pass it through the Council, not allowing it to be discussed in open Council, the object of that resolution being the enforcement of a penal enactment upon an individual member of the trade. I call attention to the fact that the whole of this has been done without one single important discussion. Without breaking confidence, I think I may quote the name of no less a person as an authority than Mr. Sandford, that it was not right an assistant should be held responsible for the acts, or want of acts, of his master. Until three months ago we never thought of prosecuting an assistant serving in his master's shop. I have carefully read through every debate in Parliament that occurred at the time, and I cannot find from any M.P. or lord in the House of Lords an expression of opinion that the assistant and apprentice should be brought under the operation of this Act. Everything pointed to the qualification of the master and the throwing of the whole responsibility of the conduct of a business upon the master, after he has been properly qualified. Therefore I do not think I am stretching or using exaggerated language in saying that this fresh action of the Council has practically been to get another Act of Parliament. I pass for the moment from that point of consideration to the desirability of the rightness or wrongness of this having been done without any public discussion, and without any reference to the members at all by an act of the Committee. I pass from that altogether. I think it was wrong, and I protested against it at the time, but my protest was of no avail. But now to deal with the fact itself. I think my position should be comprehended, though my position has nothing to do with it—I mean that my view should be understood and comprehended by the members. There are three sections of that Act which apply to this matter. There is one which says that nobody but a registered man can sell poison or keep open shop; then there comes an exception, and then the 17th section, that nobody shall sell any poison at all unless under such and such conditions. Therefore, of course, it seems a simple bit of plain English that no one can sell a poison outside of the 17th section. Nobody can. The President of the Pharmaceutical Society cannot sell poisons, except under the conditions laid down in the 17th section. It is the 17th section alone, which gives him, you, or me, the power—or anybody else the power—and right to sell a poison, and only upon certain conditions. Then the section goes on to say, and, for the purposes of this section the person (please mark the word) in whose behalf the sale s made, whether by a servant or apprentice, shall be deemed to be the seller. To my mind the meaning of the statute was so clear, and the words were so strong, that I could not see any way out of it, nor do I even now. Now what is the story? Our President, in that wonderfully facile way in which he uses language, and uses expressions, has carried us over the history of legislation, and he has pointed to the time when we vainly attempted to prosecute a certain company for taking upon itself the rights and privileges of a registered chemist. We carried that into Court with the ups and downs which you perfectly well remember; and, there being a difference of opinion, it was ultimately referred to the House of Lords, and the law lords there were unanimous in giving a verdict against us. Our solicitor is present, and can correct me, but I think I am right in saying that the main argument used, by which we were spoiled and routed, was this: that a body of men, such as a co-operative society, was not a "person" within the meanng of the Act, that it could not be registered, as it was not a person, that it could not go through its examinations because it was not a person, and, therefore, a company lay outside the operation of our Act. You see, the growth of the idea of the co-operative trade is of modern date, and one should not be biassed by the opinion of the times. Many of the judges, of course, are largely interested in co-operative stores—I do not in the least impute to them anything but the purest motives—but the general idea of the world is that we must do things in trade by different processes from what we used to do; and they came to the conclusion that they must not say a single word against co-operative societies if they could help it. Therefore, they came to the radical conclusion that a co-operative society cannot be examined or called a person, and therefore, one would have thought they could not sell poisons. But no, that would not quite suit, so the companies and societies were safeguarded by the after consideration that, perhaps, as my Lord Selborne and a few others said, in all probability if they serve the public through the agency of a qualified assistant, then the public will be safeguarded. But the point I wish to draw attention to s that a company cannot be a person, and the Act says that the person in whose behalf the sale is made shall be deemed to be the seller. Then, of course, the Act does not apply to the co-operative society, but it still applies to the person; it may be a pharmaceutical chemist, and in my view there was the broad distinction between the case which applies to co-operative trading, which should compel them to employ only qualified assistants. For if an unqualified assistant sold a poison, then he did it on his own responsibility, because there was no person who could give him the right to sell in the case of co-operative societies; but where there was a *bonâ fide* owner and director of the establishment, then it seemed to me, and it does now, that the plain object of the 17th section was to make the master liable. One of the greatest mistakes the Council ever made was endorsing the opinion that as long as the actual vendor, the shopman, was qualified by passing an examination, the public interest was sufficiently safeguarded. I think that is a deplorable thing for our Society to have endorsed. It seems to me our policy should have been to say, "Very good, there is the definition as given by Lord Selborne; in these establishments you must go to the servant for the guarantee of the public, but in the pharmaceutical establishment you have the master." The servant is here to-day and is gone to-morrow; he may be straight out of the examination room, where he may have been crammed to pass a few examinations, and he comes to the co-operative trader, or somebody else—there is no character in the man, necessarily; he has passed an examination, he is qualified technically, but that is no guarantee to the public that he knows his business. But who is it that buys? Is there nothing in the buying and ordering, as well as in the vending? I should have considered the wisest course for the Society would be to try and draw the distinction between the co-operative trade, with its qualified assistant, and the qualified master, with the responsibility of engaging whom he pleases. That is the position which I venture to say the Council should take up, and I venture again to repeat it for the last time.

Mr. GILES: I thoroughly agree with all the sentiments which Mr. Schacht has expressed, but I fail to understand his position. He rather imputed to his colleagues, of course in the kindest way, as one might expect from him, that they had in a somewhat irregular manner contributed to what he was pleased to describe erroneously as the passing of a new Act of Parliament. He has referred to the motives of the Society (I perfectly agree with him) and of the members of the Legislature, and I agree with him there as to the ideas and sentiments with which they passed that Bill; but we know perfectly well the motives of the promoters or legislators have nothing to do with the Bill when it is passed. It becomes then simply a matter for construction by the Courts. I speak in the presence of our solicitor, and I am sure he will bear me out in that. When an Act of Parliament is passed it is no good to ask what were the objects, except in so far as they may be expressed in the Act. In cases of difficulty the judges will look at the mischief aimed at, and they will sometimes either expand or contract within minute limits the operation of an Act. It may be that the result of the decison may not prove advantageous to the Society, but I am not clear of that. There is very often a kind of Providence that shapes our ends properly, and it is likely that this will turn out to the advantage rather than the disadvantage of the Society. But when you have an Act of Parliament sometime or other that will have to be construed, and you cannot help yourselves. I rather understood from the President that this matter had been forced upon the Society, and having obtained a construction of the Act it is now no use to talk further about it.

Mr. ATKINS: I do not propose for a moment to interfere with the reply of the President to the remarks of Mr. Schacht on the important case of the Pharmaceutical Society *v.* Wheeldon, because I think it would be much better to leave that in his hands, but I do wish to say to my life-long friend, Mr. Schacht, that the one thing which puzzles me in his logic is this, that he has been the intense, ardent, and consistent advocate of extended education all through his life; I have looked up to him and regarded him as a model man in that respect; I fail therefore to see why he should not rejoice in the extended education which this decision necessitates. I do not pretend to minimize the difficulties that may arise during the time in which new arrangements are being made. That is all I will venture to say upon that most important question. But I rather want to criticize another remark, made by Mr. Balkwill from Plymouth, and to thank him for calling attention to the old worn subject of unity, and the result of unity if that can be secured. He happens to have made a suggestion which I practically—more in pleasantry than in earnestness or matter of business—have made to my friends on the Council. I have suggested that it would be well if we could manage to visit different parts of the country, and in a friendly way meet pharmacists and explain our policy, and thus, I believe, tend to cement friendship. I should be glad if any practical suggestion arises from Mr. Balkwill's remark. So much has been said to-day that presses upon my conscience, that I hardly know what to say, and what not to say, because if I go on you will very quickly become impatient. I think we ought to be very thankful that there is an increased interest in pharmacy awakened. We have no right to complain of this increased interest, neither have we a right to complain of criticism if we occupy at all a prominent position. If you place us there as members of the Council, it is our lot to be heckled, whether we like it or not, and to be somewhat roughly handled. To that we must take no exception. Criticism of our conduct can only do good, but I do ask that criticism aimed at us be based upon an intelligent acquaintance with what we do and what we think. I know what criticism may be interpolated between those two remarks of mine. It may be said, "Yes; you do so much which we do not know of, you do not tell us all that you do." But when you tell us that you do not read what we do say; all I can reply is that if you do not know what we do, I fail to see that we should impress you very much more by further information as to those details. We have been charged in this controversy recently with one of two things, or both. It is said the Council, the members remaining and the members now outgoing, either do not represent trade interests, or if they once represented them, they have neglected them as soon as they have gone into the Council to represent them. Now I quietly, but most emphatically, traverse both those statements. I have no words too clear, too definite to express the conviction, and it may be that this will be my last opportunity of saying it as a member of the Council, but with the knowledge I have had of many other important bodies, I have never known a body of men more closely and more honourably devoted to the interests which they represent than the Council of the Pharmaceutical Society. Now with regard to trade interests, if, forsooth, we as a Council have neglected them, why did not the trade maintain and continue the trade association? I have had the honour of having had as brother councilmen men whom I immensely respect, and I respected them when they were the Presidents of that association, and I see some with us to-day, and I say if we were truant to the trade, and such interests were as you say neglected from higher considerations, here are gentlemen who have come in, and are working with us who know intimately what the trade association was, and I have been amazed to think that the association could have ceased to exist if it was the fact that we had been negligent of those interests. With regard to the question that we have considered science and education rather than the bread and cheese question when we proposed our Bills and sent them in Parliament, what is it we have had to contend with? Why first with the painful division in our own body. The enemy has only to quote the old Latin sentence "Divide and conquer," and they have only to sow discord among our ranks, and we become powerless. Our President goes to the lobby of the House of Commons and he has to answer certain questions; he is asked "are you united, are you agreed as a body?" and he would have to confess, by his silence, perhaps, that we were not agreed. Then, again, we have to contend of course, with the House of Commons itself, and there is no mistake about it, when we go in a great measure to that House, if it touches vested interests. We have illustration to-day, in the discussions now going on, of how it is dealt with. Touch vested interests and up spring the representatives of that interest, who oppose you. Surely in pressing science and education to the front, as we have done, we have not been neglectful of our best interests. Taking the business aspect of the question, I cannot understand how you fail to see that in putting the barriers to free ingress into the trade we are protecting you. You have only to imagine the barriers removed. If to-morrow by one fell swoop they were swept away so that every man could come in and practice pharmacy, what would be your condition? Why the competition would be enormously accelerated; the smallness of capital and the limitation of means are just the conditions which would foster a large increase of unqualified men setting up shop. In preventing that, and I do it in no ungenerous spirit to those who are seeking to enter into the business, I say we are doing you no harm in requiring that persons should be properly qualified, and that in fact it is for the interest of the trade. I used the words before "satellites of Mr. Carteighe," and do not withdraw those words. I am here to say this, and only a few words with regard to the President. It is only those who come within the circle of the Council, only those who work in committees and in the Council meetings with the President, who can have the slightest knowledge of the work which he does. I could say much more, but I say only this, because delicacy prevents my enlarging upon it, that you have in him a man of unexampled ability, of unexampled assiduity and industry on behalf of the Society. I want to say this upon the matter, because it has been very freely mentioned in correspondence—I may say that I do not write letters, certainly I do not write anonymous letters; I simply stand up when I have the opportunity, explaining what are my views. It has been asserted that the President is a strong man; but he has never used his strength as a giant, he has never in Committees attempted to sit on me as a weaker man. I was vice-president with him for four years, and worked harmoniously with him, and although I admired his strength, I must say that I have never been made to feel it, and I venture to say that no other member has. When we meet in Committee the result is the gathering up of the conviction of a great number of minds by the President, who most patiently listens to what we have to say, and then comes the result which is presented to the Council, and is accepted or rejected as the case may be. I say this to-day, because I do not know what may be the issue to-morrow, and I am not particularly careful about it. I do not care for myself. I have not the slightest knowledge of what the result may be, but I have a profound desire that Mr. Carteighe should still remain at our head. Men may come and men may go; you may change, and will have to change, the constituency of your Council; but the great policy, that is, the main lines of the policy, are so based upon an intelligent appreciation of the best interests of pharmacy, that I have no fear that they will be reversed in the election.

Mr. Wiggins: It appears to me from what I have gathered at these meetings that some among us seem to think that the ship is sinking; suppose we say the ship is in danger. The great remedy is not always to be blaming the worthy President of the Council. You may change the captain and the crew, but if we are in anything like danger, the proper *modus operandi* is for the passengers to lend a hand. I look upon the passengers as the outsiders, the men who will not come in, those who are against the Society, although they do not know for why. I have been a little radical, but when I come to look the thing in the face I do not believe there is the amount of blame to be attached to the President and Council that we imagine. They wanted a helping hand. We should not leave it all for a dozen gentlemen to do. Let those who are dissatisfied come and say what their grievances are, and give them a chance to remedy it. It is no use when a representative of the Society calls upon them to walk outside and say I will have nothing to do with you. When you call with a purpose you have a right to be listened to, but if they do not like what you say then it is time to show you the door. I would say to all outsiders remember one thing, and that is, that by concord the greatest thing increases, but by discord the greatest thing dwindles away.

The **President**: A number of complaints have been made by my friends to-day, all of considerable value, some of them under, I think, erroneous impressions on the part of the speakers, but all useful in their way. It would take me some time to do proper justice to each one, and I hope, therefore, that most of the gentlemen who have spoken will not consider me disrespectful if I do not reply to them in detail. I am sure the Council will consider those suggestions that have been made which have reference to what may be called practical politics with every desire to do something with them if possible, but I may be allowed to say that I must leave Mr. Spinks's observations to themselves. They are special and direct and the policy is a little outside our own purview as it were. It rests largely with the future members of the Society, but he is clear and very decided about it. His recommendation is that there should be one or more representatives of pharmacy in Parliament under certain conditions. I say nothing about that. It remains rather with the members of the Society at a future time, after due deliberation, to consider whether it would be advisable. When it came up in that aspect, I might have something to say to it, but my present impression is that even a delegate from such a respectable body as the Pharmaceutical Society would not be so successful as an ordinary member who was not a delegate. I admit the importance of being in the House when I see the boasts made from time to time as to what the working-men members have done. But when I come to analyse the results I find that theirs are not acts of construction, but acts of modification, acts by which the working-men members have been able to modify certain statutes that press a little hardly on their class, but they are not quite of the same kind as ours. There is no doubt of the great value of delegates; they are taken into consultation; but for constructive legislation for a class there has not been, so far as I know, a Bill emanating from any one class of that sort which has been distinctly successful, even although it was backed by a larger number of voters than even the whole of our trade put together. If the interests of the Society are to be dealt with in Parliament, my impression is we must find another Jacob Bell to do it. Mr. Spink was in earnest, and I would not pass by his observations without referring to them. Mr. Barnard, as being a divisional secretary, is constantly reminding us about the advantages of being generous, and the rights of assistants to apothecaries. But their rights are excessively small. If you have much faith in them I advise you not to stand to them. The rights of assistants to apothecaries are the rights to be assistants to apothecaries, and they are nothing else.

Mr. **Barnard**: But they are recognized as eligible to certain public appointments.

The **President**: I admit that, but they do not confer the right to sell poisons, or to dispense poisons. Then on the other hand it is suggested that we should take all assistants into the fold who are not qualified. As to that I shall have an observation to make when I deal with the remarks made by Mr. Schacht. Most of the discussion that followed, the remarks by my friend Mr. Guyer as to the assistants, are all very good in their way, but he will pardon me for reminding him—I do not wish to appear omniscient—that our great curse in a former Bill was that we had to take the qualification of assistants for the masters in 1868. It does not matter what was intended; we have to deal with the law as it is defined by the judges. If the public has any fault to find with us in the terms of that judgment, it is not that we have done that which Mr. Schacht condemns, but that we have been so long about it. When he talks about things being done in Committees, why the subject has been before us for several years, and he forgets that one prosecution at least went into court, and several penalties were recovered in Scotland, where we went against the unqualified servant to a medical man. In the face of that our Scotch friends tell us that the medical man's unqualified seller is not affected.

Mr. **Schacht**: I referred to an unqualified assistant to a qualified registered chemist.

The **President**: Unqualified assistant to a registered chemist and druggist.

Mr. **Schacht**: Mr. Wheeldon's was the first prosecution of an unqualified assistant of a qualified man.

The **President**: The matter has been discussed several years ago.

Mr. **Schacht**: In no case that I know of was he the assistant of a qualified man.

The **President**: Well it does not affect the argument. I do not care whether we commenced five or fifteen years ago thinking about it, but on the part of my colleagues I take the responsibility for what we have done, and I take the responsibility boldly and fearlessly. I say that you have no right to say that when we are acting in a semi-judicial capacity we should call the members together and ask them to do that which is actually placed in our hands by the Legislature. It was put in our hands because we were a Council; it was not put into the hands of the Pharmaceutical Society, and if we had discussed the matter in public we should have prejudiced that young man.

Mr. **Evans**: As a member of the Council I should like to bear out what Mr. Schacht has said, that this matter was discussed in committee. Mr. Schacht moved that the question should be discussed in open Council, so that the members of the Society might know what was being done.

The **President**: I am not saying anything to the contrary. These things could not be discussed in open Council. We have from time to time our own members before us, charged with breaking the law, and obviously they could not be dealt with in open Council. We have taken the responsibility, and we accept it. We were asked by a competent authority to place the question before a court of law; we have not decided the case. Mr. Schacht says we have made the law, but it is nothing of the sort; our business was merely to place the matter before the legal tribunal, which has decided in a certain way. I say whether one had been willing or unwilling, the decision would have been sought for from the judges, for if we had not done it, I know of one man who would have gone down to the judges, and had a mandamus on us in a fortnight, if we had adopted the view propounded by Mr. Schacht. The whole powers of the Council would have been taken away from us on the first opportunity, and if we are not competent to exercise these powers, we are not competent to be the Council of the Pharmaceutical Society. We have no business to ask our members whether it will do them harm or not in this, that, or the other. We are bound, in the interest of the public, to have any question considered; and that is what we have done, and it has been settled by the judges that a certain thing is wrong. The fact is, the Pharmacy Act is now beginning to be made an Act by the decision of the judges, and as Mr. Giles reminded Mr. Schacht—it is no good reminding him, for we have reminded him often enough about it—but a layman knows more than a lawyer about the law. I know something of law, and I do not agree with Mr. Schacht—it may be because I have no principle—but whether we like it or not, the judges are the persons to whom we must go for interpretation of our powers. When you say we do not know anything about it, if you will bear with me, I will tell you how the Council's eyes were opened not long ago. We were promoting our Bill in the House of Lords for a curriculum; someone sent in a suggestion that we should make managers of branch shops qualified, and the learned law lord whom I consulted asked, "What do you want it for?" An ex-Lord Chancellor, holding up the statute, said, "Do you mean to tell me that your people leave their shops in charge of apprentices and unqualified persons for hours and days and weeks together under this Act? You have the power already." You will remember, gentlemen, that the Council of this Society declined to go on with that Bill in that stage. I mean to say, it decided to go on, but it preferred not to have the assistants' clause in. As a matter of fact, it was a disadvantage in every way. Our eyes were opened, if they had been shut before. But I, like Mr. Sandford, had something to do with the passing of the Pharmacy Act, and as Mr. Schacht has chosen Mr. Sandford as a sort of authority, I would remind him that Mr. Sandford was a steady opponent to the policy of the Council of proceeding against the seller. He opposed the action tooth and nail. He said you will do yourselves harm, you will enfeeble the law, and you will run the risk of the definition of the seller. I felt that whenever the proceedings came before the tribunal it would be held that the person who would be answerable was the seller. Gentlemen, I have been sent with my learned friend, the solicitor, to consult counsel on subsidiary matters, and our own counsel, who fought with us up to the House of Lords, told us emphatically that the man who conducted the sale in the absence of a qualified man was liable—that is to say, that it would be so held by the judges. What do they say? They say practically in effect that an unqualified person shall not replace a qualified one, and now the judgment is given, and now that I have with my colleagues exercised our quasi-judicial function, let us look at it from the point of view of trade policy. I am not so sure that it is not the best thing for us. I beg to remind you who are in business that half of our Society now consists of young examined men, some of whom never intend to go into business, and many do not want to go into business very early in life. The tendency to rush into business has been reduced. We have been asked over and over again in these rooms, "What does a man get for his examination?" What does he get if the qualification of one master is to be carried on through an infinite number of unqualified assistants or apprentices. The logic of the situation is positively ridiculous. A syndicate of pharmaceutical chemists in London could cover every chemist and druggist's shop throughout the country, and of course the judges recoiled from a decision of that sort. The state of the law as laid down by the judges is broadly this, that in the case of a corporate body, the man who hands over the article must be qualified, but in the case of an individual keeper of a shop, if he leaves the shop, he must leave a qualified man to sell. You have the double qualification; you can say "I am qualified as the keeper of the shop, and the man I leave behind when I go away, is also qualified." This being the case, whether we like it or not we must face it. And it will be a distinct advantage to us. It is the only way in which the Society can deal with big companies. I take it that you are interested in the question and that you have all read the long report of the case, and that we should be treating you as children if we had given you an abstract of the whole case. I say in the neighbourhood of Birmingham we got nearly £100 in penalties upon this very decision, and one man had to pay £60; he is not a chemist in the ordinary sense at all, and it is very much question whether it will be worth his while to deal in poisons in future. I say to-day that every qualified man, whether in business or not, is stronger than he was a year ago, and the difficulty of the situation is one partly of enactment and partly of usage, and I recommend all those who want to know how to carry on business just to ask the question, "What is the best way of meeting the decision?" They can very easily find a way. I do not think it will interfere with the training of apprentices. I will tell you what it will interfere with. It will interfere with the leaving an open shop in the hands of apprentices from 15 or 16 to 20, and it will interfere with the keeping of open shop by surgeons and others, who leave them to girls and apprentices, and it will interfere in a great many ways. It is farther reaching than many of you suppose, but we are not here to boast, or to pretend that we are going to be aggressive and to use the power given to us rashly, and without due precaution. Doubtless a new condition of things has grown up, and a little time must be given before any movement can be made. Then let me remind you that we are not likely—and if we were to do it, we should very soon be stopped—to come and put our eyes and nose under your counter, or in your shop, to see whether you have an apprentice or qualified assistant; our business as a corporate body is to act when we are moved, like the Incorporated Law Society. We are not detectives. It is someone else who must bring the matter before us. It is better that it should be the public than even one of ourselves, but at the same time I cannot hide the fact, and I do not for a moment wish to hide it, that the judgment is a matter of serious moment. You must, many of you, put your houses in order, and I do not wish to minimise the effect of the judgment; but I say upon the whole that it will prove the greatest good for the common welfare of pharmacy. For the youngest members of our Society as well as for the oldest men who have a reputation, I say that the judgment is for the benefit of them all.

Mr. Reece asked whether an apprentice could supply a poison in the presence of a qualified person.

The President: The judgment will guide us. It is difficult to answer questions. There is no doubt that case would be governed by the judgment. I have repeatedly said to my colleagues that I could in Bond Street keep four or five apprentices dispensing poisons under my supervision, and selling them, that judgment notwithstanding, but if you attempt to transfer the whole of your qualification, by going and leaving them in sole charge, you will render the apprentices liable.

Mr. Reece: I said in the presence of a qualified person.

The President: I think a sale made in the presence simply and one made under the direction of a qualified person would raise different points.

Ir. **Flux** (the Solicitor): The judges went out of ir way, and distinctly pointed out what was the per and safe course, and I cannot do better than nmend that judgment to the careful study of every mber of this Society.

he **President**: What you meant was that it was essary for the chemist to be actually in the shop.

Ir. **Reece**; Mr. Justice Hawkins said his presence the shop was not enough.

The **President**: This probably comes from the nger of answering questions. I will put it in pther way, that the general opinion is—which is not —that under certain circumstances a penalty uld not be recoverable.

Mr. **Schacht**: Commercially, the word seller means e thing, and pharmaceutically it means another.

The **President**: That is it precisely. I will now t the motion. Is it your pleasure that the report received and adopted?

The motion was then put and carried unanimously.

The **President** then read a list of names of gentle-en who had been nominated to act as scrutineers, d their appointment was unanimously agreed to.

The **President** then called attention to the follow-g registers which were placed on the table in ac-rdance with the bye-laws:—

Register of Members, Associates, and Apprentices of the Society.
Register of Pharmaceutical Chemists.
Register of Assistants.
Register of Apprentices and Students.
Under the Act of 1852.
Register of Chemists and Druggists.
Under the Act of 1868.

ELECTION OF AUDITORS.

The **President**: The next business is the election f Auditors. The gentlemen proposed are:—

SCHER, FRANK HARWOOD, 60, Bartholomew Close, London, E.C.
TACEY, SAMUEL LLOYD, 300, High Holborn, London.
JMNEY, CHARLES, 50, Southwark Street, London, S.E.
VATTS, WILLIAM MANNING, 32, Lower Whitecross Street, London, E.C.
ATES, FRANCIS, 64, Park Street, Southwark, London.

Mr. **Bell**, in moving a vote of thanks to the Presi-ident and Council, said he was glad to notice the nergetic steps which had been taken by the Presi-lent with regard to methylated spirit, which was a ubject most important for many chemists in the country. He begged to move that the best thanks of he meeting be accorded to the President and Council of the Society.

Mr. **Betty** said it afforded him great pleasure to second this vote, for it reminded him of olden times. He thought that Mr. Carteighe, if not the best, was one of the best Presidents that the Pharmaceutical Society had every had. Of course, after the many well-merited tributes which had been paid to the President, it would be superfluous on his part to say more than simply record the unanimous opinion of that grand meeting, that the President had well sustained his reputation and the interests of pharmacy. The President, like others, could not say be had been beyond criticism, but of this they might be assured, that although the tongue of criticism might sometimes start at him,—and it had,—they had never yet found an arm which had been able to cope with him. He was the Ajax of the trade and the Ulysses of the Council chamber. He had heard remarks made by persons as to what they intended to do when they came to the meeting, but it reminded him very much of the old saying, that they came to curse and stayed to bless.

The motion was put and carried unanimously.

The **President**: Gentlemen, I am very much obliged to you for your courtesy and kindness. I will not detain you more than to say that I am especially obliged to Mr. Bell, and to my friend Mr. Betty, for their kind remarks. Mr. Betty knows where we first met; there were Vizer, Bland, and Betty, and I was the lieutenant under Sandford to go and fight the Philistines who were trying to upset us, and some wicked persons said I squared them by taking them into a certain club and giving them something to eat. If I did we happily found that afterwards they made application to this Society to be admitted, and so it came to pass that many who were on the executive of the other body have become members of this Society, and amongst that number there is no one for whom I have a greater respect than for my old friend Mr. Betty.

The **President** then announced that the meeting would stand adjourned until 4 o'clock on Thursday to receive the scrutineers' report.

ADJOURNED GENERAL MEETING.

Thursday, May 22.

MR. ROBERT HAMPSON IN THE CHAIR.

The adjourned meeting for receiving the report of the scrutineers was held on Thursday, May 22.

The Chairman of the scrutineers, Mr. J. W. Bowen, read the following report:—

SCRUTINEERS' REPORT.

We, the undersigned Scrutineers, appointed at the Forty-ninth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following:—

Voting papers reported by the Secretary to have been issued	3376	
Voting papers received	2478	
Voting papers issued but not returned .	898	
Voting papers received		2478
Voting papers disallowed:—		
Informal	21	
Received by post too late	46	
	—	67
Voting papers registered		2411

Result of the Poll.

Carteighe	1792	Martin	1298
Hampson	1599	Evans	1228
Greenish	1577		
Atkins	1563	Broad	1149
Schacht	1518	Hopkin	1098
Abraham	1509	Grose	1092
Hills	1499	Coleman	1072
Harrison	1434	Wells	1001
Gostling	1423	Maltby	989
Leigh	1362	Spink	965
Richardson . . .	1346	Ross	909
Storrar	1325	Lake	538

JOHN W. BOWEN, *Chairman.*

W. PICKARD.
WM. ARKINSTALL.
HENRY MATHEWS.
JOHN HARPHAM.
J. H. BALDOCK.
HENRY C. BIRCH.
JOHN C. UMNEY.
JOHN J. MATTHIAS.
W. CHAS. SAYERS.
H. A. THOMAS.
W. PRIOR ROBINSON.
C. M. LUXMOORE.
EDWD. B. STAMP.
THOS. HENRY POWELL.
A. E. TANNER.
F. BASCOMBE.
R. FISHER YOUNG.
WM. WARREN.
JOHN HOLDING.

THE NEW COUNCIL.

The Chairman then declared that the following gentlemen would constitute the Council for the ensuing year:—

Abraham, Alfred Clay, 87, Bold Street, Liverpool.
Allen, Charles Bowen, 20, High Road, Kilburn, London, N.W.
Atkins, Samuel Ralph, Market Place, Salisbury.
Bottle, Alexander, 37, Townwall Street, Dover.
Carteighe, Michael, 180, New Bond St., London, W.
Cross, William Gowen, Mardol, Shrewsbury.
Evans, Gwilym, 7, Stepney Street, Llanelly.
Gostling, Thomas Preston, Market Hill, Diss.
Greenish, Thomas, 20, New St., Dorset Sq., N.W.
Hampson, Robert, 31, Baalbec Rd., Highbury Pl., N.
Harrison, John, 33, Bridge Street, Sunderland.
Hills, Walter, 225, Oxford Street, London, W.
Leigh, Marshall, 46, Dyke Road, Brighton.
Martin, Nicholas Henry, 29, Mosley Street, Newcastle-on-Tyne.
Martindale, William, 10, New Cavendish St., W.
Newsholme, George Thomas Wilkinson, 74, Market Place, Sheffield.
Richardson, John George Frederick, Elmfield, Knighton, Leicester.
Schacht, George Frederick, 52, Royal York Crescent, Clifton, Bristol.
Southall, Alfred, 17, Bull Street, Birmingham.
Storrar, David, 228, High Street, Kirkcaldy, N.B.
Watt, James, High Street, Haddington, N.B.

On the motion of the Chairman, a vote of thanks was awarded to the Scrutineers for their services, and the proceedings then terminated.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of this Association on Thursday, the 24th of April, a paper was read on "Gold Mining," by Mr. C. W. Seccombe. The author commenced by sketching briefly the conditions under which minerals occur in nature, drawing the inference that a successful miner must be a geologist, and should be well grounded in physical geography. Gold was described as being more widely diffused than any metal except iron, but usually it occurred in such small quantities as not to be remunerative for extraction. As far back as the Roman period, a gold mine was worked at Llandovery in South Wales, and more recently it has been discovered that the quartz veins running through the strata of Merionethshire are auriferous, as much as seven ounces of pure gold per ton having been extracted. In China there are deposits of gold equal to, if not surpassing in value, any of the great gold drifts of the world. Allusion was also made to the deposits in Australia, North America, and South Africa. With regard to the occurrence of gold in alluvial deposits, the author expressed an opinion that primarily it was a deposition from solution, the coarse grains and nuggets being merely agglomerations of infinitesimal particles. In this sense gold might be said to grow, a nugget being formed by accretions continued through countless ages; this might be again dissolved and carried away to be redeposited when the proper conditions, chemical or otherwise, presented themselves. The author then described the earlier methods of working for the metal, as well as the later methods of hydraulic mining and of amalgamation, particular attention being directed to the milling operations upon which the successful working of a gold mine largely depends. The Plattner "chlorination process," for the separation of the gold which is in the auriferous concentrates from the stamping mills, was also described. In this operation the gold is dissolved out as a soluble terchloride and is afterwards precipitated in the metallic state by treatment of the solution with ferrous sulphate. The author then gave a brief sketch of the most reliable processes for the assay of auriferous ore, and concluded by discussing some of the causes that led to the financial failure of gold mining enterprises.

The President (Mr. T. A. Ellwood) said reference had been made to the gold-mining operations in Wales, but, as a matter of fact, he believed the undertaking had not proved so profitable in Britain as had the search for the baser metals, and if his memory served him correctly, the presence of 8 or 10 dwts. of gold in the ton of ore was necessary to ensure success in working.

Mr. Blackham said it spoke well for the intelligence of chemists' assistants that they should have demonstrated their appreciation of a subject outside pharmacy by attending in such force so late in the session, and that the subject should have been so ably and exhaustively dealt with by one of themselves. He had quite recently experienced a difficulty in recommending a convenient account of gold-mining and assaying to a gentleman who had applied to him before leaving this country for the gold-fields. The publication of Mr. Seccombe's paper would relieve him of all anxiety should a similar request be made to him.

Mr. Pearmain inquired if Mr. Seccombe could tell him anything of the condition in which gold exists in refractory ores; pyrites-ores, for example. He understood Mr. Seccombe to say that gold was sometimes found covered with iron pyrites, implying that the gold was the nucleus of the ore; he was inclined to think that if gold were deposited from a solution, the pyrites, and not the noble metal, should be regarded as the nucleus.

Mr. Stark asked if it were possible to determine the age of gold-bearing strata in South Africa; and the discussion was continued by Messrs. G. W. Phillips, Hopkin, Richards and Williams.

Mr. Seccombe said in reply, that Mr. Ellwood was quite right in stating that gold mining could only be profitably carried on when at least 8 or 10 dwts. of metal to the ton of ore were present, even if suitable machinery and correct methods of working were adopted. In reference to the reefs of the Whitwatersrandt, there appear to be no reliable traces whereby geologists can determine the date of their formation. The gold in auriferous pyrites is so subtly disseminated, that it is almost impossible to ascertain whether it exists entirely as sulphide or partially in the metallic state. Iron pyrites, copper pyrites, and mica might all be mistaken for gold, for nowhere had the adage "all is not gold that glitters" to be kept more persistently in view than in gold-mining. With the best appliances that were available a loss always occurred, often amounting to more than 20 per cent.; this was much too high, and here was undoubtedly a fine field for research still open in mining engineering. He desired to express his thanks to Messrs. Johnson, Matthey and Co., Mr. E. M. Holmes and Mr. R. H. Parker for the specimens they had so generously placed at his disposal.

Erratum.—By an oversight the name of Mr. Bottle, instead of Mr. J. F. Brown, was given last week as having seconded the motion for a vote of thanks to the President of the Pharmaceutical Society at the meeting of the Dover Chemists' Association.

"*Justicia*" points out that Mr. Wilkinson was incorrect in stating that "none of the special trade journals had any notice" of the provision in the Budget Bill as to the sale of methylated spirit, as it was referred to in the *British and Colonial Druggist* of the 3rd inst.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. W. Symons, Fargher, Pickering, Coates.

"THE MONTH."

Antipyrin and Chloral Hydrate.

A reclamation for priority has been put forward by Messrs. Béhal et Choay on account of the discovery of the compounds formed by antipyrin with chloral hydrate (*Journ. Pharm. Chim.*, May 15, p. 539). They point out that in the Paris Exhibition of last year two such compounds were exhibited (see before, July 20, p. 45), and they state that the compound described by Herr Reuter (*ante*, p. 602) is a third modification that no longer gives the reactions of antipyrin. As has been before mentioned, when concentrated solutions of equal weights of chloral hydrate and antipyrin are mixed an oily layer is formed, which after a short time crystallizes. If the quantities used be in the proportion of 4·7 grams of chloral hydrate and 5·3 grams of antipyrin, dissolved each in 5 grams of water by the aid of a gentle heat, large crystals may be obtained of a compound containing equal molecules of antipyrin and chloral, and represented when crystallized from alcohol by the formula $C_{13}H_{13}N_2Cl_3O_2$. This has been designated "monochloralantipyrin." It melts at 67°–68° C., dissolves in water at 14° C. to the extent of 7·85 grams in 100 grams, gives with ferric chloride the characteristic blood-red colour of antipyrin, gives rise to chloroform when heated with potash in aqueous solution and reduces Fehling's solution when warmed. If this compound be kept heated to about its fusing point for a time there are gradually deposited in the melted mass crystals of a compound corresponding to a product of dehydration, and this, according to Messrs. Béhal and Choay, is the substance obtained by Reuter. It is insoluble in water, melts at 186°–187° C., and can be distinguished easily from monochloralantipyrin by no longer giving the reaction with ferric chloride. If instead of using the constituent compounds in equal molecular proportions, a concentrated solution of chloral hydrate be used in excess, an oily layer is similarly formed, from which prismatic needles are obtained containing two molecules of chloral to one of antipyrin, and therefore named "bichloralantipyrin." This also melts at 67°–68°, but is more soluble than monochloralantipyrin, the proportions being 9·98 grams in 100 grams of water at 14° C. It gives with ferric chloride the red coloration of antipyrin and reduces Fehling's solution when heated. In water it appears to undergo some degree of dissociation, the first crystals deposited from a saturated solution being those of monochloralantipyrin and afterwards those of the bichloral compound.

Antipyrin and Carbolic Acid.

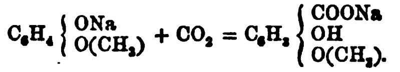
In a paper recently published by Messrs. Millard and Stark, carbolic acid was mentioned as being incompatible with antipyrin (*ante*, p. 861). This is confirmed by M. Tardy (*Répertoire*, May 10, p. 209), who says that a solution of antipyrin, to which solution of carbolic acid was added, separated after some hours into two layers. The upper layer, which was limpid, having been decanted, was found to have only the taste of antipyrin, and did not contain any carbolic acid. The lower layer, which was an oily liquid, contained both antipyrin and carbolic acid. It had a piquant taste, a faint rose colour, a slight odour of phenol and a specific gravity of 1·13; further it was neutral to reagents, insoluble in water, and soluble in alcohol and in ether.

Cocaine Hydrochlorate an Borax.

At a recent meeting of the Paris Société de Pharmacie (*L'Union Pharm.*, May, p. 210), M. Julliard mentioned that in preparing a collyrium containing hydrochlorate of cocaine and borax, upon mixing the solutions a precipitate was formed, consisting of cocaine which had been thrown out by the soda of the borax. Of course the ordinary method of filtering would here have involved the removal of a certain quantity of the more important constituent. It was pointed out by M. Patein that although borax is neutral towards reagents when in concentrated solution, it becomes alkaline in dilute solution, and it was suggested that the addition of a little boric acid would have maintained the collyrium clear without affecting its properties.

Guaiacol-carboxylic Acid.

Still another compound, guaiacolcarboxylic acid, is stated to possess such extraordinary antiseptic and antipyretic properties that it may possibly find a place among the materia medica. It is said to be prepared according to a patented process, which consists in saturating guaiacol-sodium with carbonic dioxide under pressure in the cold and then heating the mixture, still in the closed vessels, to 100° C. The reaction is represented as taking place as follows:—



$$C_6H_4\begin{cases}ONa\\O(CH_3)\end{cases} + CO_2 = C_6H_3\begin{cases}COONa\\OH\\O(CH_3).\end{cases}$$

The product is dissolved in water and decomposed with a mineral acid, when the guaiacolcarboxylic acid crystallizes out in combination with two molecules of water. It melts in the anhydrous condition at 148° to 150° C., gives in solution with ferric chloride a blue colour, and upon being sufficiently heated is decomposed into carbonic dioxide and guaiacol.

Orexin.

Dr. Martins, of Breslau, has published the results of a large number of experiments made with a view to determine how far the claims recently put forward on behalf of orexin as an appetite producer have a foundation in fact (*Deut. med. Woch.*, May 15, p. 427). The compound was administered in the form of pills, each containing 0·1 gram of orexin hydrochlorate, made up with extract of gentian and althæa root powder, three to five pills being given as a dose. In twenty cases the pills were administered without informing the patients as to the reason why they were given; in five cases the patients were told that the pills contained something that would improve the appetite, the results being checked by the use of pills containing no orexin, but made up to resemble the orexin pills; in three cases orexin pills and plain pills were administered comparatively without any statement to the patients; and in seven other cases the conditions were varied in different ways. Out of the twenty-nine cases in which orexin was administered the appetite showed some improvement in five, but not to any considerable extent; in the other twenty-four cases the orexin did not seem to exercise any influence upon the appetite; whilst in five cases an improvement in appetite followed the administration of pills although they contained no orexin. Dr. Martins considers therefore that the general results of his experiments have not afforded any distinct and indisputable evidence of the action of orexin in the direction of improving the appetite.

Ulexine and Cytisine.

In a communication made at a scientific sitting of the medical faculty at Dorpat (*Deut. med. Woch.*, May 8, p. 406) Professor Kobert directed attention to the close resemblance of the physical and chemical properties attributed to cytisine, the alkaloid from the laburnum, with those of ulexine, the alkaloid from *Ulex Europœus*, as described by Messrs. Gerrard and Symons (*Pharm. Journ.*, [3], xix., 1029). Cytisine, like ulexine, is described as a very strong base, precipitating alkaloids from solutions of their salts and liberating ammonia from its compounds. As in the case of ulexine also, nitrate of cytisine gives with concentrated sulphuric acid a yellow red colour, and both bases and their salts give with ferric chloride a yellow red colour that disappears upon dilution with water. The melting point of cytisine is given as 151°C., or the same as that of ulexine; both bases are insoluble in anhydrous ether, but readily soluble in warm amylic alcohol; their hydrochlorates are very deliquescent and their nitrates crystallize well. In addition, the formula attributed to cytisine by Husemann and Marmé ($C_{20}H_{27}N_3O$) approximates to double that suggested by Gerrard and Symons for ulexine ($2C_{11}H_{14}N_2O = C_{22}H_{28}N_4O_2$), and Professor Kobert thinks that this difference might disappear if the two substances were analysed by the same hands. The chemical and physical resemblance of the two alkaloids suggested their comparison pharmacologically, and so far as the experiments have been carried the results have corresponded exactly, qualitatively and quantitatively. When injected subcutaneously even in small doses they produce in warm-blooded animals a perceptible increase in the blood pressure, and both alkaloids are quickly absorbed and very rapidly eliminated with the urine. As the diuretic action of ulexine and cytisine depends upon increased blood pressure, due to stimulation of the vaso motor centre only, whilst the heart is not affected, they cannot take the place of digitalis. Referring to the possible effects of ulexine upon cattle browsing upon gorse, Professor Kobert quotes a recorded case of a child having been poisoned by milk from a cow that had fed on laburnum, though cytisine was ascertained to be relatively innocuous to cattle, and he utters a caution against the use for infants of milk from cows that may have fed on gorse.

Sodium Iodide.

At the same meeting Dr. Laborderie called attention to the fact that sodium iodide occurs in commerce in three forms, containing very variable proportions of water of crystallization. The crystallized iodide contains 20 per cent., the "dried" from 7·5 to 18 per cent., and that in scales 6 to 10 per cent. Under these circumstances he thinks it not surprising that there should be considerable difference in the activity of medicines containing this compound, according as one or other of the varieties is used in dispensing, and he therefore recommends that only the crystallized iodide should be used, its composition being constant. It may be mentioned that the form of sodium iodide official in the Codex is in cubic crystals.

Croton Oil.

In the new part of the *Arbeiten des pharmakologisches Institut zu Dorpat* (p. 5) Professor Kobert returns to the subject of croton oil, taking as the basis of his memoir the thesis published three years ago by Herr Hirschheydt, which has been extended so as to include a number of fresh experiments. Herr Hirschheydt's thesis, it will be remembered (*Pharm. Journ.*, [3], xvii., 881), dealt, amongst other things, with the experiments reported in three papers read by Mr. H. Senier before the Pharmaceutical Society (*Pharm. Journ.*, [3], viii., 705; xiv., 446), from which it appeared that under certain conditions croton oil was separated by alcohol into two portions, the solution containing the vesicating principle, which was an acid closely allied to oleic acid, and the insoluble portion the purgative principle. An opinion was expressed by Herr Hirschheydt that two kinds of active principles could not be so separated, since the purgative and the vesicating action alike are due to crotonoleic acid, which may occur in the oil both in the free state and as a glyceride. Professor Kobert appears still to hold this view. In the present paper the opinion is expressed that a definite relation of solubility between croton oil and alcohol cannot be established, since it varies with the age of the oil, oils occurring, in fact, which are soluble in alcohol in any proportion, an experience which so far is not necessarily opposed to that of Mr. Senier. By treatment with successive quantities of alcohol fresh quantities of oil are said to pass into solution; the portions also show different degrees of solubility, the acrid-tasting and vesication portion being the most soluble. It is thought that the varying solubility of the oil may depend upon the fact that the crotonoleic glyceride no longer exists in old samples of the oil, but only the free acid. From a large number of pharmacological experiments it was concluded that a neutral croton oil is essentially milder in its action than an acid oil such as is official in the P.G. Experiments with the free crotonoleic acid did not give favourable results, as doses less than 0·01 gram were uncertain in their action, whilst larger doses caused a very disagreeable burning sensation in the intestines. Professor Kobert therefore recommends, if croton oil be retained in the Pharmacopœia, that only the neutral crotonglyceride should be used, which can be kept unaltered if protected from light. In conclusion it may be remarked that no chemical examination appears to have been made by Mr. Senier of the insoluble "purgative" portion separated by him, though it would be interesting to know whether the portion of croton oil remaining undissolved by spirit under the conditions mentioned by him consisted wholly or in part of the neutral crotonoleic glyceride, which might also to some extent be carried into alcoholic solution by free acid present in the oil and so appear as a constituent of both the soluble and the insoluble portion.

Santonin and Castor Oil.

Having been called upon to dispense a prescription ordering santonin with castor oil, Herr Reuter was led to experiment as to their solubility relations, concerning which contradictory statements have been made. The result was (*Apot.-Zeit.*, May 16, p. 246) practically to confirm a statement by Professor Flückiger, that if finely powdered santonin be heated with castor oil on a water bath, even though vigorously shaken, it will not dissolve the extent of more than 4 per cent., the greater rt of which will crystallize out on cooling. xperiments with 1, 1·5, 2, 2·5, 3, 3·5, and 4 per cent. santonin showed that it was soluble in castor l in these proportions when heated on a water th, but that from the 1·5 to 4 per cent. solutions e santonin separated in handsome crystals on cooling. From the 1 per cent. solution prepared in small uantities there was only a very slight separation hen reduced to a low temperature, but a solution repared from 0·5 gram of santonin to 50 grams of il remained perfectly clear and free from separation t a temperature of 15° C. during two days. A 0·5 er cent. solution remained absolutely clear at 15° C. uring four days. The use of finely powdered antonin and the application of heat are essential, s santonin added to cold castor oil sinks to the ottom, whilst the viscosity of the cold oil hinders iffusion by shaking.

odophyllum Emodi.

Some time since Messrs. Dymock and Hooper eported in this journal ([3], xx., p. 585) the occurrence in the roots of the Indian *Podophyllum Emodi* of 10 to 12 per cent. of resin that appeared to be identical with podophyllum resin from *P. peltatum* roots. The value of this observation is ractically confirmed by Mr. T. A. Thompson, who reports (*Amer. Journ. Pharm.*, May, p. 245) hat he has examined a small sample of crude resin btained in Bombay from *P. Emodi* roots, and ound it to contain 56·55 per cent. of podophyllotoxin, the active principle of podophyllin resin, and 13·1 per cent. of podophyllic acid. Mr. Thompson oints out that this proportion of podophyllotoxin s fully 25 per cent. higher than the average found n ordinary podophyllin resin, which varies from 40 to 45 per cent., and as the American podophylum root yields in manufacturing operations only about 5 per cent. of resin, whilst the Indian root may be taken as yielding 10 per cent., the latter drug would appear to be at least two and a half times as valuable as the former.

Malt Extract and Acid Phosphates.

The occurrence in the market of a combination of malt with phosphates, containing free phosphoric acid, induced Mr. Dougherty to make some experiments with a view to test the power of converting starch possessed by such a preparation (*Drugg. Circ.*, May, p. 101). The first test was made with a proprietary preparation, described as being dark coloured, of dense syrupy consistence, apparently flavoured with tamarinds and quite acid in reaction and to the taste. This showed such complete lack of amylolytic power that it was decided to prepare samples with extract of malt previously ascertained to answer to Jungk's test that it should completely convert an equal quantity of starch into sugar in ten minutes at a temperature of 100° F. Two such samples were used, with which mixtures were made containing 20 parts of malt extract and 10 parts of compound syrup of the phosphates, Nat. Form., and in one case one part of tamarind pulp was added. The mixture containing the tamarind pulp failed to liquefy the starch in five hours, the paste remaining gelatinous and giving a copious precipitate with iodine at the end of that time. With the others a slow liquefaction took place, which, however, did not extend to the complete conversion of the starch. Mr. Dougherty therefore draws a conclusion adverse to acid preparations of malt and phosphates, as their power of digesting starchy food is nullified by the acid present, even the tamarind flavouring appearing to exercise a detrimental influence in this direction.

Caledonian Balsam.

At a recent meeting of the Société de Thérapeutique, Dr. Forné called attention to the advantages presented by a preparation that he had named "baume calédonien," and which appeared to consist of a solution of kauri gum in an equal weight of 90 per cent. alcohol (*Journ. Pharm. Chim.*, May 1, p. 504). He stated that it has been used with great success in the treatment of wounds and ulcers of all kinds. When applied to a well cleansed and dried wound it causes a very slight, but brief, sensation of burning, but after a few moments the solvent evaporates, and the resin is left as a very adherent varnish, which is not affected by friction or contact with water. The preparation can also be used advantageously for fixed bandages in the place of the soluble silicate. It was also said to be superior to tincture of benzoin for the obturation of the cavities in carious teeth. Lastly, a liniment made with equal quantities of baume calédonien and olive oil was recommended as an application to burns.

Ethereal Tincture of Capsicum.

Sir J. Sawyer, M.D., recommends a tincture of capsicum, made with officinal pure ether instead of rectified spirit, as a local application in cases of subacute gout, chronic gout, chronic articular rheumatism, muscular rheumatism, and some cases of bronchial catarrh and chronic bronchitis. He believes that ether, by its action on the sebaceous secretion of the skin, is preferable to alcohol as a menstruum for drugs designed to produce a therapeutic effect on or through the skin. It has also the advantage that oil of turpentine or a bland oil is easily miscible with it, if requisite to add either. He states that a mixture of equal parts of ethereal tincture of capsicum, liquor ammoniæ, oleum terebinthinæ and oleum lini forms an excellent rubefacient liniment. The ethereal tincture can be applied on spongio-piline (*Lancet*, May 17, p. 1066).

Gurjun Oil as an Expectorant.

Dr. Murrell, in a communication to the *Lancet*, (May 3, p. 962), recommends gurjun oil as an expectorant in bronchitis. He states that it does not cause the rash, attended with intense itching, which follows the use of copaiba in a large number of cases. He prescribes it in doses of two drachms, with an ounce of extract of malt, three times a day.

Kola Nut in Sea-Sickness.

Surgeon C. U. Hamilton, R.N., states that in some cases of *mal de mer*, he found that chewing 30 to 60 grains of kola seed led to the complete cessation of the sickness in about forty minutes; the depression and giddiness disappeared and the heart's action was regulated and improved. He remarks, however, that it seems reliable only when freshly procured, and suggests that pharmaceutical chemists should prepare a neater, more portable and efficient preparation than the fresh seed (*Brit. Med. Journ.*, May 10, p. 1067).

Attention has been directed to the use of borax in epilepsy by Drs. J. S. Risien Russell and J. Taylor (*Lancet*, May 17, p. 1061). The results obtained in twenty cases lead them to state that it is well worthy of a trial in cases where bromides have failed, or are badly borne.

Borax in Epilepsy. It is given in doses of 10 grains, increased to 20 grains, three times a day. In some cases a scaly eruption appeared, which disappeared when arsenic was administered, and in one case vomiting occurred, which ceased when aromatics were combined with the borax.

Moorland Water and Lead. In an appendix to the report of the Medical Officer of the Local Government Board, just issued, are recorded the results of a number of experiments made by Dr. W. R. Smith to determine whether there is any connection between the life processes of low animal or vegetable organisms and the acidity to which the plumbo-solvent action of moorland waters is supposed to be due. Ten samples of water were collected in May and November from the tributaries and stagnant pools on the gathering ground from which the water running into the Sheffield high service reservoir is derived and certain organisms isolated from them were cultivated with a view to ascertaining whether they possessed the power of giving rise to acidity in the media in which they were placed. The organisms from nine of the samples of water gave either negative or very trifling results. One sample of water, however, taken from a stagnant pool in November, gave a chocolate-coloured and a white torula, both of which imparted a decided acid reaction to the broth in which they were cultivated.

THE CHEMISTRY AND COMMERCIAL POSSIBILITIES OF WATTLE GUM.

BY J. H. MAIDEN, F.L.S., F.C.S.,

Curator of the Technological Museum, of New South Wales.

(Concluded from page 871.)

GROUP II. (CONNECTING GROUPS I. AND III.)

Acacia binervata.
,, *dealbata.*
,, *elata.*
,, *glaucescens.*
,, *penninervis.*

These gums form lower grade gum arabics. Arabin is their main constituent, but they also contain a little metarabin. There is no sharp line of demarcation between this and Groups I. and III., and the classification is, as has already been remarked, only provisional.

	Arabin.	Metarabin.	Ligneous matter.	Moisture.	Ash.	Total.
A. binervata .	76·57	4·24	1·62	16·01	·771	99·211
A. dealbata .	76·37	4.163	1·0	16·3	1·12	98·953
A. elata . . .	74·2	6·85	—	17·73	·581	99·361
A. glaucescens .	66·59	12·3	·5	16·48	3·18	99·05
A. penninervis	70·3	11·42	—	16·67	·66	99·05

Acacia binervata, D. C., 'B. Fl.,' ii., 390.—A "black wattle." Found in New South Wales and Queensland. Obtained from old trees, Cambewarra, New South Wales. Diameter 8-12 inches. It is obtainable in pieces from the size of a pigeon's egg to that of a hen's egg, and is of a waxy lustre. The freshly-exuded gum is very pale brown; old gum is often nearly black. Being in comparatively large masses, sorting for market would be easy. It has a dull horny-looking fracture.

It dissolves fairly well in water, leaving a quantity of insoluble gum in the form of a flocculent deposit. The colour of the dissolved gum is rather dark, owing to the presence of included fragments of bark. This description of the effect of cold water will apply equally well to *A. dealbata* and *A. elata*. Like other wattle gums, its aqueous solution is distinctly acid to litmus paper.

Acacia dealbata, Link., 'B. Fl.,' ii., 415. "Silver Wattle." Found in all the colonies except Western Australia. Sample obtained from Quidong, near Bombala, New South Wales, from trees 12 to 18 inches in diameter.

The gum from this tree is very viscous, and quite as useful as some kinds of gum arabic, taking fairly high rank amongst wattle gums. It is of a sherry colour, up to very dark and dirty looking, and can easily be detached from the tree in large masses. It has a clean but slightly dull fracture. Owing to the roughness of the bark it almost invariably contains, closely adherent to it, or imprisoned within it, small fragments of bark. For a note on the occurrence of this gum, see *A. penninervis*. For the action of cold water, see *A. binervata*. "M. Naudin has in his experimental garden at Antibes (Algeria) a tree of *A. dealbata*, which without any known cause has commenced to produce gum in such quantity that the tree is enveloped in it from the root to the branches. Some of this gum, which is described as being very fine and transparent, has been pronounced by M. Clos to be identical with gum arabic" (*Pharm. Journ.*, [3], xix., 1051).

In a paper by Dr. A. Corre on the gums of senegal, in the *Journal de Pharmacie*, [4], xxiv., [illegible] (*Pharm. Journ.*, [3], vii., 330), the author speaks of this tree as yielding one of the senegal gums. This species is however endemic in Australia. The error is probably a clerical one, but it is as well to draw attention to it.

Acacia elata, A. Cunn., 'B. Fl.,' ii., 413.

Found in New South Wales (Blue Mountains only). Sample obtained from Fitzgerald's Creek, the valley. Height, 50 feet; diameter, 7 inches.

In amber-coloured tears. It does not appear to exude freely, for of say two hundred trees examined by me only one exuded it to the extent of a quarter of a pound; perhaps half a dozen gave a few grains each, while on the remainder no trace of gum was visible. Perfectly healthy trees appear to yield no gum. For the action of cold water see *A. binervata*.

Acacia glaucescens, Willd., 'B. Fl.,' ii., 406.

"Rosewood," "Myall." Found in Victoria, New South Wales and Queensland. "The gum from this tree makes an excellent adhesive mucilage" (*Exhib. Cat.*).

Sample obtained from the Snowy River, New South Wales, where it is called "Myall" and "Boree." The gum is not so scarce as might appear at first sight, but it is very tedious to gather, even on trees which have a fair quantity, since, in this locality at least, in only occurs in small isolated drops or fragments. It could only be obtained from old trees, and always more from the branches than from the stems. The sample as received is in very small pieces, much mixed with bark and lichens; from which, however, it may be separated by tedious hand-picking. The selected gum is then seen to be of a pale amber colour, and rather friable. In the mouth it has a pleasant sweetish taste. When placed in water a fair mucilage, transparent and of a pale colour is obtained, and it could, when not too concentrated, be readily separated by filtering from floating pieces of bark and metarabin.

Acacia penninervis, Sieb., 'B. Fl.,' ii., 362.

A "blackwood" and "mountain hickory." Found in Tasmania, Victoria, New South Wales, and Queensland. Sample from Quiedong, near Bombala, New South Wales.

While not approaching the best kinds of gum arabic in lightness of colour, it is the palest and cleanest looking of the coast Wattle gums described in this paper. Colour pale sherry to orange. It has a bright fracture, although a sample received from Brown's Camp, Delegate, and obtained from various trees 6 feet 2 inches, 6 feet in diameter and 40 feet to 60 feet high, has a dull fracture like *A. binervata*. It is interesting to note that in the Quiedong district the gum was obtained in abundance from shrubs or small trees growing in low ground, while in the Braidwood district no gum whatever could be found on trees of this species, where it grows at high elevations, and at Delegate, at moderately great elevations, only very small quantities of gum could be obtained. The inference is that this species yields gum plentifully from shrubs at low elevations, but little or none from trees at high ones. The same thing has been found to hold good to some extent in regard to *A. dealbata*. These observations point to the truth of the oft-expressed surmise that gum is a pathological product, or the product of plants in uncongenial surroundings.

GROUP III. (METARABIN GROUP).

Acacia decurrens.
Acacia mollissima.
Acacia mollissima, var. *Leichhardtii.*
Acacia vestita.

They swell up enormously in cold water, and seem scarcely to dissolve. They contain metarabin as their main and characteristic component, admixed, however, with more or less arabin. It is interesting to note the variability in composition of these gums. The normal *A. mollissima* appears to contain more arabin than its variety *Leichhardtii*, and there is noticeable variability in the composition of the gums of *A. decurrens*, but it would be rash to make generalizations on the few samples analysed. As a rule they contain more moisture than the more soluble gums.

	Arabin.	Metarabin.	Ligneous matter.	Moisture.	Ash.	Total.
A. decurrens (Cambewarra). .	41·07	32·96	—	23·26	2·38	99·67
A. decurrens (Rydalmere).	23·45	48·38	—	25·45	1·706	99·0·6
A. decurrens (Gosford) . . .	30 1	44·45	—	20·57	3·418	98·538
A. decurrens (Valley)	29·1	46·20	—	21·02	2·827	99·147
A. decurrens (Sydney)	17·2	56·14	—	23·83	2·08	99·25
A. mollissima . .	23·82	52·1	—	21·66	2·081	99·661
A. mollissima var. *Leichhardtii* . .	9·2	66·59	—	21·2	2·28	99·27
A. mollissima var. *Leichhardtii* . .	7 9	63·80	—	23·83	3·8	99·33
A. vestita	38·99	46·4	1·2	11·68	·954	99 174

Acacia decurrens, Willd. : 'B. Fl.,' ii., 414.

"Black," "green," or "Feathery Wattle." Found in all the colonies except Western Australia. Sample 1 from trees of different sizes at Cambewarra. This tree yields gum copiously during the summer season. The gum feels horny under the teeth, though with smart blows it may be reduced to a coarse, bright looking powder. It is one of the most inferior of the abundant wattle gums. It is very slowly and partially soluble in cold water, but swells up in that liquid to a great extent. The soluble portion is pale with a faint cloudiness. After several days' boiling in a large quantity of water it becomes almost entirely soluble.

This gum is the particular delight of small Sydney boys. They soak it in water, add sugar, call the preparation "gum jelly," and consider it exceedingly toothsome.

In sizing leather, a tanning correspondent mixes with the glue, etc., a small quantity of gum of this species or of *A. dealbata* (not quite an ounce to the pound of glue). In his experience this greatly improves the "size," giving the leather a fine polish underneath the bloom when rubbed with the finger, and then shortly afterwards assuming the bloom again. It also prevents the leather from "opening" when bent.

The present species has been introduced into Southern India and Ceylon. According to a correspondent of the *Tropical Agriculturalist*, he never uses any other gum for office purposes (vol. ix., 66). The species is so common in Ceylon that it could scarcely be mistaken, and the statement points to a change for the better having taken place in this gum in its new locality.

Sample 5. Purchased in Sydney. In more than ordinarily large tears and irregular masses. Perfectly transparent, and in colour amber of all shades. A typical sample of the pure gum. It was sold in a shop as "chewing gum," but I was informed by the proprietor that it was chiefly used for making jellies. Certainly it is a very harmless "chewing gum," and if people in the colonies intend to adopt this practice, after the fashion of the Americans, they have a material at hand, without resorting to some of the substances iniquitously sold as "chewing gum," some of which have been found to contain as much as 7 per cent. of solid paraffin.

Sample 3. Gosford, near Sydney. A beautifully clear sample, of a pale brown colour, and only second in appearance to the preceding sample.

Samples 2 and 4 require no detailed notice.

Acacia mollissima, Willd.; Syn. *A. decurrens*, Willd.; var. *mollis*, 'B.Fl.' ii., 415.

Found in Tasmania, Victoria and New South Wales, "green" or "silver wattle."

It forms a lower class gum arabic. It is said to be sometimes substituted (in Tasmania, at least) for that of *A. dealbata*, but it is far inferior ('Cat. Tas. Exhib.,' Exhibition of 1862). "Jark" was the name given by the Yarra (Victoria) aboriginals to this gum. They used to employ it for fixing the bottom ends of their spears, which were taken from a small wattle in the Loddon district ('Cat. Intercol. Exhib.,' Melbourne, 1866). Brough Smyth ('Aboriginals of Victoria,' i., 304) also states that it is occasionally used for fixing the chips of stone in jagged spear-heads. It would, however, be a poor material for any such purpose.

Sample from Bell's Creek, Araluen, New South Wales. From trees 25 to 30 feet high, and diameter 6 to 18 inches.

A transparent, amber or sherry coloured gum in rounded masses up to the size of marbles. It cannot be distinguished from that of *A. decurrens* by physical appearance or behaviour in water.

Acacia mollissima, Willd., var. *Leichhardtii*, F. v. M.

A variety apparently confined to south-eastern New South Wales, where it is known simply as "wattle." Sample from Monga, near Braidwood, from trees 15-40 feet high, and 6-15 inches diameter. The collector states that he has never seen gum so abundant on any species of acacia as on this one; the most copious flow took place in November, some time after flowering.

Sample 1.—Gathered from the tree. An amber-coloured gum, somewhat dirty in appearance, and having a greasy lustre. Cold water acts upon this gum in a precisely similar manner to that of *A. decurrens.*

Sample 2.—Picked from the ground. It so happens that the general appearance of this sample is lighter and cleaner than the preceding one.

Acacia vestita, Ker., 'B. Fl.,' ii., 375.

Confined to southern New South Wales and northern Victoria. Rare. Has no other local name than "wattle." Sample from Tombong, Snowy River, New South Wales. It appears to possess a slight and peculiar odour when quite fresh, but this may be accidental. It was obtained from an old tree. This sample is of a dark amber colour, breaks with a bright fracture, and is mixed with fragments of bark, which it has almost entirely enclosed, with the result that it is almost black by reflected light. By careful hand-picking a quantity has been selected for analysis. In cold water it swells up considerably, then breaks down, leaving a considerable quantity of jelly of metarabin, while the supernatant liquid is pale-coloured and slightly opalescent.

The following gum probably belongs to Group III., but the sample at my disposal is not sufficient for me to spare enough for quantitative determinations.

Acacia linifolia, Willd., 'B. Fl.,' ii., 371.

The Valley, Blue Mountains, April 1, 1888. This shrub, or small tree, rarely exudes gum, so far as my experience goes. But a plant 1½ inch in diameter, yielded about an ounce of a pale gum which swells up in cold water.

Wattle Gums not seen by the Author.

Acacia decora, Reichb., 'B. Fl.,' ii., 372 (included by Baron Mueller in *A. buxifolia*, A. Cunn.).

Mr. Edward Palmer ('Proc. R. S., N.S.W.,' 1883, p. 94) states that the blacks of Northern Queensland feed on gum of this species.

Acacia farnesiana, Willd., 'B. Fl.,' ii., 419.

Found in all the Colonies except Tasmania. Sometimes called by the absurd name of "Dead Finish."

This gum is collected in Sind, and forms part of what is known in Bombay as Karachi gum, a kind of gum arabic ('Mat. Med. of W. India,' Dymock, 281). I have not heard of its occurrence iu Australia.

Acacia harpophylla, F. v. M., 'B. Fl.,' ii., 389.

The common brigalow. Found in South Queensland. It yields a gum arabic. Some collected by Mons. Thozet was exhibited at the Intercolonial Exhibition, Melbourne, 1866, as was also some from *Acacia Bidwilli*, Benth.

Acacia longifolia, Willd., var. *mucronata*, F. v. M. Syn. *A. mucronata*, Willd., 'B. Fl.,' ii., 398.

Found in Victoria and Tasmania. This gu was shown at the International Exhibition of 18 where it was considered a fair gum arabic.

Acacia melanoxylon, R. Br., 'B. Fl.,' ii., 388.

"Blackwood." Found in Tasmania, Sou Australia, Victoria and New South Wales.

Herr G. Kraus gives a microscopical investigation of gum of this species in *Ber. Sitz. Naturf Ges., Halle*, 1884, 19 (*Journ. R. Micros. Soc.*, [2] vi., 1886, p. 90).

I have never seen nor heard of gum naturally exuding from this species, although the tree is so well known in Australia and Tasmania. A collector also states, "I have examined hundreds of trees with the view to obtaining samples of gum and have in not one instance yet seen a trace of it though I have examined trees in all situations and conditions, from deep rich valleys up to rocks and stone ridges of mountains more than 5000 feet high. I have examined trees of all ages, both sound as well as broken and bruised, but have so far not seen any sign of gum."

Acacia microbotrya, Benth., 'B. Fl.,' ii., 363.

"Badjong" of the aboriginals. Found in Western Australia.

This tree often produces 50 lbs. from one tree, in one season. The aboriginals store it in hollow trees for winter use; it is of a pleasant, sweetish taste (G. Whitfield). It is said to form a superior gum arabic.

Acacia pycnantha, Benth., 'B. Fl.,' ii., 365.

"Golden" or "Broadleaved Wattle" of South Australia. Found also in Victoria and New South Wales.

A quantity of gum from this species was exhibited at the Intercolonial Exhibition, Melbourne, 1866. Mr. J. E. Brown, Conservator of Forests of South Australia, in a report says of it: "During the summer months this wattle exudes a very considerable quantity of gum, which is used for the same purposes as the well-known gum arabic. Large quantities of this superior marketable article were gathered in the early days of the colony, but of late years the supply has fallen off, owing to the fact that the trees aro now cut down at an age before they exude gum in any quantity."

Acacia retinoides, Schlecht., 'B. Fl.,' ii., 362.

Found in Victoria and South Australia. Said to yield a good Wattle gum.

Acacia saligna, Benth. von Wendl., 'B.Fl.,' ii. 364.

"Weeping Wattle." Found in Western Australia.

This species is said to yield a useful gum. In an official report it is stated that it "is recommended by the medical faculty for its strengthening properties."

PHARMACY IN SINGAPORE AND CEYLON.*

BY A. TSCHIRCH.

The largest pharmacy of Singapore lies in the centre of the city. The proprietor is a German, and as is generally the custom in the English colonies "stood in" with a physician, also a German, and who, if I am correctly informed, is likewise part owner of the pharmacy. His consulting room joined the store, he receives patients in the pharmacy, and calls for him were also received there. Costly "concessions" or privileges are unknown there, legal authorization not being required. One can open a pharmacy at any time (provided always that he has the necessary capital) and forthwith begin dispensing, and it is by no means a poor business. I am well assured that our friend there will return to Europe a rich man within ten years—rich, too, in the Indian sense, which is quite a different thing from the European.

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* From the *Pharmaceutische Zeitung*. Reprinted from the *Druggists' Circular and Chemical Gazette*, January.

On entering the large and roomy store, which was level with the ground and well filled, particularly with specialties, I found the pharmacist, a man of gigantic stature, hard at work. He was clad in a pair of trousers, and a gauze shirt, and promptly desisted from the work in hand to supply my wants. I also afterwards became acquainted with his partner, the physician, a most agreeable man with extensive practice, with whom I afterwards had the pleasure of an outdoor lunch on the terrace of the Singapore Club, overlooking the beautiful harbour. The working costume of the partner, which had at first struck me as rather startling, was not at all unusual for Singapore. In the largest business houses chiefs and employees alike work in their shirt sleeves, and even with the large lofty room, wide and airy, and with a punkah (a broad fan) waving over each working place, the heat frequently becomes utterly intolerable.

As to the hours of opening and closing, the pharmacist does the same as every other business man in the city, opening at nine and closing at five. Before and after these hours nothing can be obtained. The sick conduct themselves accordingly, and it is only as an exception that entrance can be obtained at any other time. At nine o'clock the stream of merchants and functionaries flows toward the city from the surrounding hills, where they live in neat country homes or bungalows, amid delightful surroundings. The number of carriages and riders fairly crowd the streets; the stores and offices are then opened and the streets become empty. At five they are all closed and the stream of carriages and riders flows outward again, and by six o'clock the city lies deserted. Then the good people assemble in the club houses, on the lawn-tennis courts and pleasure grounds, or in some way take that exercise which is such a hygienic necessity in the tropics.

I myself once suffered from this early closing. The physician having one afternoon prescribed diluted hydrochloric acid for me I went toward evening to obtain it. After repeatedly knocking the door of the pharmacy was opened by the inevitable Chinee. The proprietor had but just gone home, so I told his factotum, who appeared to be somewhat acquainted with the premises, what it was that I desired. He, however, wanted to put up first crude hydrochloric acid and even carbolic acid. I therefore betook myself behind the prescription counter and sought out the desired article and gave the son of the Celestial Kingdom, who stood gazing open-mouthed, the pleasure of seeing me carefully cap the bottle myself (with 15 plaits), and it was very fairly done too, although it was eleven years since I had practised the noble art of capping.

In Ceylon I also had an opportunity to learn something of the pharmaceutical establishments. While the pharmacy in Singapore, notwithstanding its essentially English character, had impressed upon it certain German characteristics through its German proprietor, which showed themselves in various ways, such was naturally not the case with the largest pharmacy of Ceylon in Colombo, which was entirely in English hands. This was a genuine colonial pharmacy. The legend "Colombo Apothecaries' Company" on the large sign above the wooden awning aroused my curiosity. What did it mean? Was pharmacy here conducted by a stock company? This proved to be very near the case, as I found on further investigation. The headquarters of the house, as with many colonial business houses, was not in Ceylon, but in London. A physician, a pharmacist and a capitalist had established the business, without of course any "concession" in our sense of the word. They had merely opened the business and then informed the Government of the fact. The undertaking thrived, and their handsome two-storied house being in one of the best locations of the town, they were induced to enlarge the business. A dentist was first engaged, then a photograph gallery was added, and finally a large bazaar was established.

The occasion upon which I first went to this house in the spring was somewhat peculiar. The photographer of the Apothecaries' Company had in his cabinet a collection of travelling naturalists, etc., and desired to "hang up" Mr. Church (for I was known by no other name in English India) along with them. I accepted the courteous invitation, and so gained an opportunity of catching a glimpse of the business. The rooms covered the entire ground floor and the first floor of the large building. On the ground floor of the Apothecaries' Company (!) you could purchase rubber cloaks, fans, carvings, umbrellas, slippers, jewellery, photograph-albums, books, dress goods, pictures, perfumery, shoes, stationery, hats, tooth powder, and many other articles. On the first floor of this Apothecaries' Company, where the photograph gallery was established, where the dentist tortured his patients, and the office was located, could also be found all the articles indispensable to the European, such as lamps, glasses, overcoats, tools, porcelain, and many other things. You could not say that the business was by any means one-sided; all was there that the heart could desire.

But where then was the pharmacy which gave the name to the whole proud building? In fact I had almost overlooked it, and indeed, it was not very easy to find. On the ground floor of the large bazaar a little space was partitioned off which was lit by a single low window, and in this place a half-breed ruled, dispensing medicines. Against the wall stood the stock of bottles, and on a small table were prepared the healing drinks for ailing mankind, and among others, unfortunately for myself also.

Notwithstanding these primitive arrangements, I did not hear that the familiar complaint of bad drugs had grown particularly loud. What I got there was in every instance well prepared, neatly labelled and elegantly wrapped up, while the prescription was always placed in an envelope bearing the inscription "a copy of every prescription is kept, therefore when a repetition is required, the number of the same will be sufficient." One would think himself in Europe. Above all and without jealousy it must be confessed that the English are born colonists. They are industrious and quiet, and where they come, order follows. For instance, the trains on the Kandy-Colombo railroad line arrive so punctually, and go so rapidly, that they leave nothing to be desired. I have often envied the Cingalese their rapid communication There they do not know what a second-class road is; we however do.

Before leaving Ceylon I felt that I must at least see one Singhalese pharmacy, and shortly before my departure from the hospitable house of the charming German Consul, Freudenberg, I rode once again to Colpetly and made a call upon the cinnamon-brown apothecary, with the beautiful almond eyes. Here also the natives, the Singhalese as well as the Tamils, quite frequently consult European, or at least half-caste physicians, and consequently, here also, the business of the native pharmacist has fallen off, although the store rent at least cannot be very high.

The most noteworthy difference between the architecture of the Japanese and Singhalese houses is that while the Japanese live in isolated houses, the streets of the villages of Ceylon are lined with extraordinarily long, narrow buildings, all under one continuous roof and divided by transverse walls into numerous single dwellings or shops, of which seldom more than two belong to one family. On this account the general effect of the buildings is much poorer. The "native dispensary" at Colpetly was located in such a compartment of one of these houses, and its appearance makes by no means an impression of stateliness.

A room even with the ground, with tottering shelves on which the medicaments stood in boxes and jars, on the right a bench upon a few chests, a shaky table of European make, with balances on it composed the entire establishment. But the intelligent apothecary, who spoke English fluently, with his brilliant artistic "sarong" and dazzlingly white jacket, and the luscious fruit laden cocoa palms and bread fruit trees peeping over the house tops, made us soon forget the poverty of the shop, and we saw in our eastern colleague rather the type of the contentment of Paradise. He desired no more than he possessed. He but recently purchased the business, and had paid certainly not 100,000 marks more than the previous owner, and, as I heard, without the assistance of an agent. Among his drugs the "five minor roots" were, of course, not missing (*Desmodium Gangeticum*, *Uraria lagopodioides*, *Solanum Jacquini*, *Solanum indicum*, and *Tribulus terrestris*), nor were the "five major plants" wanting (*Ægle Marmelos*, *Calosanthes Indica*, *Gmelina arborea*, *Stereospermum suaveolens* and *Premna speciosa*).

CAOUTCHOUC PLASTERS.*

BY A. SCHNEEGANS AND M. CORNEILLE.

The authors, who are pharmacists in the Bürgerspital at Strassburg, state that they have for some time past been experimenting with a view to replacing purchased caoutchouc plaster with plasters made more economically on the premises, and in this they claim to have succeeded, plasters made according to the formulæ published by them being actually in use and much appreciated in the clinic of the hospital.

The method of operating is described as very simple, requiring no special apparatus, and such as to be remunerative in an ordinary pharmaceutical laboratory. As the number of preparations that can be made with advantage by the pharmacist is daily decreasing, the authors considered it desirable to let the result of their experiments be known.

The basis of the plasters adopted is a mixture of lanolin, benzoated tallow, caoutchouc and dammar resin in variable proportions. The proportions of caoutchouc and dammar resin are kept as small as possible, consistent with securing a good adherent mass; the lanolin and tallow preponderate, which excludes irritating action upon the skin. A slight addition of glycerine prevents the plaster from becoming dry and brittle under the action of the atmosphere.

The caoutchouc is incorporated in the form of a solution, which is made by macerating the flake india-rubber of commerce in five times its weight of benzine, with frequent agitation. The india-rubber swells up at first considerably, but dissolves entirely after three or four days. The following are the formulæ adopted, and the manner of operating:—

Zinc Oxide Plaster (20 *per cent.*).

Dammar resin	20 parts.
Benzoated tallow	25 „
Lanolin	15 „
Caoutchouc	8 „
Glycerine	12 „
Zinc oxide	20 „

The resin is melted over a bare fire; then the tallow is added and the whole is strained through three or four thicknesses of gauze. With this mass, whilst still liquid, the lanolin and caoutchouc solution are incorporated, under continual agitation. A very homogeneous mass is thus obtained, which is heated with necessary precautions, over a water-bath, to eliminate the benzine. After complete evaporation of the benzine, which on the large scale can be recovered by distillation, the zinc oxide, previously made into a fine paste with the glycerine, is added. When the mass is uniform it is allowed to stand for a time while warm, to permit bubbles of air to escape, and it is then spread upon shirting. The mass should not be too warm when spread, or it may soak through the shirting; the thickness of the layer should be from that of a sheet of writing paper to that of a playing card. The plaster is dried in the air during two or three days, then covered with gauze, rolled and wrapped in paper.

Mercury Plaster (20 *per cent.*).

Dammar resin	25 parts.
Benzoated tallow	12 „
White wax	15 „
Lanolin	20 „
Caoutchouc	8 „
Metallic mercury	20 „

The mercury is extinguished with the lanolin. The mixture, which is at first light grey, darkens during the trituration and finally becomes blue grey. The resin is melted with the tallow and wax, strained through gauze, the solution of coautchouc added and the benzine driven off on a water bath; to this warm mixture the mercurial lanolin is added and the whole worked up together. It is then allowed to stand at a gentle heat for the escape of air bubbles, and the mass is spread when it has almost lost fluidity. The plasters are kept in tin boxes in a cool place.

Mercury and Zinc Plaster (20 : 10 *per cent.*)

Dammar resin	20 parts.
Benzoated tallow	12 „
White wax	10 „
Caoutchouc	8 „
Lanolin	20 „
Mercury	20 „
Zinc oxide	10 „

The mercury is extinguished with the lanolin, the zinc oxide rubbed in, and then added to the lukewarm mixture of the other constituents.

Iodoform Plaster (20 *per cent.*).

Dammar resin	15 parts.
Benzoated tallow	30 „
Lanolin	20 „
Caoutchouc	5 „
Glycerine	10 „
Iodoform	20 „

Prepared in the same way as the zinc plaster. The iodoform is triturated with the glycerine and added to the mass, suitably cooled to avoid the volatilization of the iodoform. The plaster is preserved in tin cases.

Boracic Acid Plaster (20 *per cent.*).

Dammar resin	20 parts.
Benzoated tallow	25 „
White wax	15 „
Caoutchouc	8 „
Lanolin	12 „
Boracic acid	20 „

The resin, tallow and wax are melted together, and the solution of caoutchouc added to the mixture while still liquid. After driving off the benzine on a water bath, the boracic acid, rubbed up with the lanolin, is thoroughly incorporated with the mass.

The formula for *Salicylic Acid Plaster* corresponds to that for Boracic Acid Plaster.

Ichthyol Plaster (20 *per cent*).

Dammar resin	20 parts.
Benzoated tallow	20 „
White wax	20 „
Caoutchouc	8 „
Lanolin	12 „
Ichthyol (Ichthyol-sodium) . . .	20 „

The ichthyol is melted upon a water-bath with the lanolin and incorporated with the liquid mixture of the other constituents.

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* Journal der Pharmacie von Elsass-Lothringen for ary, March and April.

The Pharmaceutical Journal.

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SATURDAY, MAY 31, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACOPŒIA REVISION.

ALMOST simultaneously, measures have been in progress for a revision of the United States Pharmacopœia and for the preparation of an addendum to the British Pharmacopœia. On page 987 will be found a report from a correspondent in America of the proceedings of the Pharmacopœia Convention in that country, and we have also received from Professor ATTFIELD, by direction of the General Medical Council, an advance copy of his latest annual report on the British Pharmacopœia, 1885, which has just been presented to the Pharmacopœia Committee of that body. This report contains as usual, a brief descriptive *résumé* of observations published during the past year which have a direct bearing upon the contents of the British Pharmacopœia and critical comments upon them intended to promote some proposed improvement in a future edition of that medical and pharmaceutical authority. Among various other subjects treated of, prominence is given to the consideration of the influence exercised by the Pharmacopœia on the quality and strength of those preparations which are in ordinary use for the purposes of domestic medication. This has been done in view of the circumstance that a recent unquestioned magisterial decision has given legal recognition to the British Pharmacopœia as a standard for these familiar remedies. The recognized position that has thus been accorded to the Pharmacopœia as the legal standard is referred to in the report as having been apparently welcomed by the majority of chemists and druggists in the kingdom, and we have reason for believing that is really the case with all who take a sound view of what is desirable in the interests of the public and of British pharmacy. There can be no doubt of the propriety of pharmacists doing all they can to impress upon the public that domestic remedies should be of uniform quality and strength, and the same in those respects as the medicines physicians direct to be used in the compounding of their prescriptions. If chemists and druggists would uniformly adopt that course, and give their own individual guarantee that this principle is adhered to by them, they would help to rid themselves of much of the outside competition of which they complain, and to put a stop to the sale of weak and inferior articles that are often supplied in lieu of the preparations of higher standard sold by themselves. This is a procedure distinctly in the interest of the pharmacist, besides being conducive to the benefit of the public. The principle involved in it is of far greater importance than any consideration of the question whether it is legally compulsory to sell by retail only British Pharmacopœia preparations, and it should stand higher in the appreciation of pharmacists. On these grounds we gladly endorse the view expressed by the President of the British Pharmaceutical Conference last year, and quoted by Professor ATTFIELD in his report, to the effect that it is desirable pharmacists should cooperate with the Medical Council in the endeavour to establish as far as possible the British Pharmacopœia as the recognized legal standard for medicinal preparations.

But while unreservedly expressing this opinion it is impossible to ignore the fact that established usage, founded in some instances on the justifiable basis of authority given by previous Pharmacopœias as well as upon popular taste, has had the effect of creating a demand for some medicinal preparations of the kind employed for domestic medication which are different from those of the British Pharmacopœia to which they most nearly correspond. It is only necessary to mention in the popular nomenclature, such articles as sweet spirit of nitre, sal volatile and milk of sulphur to justify the doubt whether such preparations can be included under the ægis of the Pharmacopœia. Is it likely that those who have long been addicted to the use of such preparations will permit their predilections for them to be extinguished by the uncompromising edict that the names by which they have been known and approved have henceforth been appropriated as synonyms of other things that are declared to be superior? This is scarcely a case where medical authority can prevail. Domestic medication, a custom irregular in itself, can scarcely be expected to submit to regulation upon orthodox principles. Truly the pharmacist may contribute to the bringing about of such a result by wise administration of professional advice that may sometimes be useful, though at others it would be resented as an attempt at grandmotherly education as much out of place as the attempt of an innkeeper to press his recommendation of railway travelling as an improvement upon a customer invincibly determined to adhere to the older variety of locomotion. We have no sympathy whatever for chemists and druggists of the class who, actuated solely by trade spirit, consider their highest aim to be that of pleasing their customers without regard to other considerations. With such it may be requisite that *caveat emptor* should be a maxim remembered by their customers as well as by those of a class who care little what they sell so long as it is profitable. But it must still be maintained that the first duty of the pharmacist as a trader is to satisfy his customers by honestly supplying them with what they want. If the authority of the Pharmacopœia and the technical knowledge of the pharmacist can be applied to the rectification of those wants, well and good; but to go beyond that would be to adopt a course that might be held to savour of impertinence, and that would be likely to fail in attaining its object.

The case in which a magisterial recognition of the British Pharmacopœia has within the past year supported the doctrine that the Pharmacopœia is the absolute standard for all medicinal preparations, not excepting those employed for domestic medication, is one that presents a somewhat unhappy opportunity for enforcing that doctrine. It was a result of the decision to adopt in the Pharmacopœia certain popular designations as synonyms of preparations recognized in the Pharmacopœia. The intention of that decision was in every respect good: it was evidence of regard for the need of introducing greater precision into the application of names to medicinal preparations, and so far as it applied to those containing potent drugs the adoption—and even the appropriation—of synonyms that had been loosely used was a distinct gain. But there is danger in following too implicitly a path thus paved, and in the extended attachment to official preparations of synonyms that have long been familarly applied to other things there seems to have been in some instances an excessive desire to make the Pharmacopœia a standard. In ruling that the terms laudanum and paregoric shall be represented in trade only by the preparations to which they have been attached by the authority of the British Pharmacopœia there can be no doubt that good service has been rendered both to those who require to use these preparations and to those whose business it is to supply them. In the case to which the above-mentioned magisterial decision relates the conditions appear to be different. The aromatic spirit of ammonia of the British Pharmacopœia is not the preparation to which the term "spirit of sal volatile" was applied by a former authority, nor is it the preparation that is familiar to many under the name of "sal volatile." Moreover, while there can be no argument in favour of two kinds of laudanum, there seems to be little reason for objecting to the continuance of two or more kinds of a preparation such as spirit of sal volatile. In fact the evidence points the other way, since the older spirit of the London Pharmacopœia, as well as some other analogous eparations, are still preferred in popular esteem, although the B.P. preparation is held by orth dox authorities to be superior. Altogether apart therefore, from any question as to the legality appropriating synonyms so as to bind the action traders, we fail to perceive the utility of makin "sal volatile" a synonym for the official aromati spirit of ammonia. Many persons who a for "sal volatile" do not desire to have th B.P. preparation, but something else; and upo the principle that a trader is bound to supply what his customer demands, we cannot se any reason why he should be prevented from doing so in such cases, provided there be a perfect understanding between the parties to the transaction. If aromatic spirit of ammonia were asked for the case would be entirely different, and this shows that the attempt to introduce uniformity in this instance is unfortunate in tending rather to confusion than otherwise. Moreover, in the adoption of a synonym in the British Pharmacopœia, it is to be assumed that any synonym adopted should be the scientific equivalent of the official name, not merely a popular term that may be altogether incorrect. The term "sal volatile," however, does not represent aromatic spirit of ammonia of any kind, otherwise than by vulgar error; properly it denotes carbonate of ammonia, and hence its use as a synonym of the pharmacopœia preparation to which it has been attached should be limited to the statement that it represents what is popularly known as corresponding to that preparation. In any case it appears that a loose adoption of erroneous popular names as synonyms of official medicinal preparations in regard to which precise definition is desired, would tend to defeat its own object if it were not accompanied by some qualification such as that indicated, and beside that we might expect to see the Pharmacopœia disfigured by the introduction of such terms as "sweet nitre" and "hartshorn" as synonyms for spirit of nitrous ether and solution of ammonia.

The pressure upon our space last week prevented our mentioning that among those upon whom birthday honours were conferred by Her Majesty Sir Henry Wentworth Acland, K.C.B., Regius Professor of Medicine in the University of Oxford, was created a baronet of the United Kingdom, H. Trueman Wood, Esq., Secretary to the Society of Arts, received the honour of knighthood, and W. C. Roberts-Austen, Esq., F.R.S., Assayer to the Royal Mint, and George Bullen, Esq., late Keeper of the Printed Books, British Museum, were appointed Companions of the Most Honourable Order of the Bath, Civil Division.

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In the *Times of India* of Friday, May 2, is an announcement of the appointment, from the 1st of May, 1890, of Surgeon-Major J. Parker, *M.D.*, to be medical storekeeper, Bombay, vice Brigade-Surgeon W. Dymock, retired. The latter is an honorary member of the Pharmaceutical Society of Great Britain and well known to our readers; the former was recently a student in the laboratories of the Society's School.

United States Pharmacopœia Convention.

At Washington, on Wednesday, May 6, at noon, Robert Amory, M.D., who was the presiding officer of the United States Pharmacopœia Convention of 1880, called the Convention for 1890 to order and announced that the meeting was ready for business, and having appointed a committee on credentials, then read a brief address. There were present over 150 delegates. Very shortly afterward an adjournment was taken that the committee might prepare its report, and the delegates, with the ladies accompanying them, called at the White House to pay their respects to the President of the United States. On reassembling, the Committee reported the names of the organizations represented and the names of the delegates. There were present during the two days of the Convention 190 delegates, representing medical colleges and societies, pharmaceutical colleges, schools and associations, besides the American Pharmaceutical Association, and representatives from the medical branches of the army, navy and the marine hospital service. A call for a nominating committee representing one delegate from each organization present made a very formidable body of about 80, and during the evening they deliberated—in fact, quite into the morning before they were through the business assigned to them.

The report as read at Thursday morning's session was at once heartily adopted as follows:—

President, Horatio C. Wood, M.D., LL.D., Philadelphia.

Vice-Presidents, William S. Thompson, Washington; Albert E. Ebert, Ph.G., Chicago, Ill.; J. M. Flint, M.D., U.S.N., Washington; D. Webster Prentiss, M.D., Washington; William M. Searby, San Francisco, Cal.

Secretaries, Robert A. Hare, M.D., Philadelphia; G. H. Charles Klie, Ph.C., St. Lewis, Me.

These officers were unanimously elected.

The Committee further reported that its members had united in presenting the following names for the Committee of Revision and Publication:—Charles Rice, Ph.D., New York; Joseph P. Remington, Ph.M., Philadelphia; F. B. Powers, Ph.D., Madison, Wis.; P. W. Bedford, Ph.G., New York; Surgeon W. M. Mew, M.D., U.S. Army; Surgeon John Godfrey, M.D., Marine Hospital Service; Surgeon J. M. Flint, M.D., U.S. Navy; John M. Maisch, Ph.M., Philadelphia; George F. H. Markoe, Ph.G., Boston; Roberts Bartholow, M.D., Philadelphia; Charles O. Curtman, M.D., St. Louis; Frederick A. Castle, M.D., New York; N. S. Davis, Junr., M.D., Chicago; C. Lewis Diehl, Ph.G., Louisville, Ky.; R. G. Eccles, M.D., Brooklyn, N. Y.; Willis G. Gregory, M.D., Buffalo, N. Y.; Charles Mohr, Ph.D., Mobile, Ala.; Oscar Oldberg, Phar.D., Chicago; Lucien Sayre, Ph.G., Lawrence, Kans.; Otto A. Wall, M.D., St. Louis; Thomas F. Wood, M.D., Wilmington, N. C.; Henry H. Rusby, M.D., New York; Alfred B. Taylor, Ph.M., Philadelphia; Robert T. Edes, M.D., Washington; Carl N. S. Hallberg, Ph.G., Chicago; and by a subsequent vote the President of the Convention for 1890 was added to the Committee.

The Report by the Secretary of the Committee of 1880 was read, giving information as to the meetings, correspondence, methods of voting, members deceased and resigned from the Committee, members elected to fill vacancies, and matters pertaining to the publishing of the work; while the Treasurer's report gave all the items of receipts and expenditures, showing a balance on hand ready to turn over to his successor of $2878·50.

The new officers being now in charge, the Secretary of the previous Committee read the report prepared by it in pursuance of the instructions from the Convention of 1880 to submit a draft of the general principles which should guide the next Committee of Revision. After being read in full the separate sections were then read separately, so considered, and, as finally adopted, they read as follows:—

Draft of the General Principles which are to Guide the next Committee of Revision, etc.

1. *Assay Processes for Drugs.*—It is recommended that assay processes be appended to the descriptions of the more energetic or otherwise important drugs containing active principles, provided the therapeutic value of the drug depends upon the amount of these principles, and provided, also, that these principles can be assayed and identified with reasonable accuracy and without requiring complicated processes. The Committee may attach a note stating the usual percentage of these active principles in good commercial samples of the drug, and, if it be found feasible, it may attach a requirement that the drug shall not be used unless it conforms to these limits.

2. *Assay Processes for Galenical Preparations.*—The Committee may attach assay processes to such galenical preparations as fluid extracts, tinctures, etc., and shall adapt standards corresponding to those established under the preceding section, but it shall omit requirements of a definite strength or percentage of active principles except in the case of drugs for which an upper or lower limit, or both, of active principles is prescribed.

3. *Assay processes for Opium and Cinchona.*—In the case of opium and cinchona the Committee shall adopt such processes of assay as will be found to yield the largest proportion of the desired active principles with greatest uniformity and with least manipulative difficulty, the object of these processes being to ascertain how much of the respective principles can practically be extracted.

4. *Descriptions of Chemicals and Tests.*—In the case of chemicals the degree of purity, or the allowable percentage of impurity, shall be prescribed as closely as practicable. The standard of purity shall be set as high as practicable for legal enforcement, but not beyond a point reasonably attainable by the manufacturer without subjecting any particular product to unnecessary cost through the enforced removal of some harmless and insignificant accidental impurity.

5. *Chemical Formulas.*—Chemical formulas shall be given only in the new notation.

6. *Proprietary or Patented Articles.*—No substance which cannot be produced otherwise than under patented processes, or which is protected by proprietary rights, shall be introduced into the Pharmacopœia.

7. *Nomenclature.*—In the choice of official titles of articles it is recommended that convenience, established custom, and considerations of safety against mistakes, through similarity of or changes in names, should outweigh purely theoretical considerations or scientific preciseness.

8. *Specific Gravity.*—It is recommended that the Committee define the exact degree of temperature of the standard by which other specific gravities are to be determined, and the specific gravities of the various official liquids shall be determined and stated by the Committee, so far as it may be practicable, on the basis of the established temperature and other conditions of the standard.

9. *Weights and Measures.*—It is recommended that the next Committee of Revision be instructed to direct solids to be weighed and liquids to be measured, except in such cases as the Committee find it advisable to use parts by weight only, and that the metric system be employed for that purpose.

10. *General Formulæ.*—It is recommended that general formulas be introduced for fluid extracts and such other preparations as have duplicate products, and that

the general formulas to be followed in any particular case be merely indicated by reference.

11. *List of Reagents, Tables, etc.*—The tables and list of reagents authorized or prescribed for the Pharmacopœia of 1880 shall also be inserted in that of 1890, with such correction or substitutions as may be required to bring them up to date.

12. *Publication of the Pharmacopœia.*—It is recommended that the Committee of Revision, etc., which will be elected by the Convention of 1890, be authorized to print and publish, on its own account, the Seventh Decennial Revision of the Pharmacopœia of the United States of America.

13. *Date for the Pharmacopœia to go into effect.*—The Committee shall announce in a conspicuous place, in the printed work, a definite date, reasonably distant from the actual date of publication, when the new Pharmacopœia is intended to go into effect, and to supersede the preceding one.

14. *Compensation of Experts.*—It is recommended that the Convention of 1890 instruct the Committee of Revision, etc., to pay the experts and others employed in the preparation and publication of Seventh Decennial Revision of the Pharmacopœia.

There was some considerable discussion on the paragraphs on assay of drugs (paragraphs 1, 2, 3); on patented and proprietary articles (6); weights and measures (9); but the general drift of it all was to coincide by a large majority with the views of the committee, and the vote was nearly unanimous, or by large majorities. It was ventured to offer as an amendment the use of the avoirdupois ounce with a fluid ounce, to correspond in weight, but this was voted down by a large majority. The able address of Mr. T. C. Mendenhall, of the Coast Survey Office, which preceded the discussion on paragraph 9, was a clear exposition of the legality of the metric system as being the only one that was upon the statute books of the nation, all other standards being the enactments of state and not national legislation, while it was the only one that admitted a harmonious comparison of weights and measures. When the vote was taken it was carried by a vote that was very nearly unanimous. It will be observed that the committee has the option of using "parts by weight," for some preparations in their judgment—and this is to cover the use of mixtures of fluids of light with those of heavy density, in which exact chemical proportions are desired in the product.

With the election of the committee of revision and publication, and the adoption of general rules for its guidance, the functions of the convention usually cease. But in this instance there was an evident desire to make a suitable acknowledgment of the splendid labours of the chairman of the committee of revision of 1880, and the hearty and unanimous passage of a resolution authorizing the treasurer to pay to Charles Rice the sum of one thousand dollars as an honorarium for his past services will show the true appreciation of his confrères for his devotion to the advancement of pharmacy, and his work as expressed in the pages of the United States Pharmacopœia of 1880.

No meeting of physicians or pharmacists, or both, ever disbands without some pleasant features besides the business transacted. So your correspondent would note that a delightful evening reception was given at the home of Mr. Thomas E. Waggaman, whose fine gallery of paintings and collection of Japanese curios are among the most interesting in Washington; a visit to Mount Vernon, a feast at Marshall Hall, one of the handsome spots on the Potomac River where in season (which was just at the time of our visit) *planked shad* is one of the epicurean allurements.

The convention is over, the work of the Committee is about to begin, and when in the early part (probably) of 1892, the next Pharmacopœia is ready for delivery, your correspondent does not think it will receive other than kind words and hearty approval.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual meeting of the Midland Counties Chemists' Association was held on Tuesday night, at the Mason College, Birmingham; Mr. W. J. Wyley presiding.

The annual report which was presented stated that the Association now numbers 163 members and associates. The Session had been opened by a Conversazione at the Midland Hotel, at which the President, Mr. W. J. Wyley, delivered his presidential address. Three other meetings had been held for the reading of papers; the annual supper had been held in December, the annual ball in January, and a musical and social meeting in April. At all these meetings the attendance had been fairly good. Four council meetings had been held during the year, at which the subjects discussed had been the Pharmacy Act Amendment Bill, Medicated Wines, Railway Rates, the Pharmaceutical Society Council Election, and others of minor importance. Regret was expressed that the Council of the Pharmaceutical Society had not seen its way to give a grant for the purchase of books, in consequence of there being no classes in connection with the Association, and it was stated that a subscription list had consequently been opened for the purpose, to which it was hoped there would be a liberal response. The subject of the classes had received very careful attention. A sub-committee had been appointed, the fees had been reduced and circulars had been issued to all members, associates and apprentices, but nevertheless it had been found impossible to continue the classes, on account of the small number of persons who sent in their names. The applications for relief from the benevolent fund had not been numerous, and assistance had been given in every deserving case. The cricket section had met weekly, and seven matches had been played during the session.

The Financial Statement showed that the year had begun with a balance in hand of £12 8*s*. 0*d*., and the receipts had been £36 19*s*. 10*d*.; the expenditure had been £33 15*s*. 6*d*., leaving a balance in hand of £15 2*s*. 4*d*.

In moving its adoption the President said: In reviewing the work of the past year, I think I may with safety say that although there have been no events of a striking character, yet that it has been a useful year, and that the harmonious and good feeling which has always existed between the members of the Midland Counties Association is still in being and is likely to continue. During the past year six meetings have been held and four papers have been read, and the report which has been already placed in your hands records the success of the annual ball, and the fact that the general meetings have been well attended. It is also known to you that at the Council meetings of the Association such subjects as the Pharmacy Acts Amendment Bill, medicated wines, railway rates, and the Pharmaceutical Society Council election have received attention. It may therefore be said that our Association is fully alive to the general interests of the trade. I may also add that a share was taken by our indefatigable secretaries in getting rid of the clause in the Budget Bill about methylated spirit. The proposition that no quantity less than a quart could be sold by the retailer would have been of serious inconvenience and annoyance to the chemist. The enhanced cost of spirit brought about by the new budget is of great importance to chemists, and hough I suppose it is looked upon as one of the ghest forms of self-sacrifice to suffer for the public od, yet there is no doubt about it that this is an ditional tax upon the already heavily handicapped armacist. The regret expressed by the Council in report in reference to the Pharmaceutical Society t seeing its way to give us a grant of money to rchase books has left us no other course open than appeal to our members for contributions in the rm of books or money towards stocking our library. hat this application will not be made in vain is, I am re, a settled question, and to ask you to subscribe to good an object is superfluous, since a duty so leasant is not likely to be neglected when the oppor- unity is offered you. In reference to classes and our fforts to provide teaching, the Council has still to hronicle its regrets, but as regrets are vain things, nd the Association has done its duty, the subject ay be dismissed, I think, with this allusion to it. he question of the moment is the unqualified assis- ant's position, and I fully sympathize myself, as Mr. chacht does, with many men whose previously oubtful position is rendered in distinct colours; but his is individual sympathy, and I do not think that nyone can differ from the re-elected President of the harmaceutical Society when he says that to-day he trade is stronger than it was a year ago. he law on the subject is now clear and precise, and eally gives no more and no less than what the public nd the trade might expect and require from such an ct as the Pharmacy Act. One point in conjunction with this question is worthy of very serious considera- ion—I allude to the remarks made last week by Mr. Barnard, who alluded to unqualified assistants as likely to set up in business and dispense non-poisonous prescriptions. That this possibility had not escaped the notice of Mr. Carteighe is seen by the spirited allusion he made in his speech at the annual meeting of the Pharmaceutical Society, when he said, "we propose to attack the dispensing of medical prescriptions, etc.," and it is the duty of this Association to emphasize that position by forcibly stating the absolute want of legislation in this direction. If the Pharmaceutical Society could accomplish this, then I am sure it would at once render itself popular to the trade as a body. A demand that prescriptions should only be dispensed by qualified men would appear to be a good one to make upon our law makers and one that would receive the most serious attention. In conclusion I should like to thank most warmly the many kind friends who have assisted me during the past year, especially the late President and the Hon. Secretary, and to add that I should look back with pleasure to my year of office as President of the Midland Counties Chemists' Association.

Mr. Pullen seconded the motion, which was supported by Mr. Taylor, Mr. Crookes and others and carried.

The following gentlemen were then elected as the council for the ensuing year:—Messrs. F. H. Alcock (Birmingham), C. J. Arblaster (Birmingham), T. Barclay (Birmingham), F. Barlow (Birmingham), Barrett (Leamington), T. W. Chapman (Birmingham), C. Crookes (Birmingham), S. Dewson (Birmingham), E. J. P. Ferriday (Birmingham), R. D. Gibbs (Edgbaston), F. J. Gibson (Wolverhampton), J. Hinds (Coventry), H. Howes (Birmingham), W. Jones (Birmingham), M. Magor (Birmingham), J. O. Morris (Walsall), G. E. Perry (Birmingham), F. H. Prosser (Birmingham), W. H. Pullin (Leamington), W. H. Richardson, (Dudley), A. E. Robinson (Birmingham), W. R. Selleck (Stourbridge), A. Southall (Birmingham), S. Taylor (Small Heath), C. Thompson (Birmingham), G. Thonger (Harborne), and W. Wyley (Coventry).

The meeting closed with a vote of thanks to the President.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At the meeting on Thursday, May 1, Dr. W. J. Russell, F.R.S., President, in the chair, the following papers were read:—

An Investigation of the Conditions under which Hydrogen Peroxide is formed from Ether. By Professor WYNDHAM R. DUNSTAN and T. S. DYMOND.—The authors have investigated the conditions under which hydrogen peroxide is formed from ether. The ether used by them was purified by the usual method, and also by repeated agitation with dilute aqueous chromic acid. Contrary to the usual statement, the authors find that pure ether, either wet or dry, does not form hydrogen peroxide when exposed to light (daylight or electric light). Ether prepared from methylated spirit yields hydrogen peroxide when kept for some time, but not if it has been previously purified by means of dilute chromic acid. Neither water nor dilute sulphuric acid forms hydrogen peroxide when exposed to light in contact with air. Hydrogen peroxide is formed when ozone acts on ether in the presence of water. Hydrogen peroxide is produced when certain conditions are maintained during the slow combustion of ether in contact with water. At a low red heat the ether and oxygen appear to interact in a manner similar to that in which ozone and ether interact.

Dr. Richardson said that everything depended on the nature of the glass of the bottles in which the liquids were exposed, and the quality of the light. The authors had spoken of Winchester bottles. Of what kind of glass were the bottles which had been used made? With regard to the method which he had adopted in purifying his ether, so-called pure ether was shaken with water, and then repeatedly distilled from sodium until at last this was unaffected. His more recent experiments led him still to believe that peroxide was formed from water and oxygen on exposure to light.

Professor Ramsay, speaking of the purification of ether, referred to the investigation of the thermal properties of ether by Professor Young and himself. Regnault states that ether, after standing, no longer has a constant boiling point, and they had found that such ether acts on mercury but that after agitation with mercury and distilling it does so no longer. Professor Young and he had prepared ether from alcohol and sulphuric acid, and after washing it with potash and with sulphuric acid, had found it necessary to agitate it about fifty times with water before the iodoform test ceased to afford evidence of the presence of alcohol. Proof that such ether was pure was afforded by the agreement of the determinations of its vapour pressure made by the static and dynamic methods; four specimens were found to give identical results. Some of the authors' specimens may have contained alcohol. He then referred to the experiments which he had made showing that hydrogen peroxide is produced on evaporating water (these 'Proceedings,' 1886, 225).

Mr. Wood asked if any observations had been made of the temperature during exposure; the amount of ether vapour would vary greatly with the temperature. In India he had frequently noticed that ether liberated iodine, but its behaviour in this respect was extremely capricious; he could scarcely think that the very different behaviour of several bottles of one consignment was due to impurity.

Professor Dunstan, in reply to Dr. Richardson, stated that colourless Winchester bottles were employed. The specimen of impure ether which yielded hydrogen peroxide scarcely affected potassium iodide before exposure; another similar specimen had no action on the iodide. He had not been able to confirm Dr. Richardson's statement that hydrogen peroxide is formed when acidified water is exposed to light together with oxygen. In reply to Dr. Ramsay, he stated that the method used to purify the ether must have resulted in the entire removal of alcohol. The experiments now recorded proved that under certain well-defined conditions hydrogen peroxide was not formed from pure ether. It was for those who, like Dr. Richardson and Professor Ramsay, maintained that it is produced under similar circumstances to point out what the necessary condition is. This had not yet been done, and in fact so far apparently no one had suspected that the result might be due to an impurity. He had not been able to detect any hydrogen peroxide in water which had been heated in the manner described by Professor Ramsay in contact with air, although the experiment had been tried many times. With reference to Mr. Wood's remarks, the conditions under which the ether had been exposed were fully described in the paper; the temperature ranged between 15–25°. In London it was not possible to obtain "intense sunlight," but it seemed well established that the electric light is highly active in influencing chemical change. There was evidence that ether prepared from ordinary alcohol sometimes, but not invariably, contains the impurity from which hydrogen peroxide is formed; in any case this impurity would be removed by treatment with chromic acid. As was stated in the paper, the formation of an oxidizing substance by the imperfect combustion of ether, to which Mr. Wood had referred, had been observed long ago: in fact Faraday had shown the experiment in his lectures on ozone. It is established by the present results that pure ether yields hydrogen peroxide when it is imperfectly oxidized in contact with cold water. In reply to the President, he said that, although the period of exposure was the same in the case of the experiments with purified ether, they were made at a later date.

p-Desylphenol. By **Francis R. Japp**, F.R.S., and **G. H. Wadsworth**.—The authors find that by the action of cold concentrated sulphuric acid on a mixture of benzoin and phenol *p*-desylphenol-mono-sulphonic acid is formed: $C_{14}H_{12}O_2 + C_6H_5{\cdot}OH + H_2SO_4 = C_{20}H_{15}O_2(SO_3H) + 2H_2O$; and that on heating this with concentrated chlorhydric acid at 150° it is hydrolyzed, yielding *p*-desylphenol, $C_6H_5{\cdot}CO{\cdot}CH(C_6H_5){\cdot}C_6H_4{\cdot}OH$. This phenol crystallizes from light petroleum in small, colourless laminæ melting at 133°; from dilute alcohol in large, thin laminæ; and from benzene in warty aggregations with 1 mol. of benzene of crystallization. It dissolves in caustic alkalis, and is reprecipitated by carbon dioxide. When heated with acetic anhydride it yields a monacetyl-derivative, $C_{20}H_{15}(C_2H_3O)O_2$, which forms aggregations of slender, white needles melting at 106–107°. By acting on the sodium salt with methyl iodide, *p*-desylanisoil, $C_6H_5{\cdot}CO{\cdot}CH(C_6H_5){\cdot}C_6H_4{\cdot}OCH_3$, is obtained. It melts at 90–92°, and is insoluble in caustic alkalis. On fusion with caustic potash at 200°, *p*-desylphenol is resolved into benzoic acid and *p*-benzylphenol. If the temperature be carried higher the *p*-benzylphenol is oxidized to *p*-hydroxybenzoic acid. On reduction with sodium and boiling amyl alcohol, it is converted into the compound $C_6H_5{\cdot}CH(OH){\cdot}CH(C_6H_5){\cdot}C_6H_4{\cdot}OH$, which crystallizes from benzene in tufts of slender needles melting at 161–162°, and yields a diacetyl-derivative melting at 156–157°. Iodhydric acid and amorphous phosphorus at 130°, on the other hand, reduce *p*-desylphenol to dibenzyl and phenol, a carbon linkage being severed in the interaction. It yielded no hydroxime, or phenylhydrazone, although it was subjected to the action of hydroxylamine and of phenylhydrazine under a variety of the most favourable conditions. This negative evidence might be regarded as an indication that the compound does not contain a carbo group; but, apart from the fact that such evidence not conclusive, the alternative formula in which, the sake of getting over the difficulty, a union of oxygen-atom to two directly linked carbon-atoms might be assumed, has so little antecedent probability that the authors hesitate to put it forward, and the meantime continue to regard the compound *p*-desylphenol, a constitution with which all its interactions are in harmony. Attempts to prepare similar condensation-products of benzoin with other phenols led to no result.

On Benedikt's Acetyl Values. By J. **Lewkowitsch**, Ph.D.—In his paper on a new method of examining fats (*Zeitschrift für die chemische Industrie*, 1[illegible] 149), Benedikt proposes a method which is based on the principle that only hydroxylated fatty acids take up the radicle of acetic acid when heated with acetic anhydride, and he asserts that those fatty acids which do not contain the hydroxyl-group remain unaltered, so that the quantities of potash required for neutralizing fatty acids before and after treatment with acetic anhydride will be either identical or nearly so, any difference being due to the errors of the method of determination. While examining a somewhat abnormal sample of tallow, the author was led to doubt the accuracy of this statement, and the following results of experiments which he has made serve to confirm his doubts. The fatty acids prepared from a sample of fresh town tallow required for neutralization 19·717 per cent. of potash, in other words, their "acid value" was equal to 19·717, corresponding to the molecular weight [illegible] Fifty grams of these acids was acetylated with [illegible] grams of acetic anhydride in the manner indicated by Benedikt, and both the acid value and the "saponification" value of the acetylated product were then determined. The values found were 160·5 and 217·5 respectively, corresponding to an acetyl value of 217·5 – 160·5 = 57. A second test gave 216·3 – 1[illegible] = 56·4. In the same way the fatty acids of samples of South American tallow and of North American tallow gave the acetyl values 77·8 and 23·93. According to Benedikt the acetyl values ought to have been nil or nearly so. As tallow is considered to consist essentially of a mixture of the glycerides of stearic, palmitic and oleic acids, it was thought possible that it was the oleic acid which had fixed the acetic acid radicle. A sample of oleic acid obtained from Kahlbaum as pure was therefore examined; it contained, however, some solid acids, which settled out when the acid was kept for some time in a stoppered bottle. To determine the impurities, the acid value and iodine absorption were ascertained: the acid value found was [illegible] and the iodine absorption 90·14; the theoretical values for oleic acid was 198 and 90·07. Although containing a certain amount of higher homologues, the acid was considered sufficiently pure for the desired purpose: 50 grams of it when acetylated gave an acid value = 116·50 and a saponification value = 242·05; consequently an acetyl value = 125·55. If the fixing of the "acetyl," however unlikely it might appear, were due to the CH=CH-group in the molecule of the oleic acid, the acetylated acids ought to have lost the capacity of taking up iodine. However, the iodine value of the acetylated acids was found to be 87·11, proving clearly that acetyl was not taken up by the CH=CH-group. Therefore the acetic anhydride must have acted in some other way on the oleic acid, and if so it was not unlikely that palmitic or stearic acid might be acted on in the same way: experiment fully bore out the correctness of this assumption. Fifty grams of palmitic acid, the comparitive purity of which was proved by an acid value of 213·4 (instead of the theoretical value 219·1), was acetylated and gave an acid value = 143·53 and a saponification value = 226·13; conequently an acetyl value = 82·6. Fifty grams stearic cid—showing an acid value of 203 instead of the heoretical one of 197·5—gave, after being acetylated, n acid value = 138·89 and a saponification value = 21·18; consequently an acetyl value = 82·29. The uthor refrains from venturing upon an explanation of hese results, merely wishing to point out at present hat they contradict Benedikt's assumptions.

ROYAL INSTITUTION.

Colour Vision and Colour Blindness.

A lecture on this subject was given on Friday, the 9th inst., by Mr. R. Brudenell Carter, F.R.C.S. The structure of the eye, and more especially of the retina, which covers about four-fifths of the internal surface, was illustrated, and the fact that the retina, although only about a fifth of a millimetre in thickness, consists of ten different layers of tissue. Of these layers, a magnified image of which was displayed, the layer of "rods and cones," as being probably the direct origin of the sensations of vision, received particular attention. It is probable that the cones are more delicate and sensitive than the rods, and on examination of the human eye it is found that there is a central spot in the retina, known as the "yellow spot," which is made up almost entirely of cones. Accordingly the sensation of vision is much more acute here than on the other portions, and this is shown by the fact that we only see distinctly the objects at which we are directly looking and whose images therefore fall on this spot, while objects placed laterally at a considerable angle, whose images fall on the other portions of the retina, are seen very indistinctly, and if we wish to see them more clearly we turn the eye so as to receive their images on the yellow spot. As the sensations of vision are dependent both on the amount and the quality of light, acuteness of vision is enhanced by a perception of colour and is probably proportional to it. It is obviously easier to distinguish objects of different colours than those which differ only in form or in degrees of light and shade. The perception of colour is in all probability a property of the cones only, the rods being sensitive only to different degrees or amounts of light; in nocturnal animals, such as hedge-hogs, bats, and nocturnal birds no cones are found but only rods. In the human eye it is probable that colour is perceived mainly in the region of the yellow spot, and that beyond an angle of about 40 degrees objects are seen only by their relative brightness. (An instrument for measuring the angle of distinct vision or of colour perception was exhibited.) Young propounded the theory that the cones by which colour sensations were produced were of three kinds, one of which was sensitive to each of the three primary colours, and that when all of these were stimulated together the effect of white light was produced, while when only a portion were stimulated, the effect of blending the corresponding colours was the result. So far, however, no optical difference has been discovered in the cones of the human retina. Still it is probable that such is the case, and that normally cones responding to all three primary colours are present in the yellow spot or central portion; that in the zone immediately surrounding this the cones sensitive to green light are absent, but some of the other two are still present, while beyond this there is no perception of colour. Although no difference has been discovered in the appearance of the cones in the human retina, in the case of birds, the finches, for instance, the cones have been found to contain in their apices coloured droplets of fluid, which only allow the corresponding light-sensations to be transmitted; these droplets are respectively red, green, and yellow or orange, so that the birds probably see all these colours and their compounds, but are unable to see blue as a colour. In the retina of the bird these cones are not localized in the centre, but are more evenly diffused, and if we watch a fowl when feeding it will be evident that the angle of distinct vision is very much wider than in our own case. In the case of colour-blind persons the cones sensitive to one or more of the primary colours are absent; some few persons are totally colour-blind, their yellow spot being altogether insensible to colour and only capable of appreciating degrees of light and shade. Cases of this description are, however, extremely rare, and the ordinary forms of colour-blindness are only partial, that is the cones which are affected by one only of the three primary colours are wanting. Most commonly a condition of things exists in the central spot, such as in the normal eye is found in the part immediately surrounding the yellow spot; that is, the green-seeing elements are absent, but the other two are present. In some other cases there is absence of the red-seeing power, and a very few people are blind to blue and violet. The hypothesis of Young and Helmholtz, which explains the phenomena of colour-blindness, is that light of a particular wave-length, although it stimulates more especially the particular cones corresponding to that colour-sensation, also has a much slighter effect on the others; red light, for instance, would strongly affect the red-seeing ones, less strongly the green, and very feebly the violet. Similarly the cones adapted to violet would be strongly roused by light of that colour, much more feebly by green and slightly by red. Consequently, to the normal eye the yellow and orange part of the spectrum has the greatest luminosity, for there the action of all three primary colours is blended. If the perception of red is absent the most luminous part is the blue-green; and if the eye is wanting in the power of seeing green the red and violet parts will be most luminous. It is evident that if any particular colour is incapable of producing an effect on the retina, the effect produced by white light will be the same as that produced by all the other components of white light except the colour in question, that is, by the colour complementary to it; this explains the way in which colour-blind people match various colours with white or with each other. Where this blindness to a particular colour exists it is quite incurable, for although much may be done in educating the eye to distinguish shades of colour (a Lyons silk firm having on its pattern list no less than two thousand different colours), yet it can no more be trained to receive impressions beyond its range than the ear can be made to hear notes beyond its auditory pitch. In speaking of tests for colour-blindness the lecturer mentioned that the methods usually employed in England in testing men for railway and merchant shipping services were generally very imperfect, the same candidate being sometimes rejected at one examination and passed at another. This arose partly through a confusion of colour-blindness with colour-ignorance, for many uneducated people are unable to give the proper names to colours they are perfectly well able to distinguish; in fact, it is their colour vocabulary and not their colour sense which is imperfect. The colour vocabulary of the silk firm above mentioned, for example, would be more extensive than the whole vocabulary of a great many people. Instead of showing a man a colour and asking him to name it, the proper way to test him is to make him match one colour with another; for instance to have a heap of skeins of coloured wools on the table and let him pick out as many as he can to match a selected one, watching his manner of doing so, and not allowing minute and close comparisons. It is curious that the existence of colour-blindness should have remained so long undiscovered, for it was only so late as 1777 that Dr. Priestly first noted a case of it; soon after it was found that the great Dalton was colour-blind, and the affection was then so little known that the name of "Daltonism" was proposed for it; fortunately, however, the name of the great chemist has not been handed down to posterity in connection with a physical abnormality. Later data show that colour-blindness exists to the extent of about four per cent. among males (slightly less among the more educated classes), although only one female in a thousand is defective in this respect. This peculiarity is to a certain extent hereditary, like other race variations, and is found to be more common among the Society of Friends and among Jews than with the average of mankind. The lecturer humorously suggested that the immunity of ladies from colour-blindness might probably be due to the constant employment of the colour sense in their sex in connection with costume.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, May 15, Mr. L. Ough, Vice-President, in the chair.

The first paper was read by Mr. G. H. Lansdown, the subject being "Coal." The different varieties of the mineral were first described, and illustrated by specimens, their relative suitability for different purposes compared, and finally the geological occurrence and manner of formation of coal-beds was sketched.

The paper gave rise to a discussion in which the Chairman, Secretary, Messrs. Umney, W. Wilson, Pears, Sherlock and Cranstone took part.

The following paper was then read by Mr. J. C. Umney:—

HOW DRUGS ARE IMPORTED.

BY JOHN C. UMNEY,

Pharmaceutical Chemist.

I wish to preface the short notes that I am about to read by stating that they have been compiled rather with the intention of explaining the various specimens of drugs and their packages placed before you, than as a set paper, drawn up in any way for purpose of reference.

Though the majority of our pharmaceutical students come to the metropolis to complete their studies, yet but few can have any idea of the magnitude of the import of drugs into the port of London, the drug market of the world. The small pound parcel, perhaps, of a drug, or well conned specimen drawer, gives but a vague idea of the almost endless variety that may be found in the bales from which they have been selected. But it is rather the methods of consigning them to this country, than the actual drugs, that I wish to treat of this evening, and thus to complement the study of materia medica from a commercial point of view.

As will seem most natural, our less civilized friends contribute the greater part of the curious consignments to our drug markets, but many of the packages from different parts of Europe even, will have their special interest. I have endeavoured as far as possible to procure everything this evening that I thought would be of interest to you, and only regret that the weight of many of the packages has compelled me to show them to you empty instead of full.

An arrangement of the drugs themselves in alphabetical order, rather than of the countries from which the various exports are made has been adopted as the most convenient method of classification. We will therefore, without further preliminary, plunge *in medias res* and commence our short review with

Alcohol.—It is largely exported to this country from rmany, in puncheons containing about 120 gallons 0 per cent. to 92 per cent. real alcoholic strength. The contents of these puncheons are determined gaugers. Though it may seem at first sight curio that the Customs should depend solely on this meth of determining the contents for the impost of du confirmation by weighing shows with what marvell accuracy this operation is usually carried out.

Aloes.—The *Barbadoes* variety is usually impor in gourds varying in weight from 2 to 20 pounds, i which the drug is poured in a melted condition, t hole being closed by a piece of calico tacked over t opening. Those sent from Curaçoa are packed square boxes averaging in weight about 75 pounds.

Socotrine are imported (principally by way Bombay) in tin-lined cases, generally those that ha left this country containing Martell's brandy, t firm's trade mark being usually visible on the side the package.

Another kind, which some pharmacognosists are opinion is produced from the same variety of aloe that grown in Barbadoes, reaches us in skins, usual those of the goat, sometimes monkey, whilst a thi kind of package, the variety of which is not ea to identify, is met with in tins similar to those whic are familiar to you all as "castor oil tins."

Almonds (*Bitter*).—The finest are imported fro Mogador, and reach this country packed in seron about 2 cwts. each. A considerable quantity are als sent from Sicily. The former are largely used for th production of the fixed oil of almonds, and the cake after expression, for the preparation of the essentia oil.

Balsam of Canada, formerly imported from Lower Canada in large barrels and kegs, is now seen almos entirely in tins averaging about 40 pounds' weight.

Balsam of Tolu is now no longer imported in cala-bashes, as at the beginning of this century, but i cylindrical tins of about 6 inches diameter, weighing about 10 pounds.

Camphor (*Refined*).—That exported to this country from Germany is almost always in bells of about pounds' weight, only about one-third the size of those sublimed in England. A few continental refiners, however, send the drug to this country in imitation of "English Bells," which are of about 14 pounds' weight.

Cantharides reach this country in casks, often containing as much as 5 cwt., principally by way of Trieste. The "Chinese Flies" (*Mylabris*) are usually sent to this country in boxes of one hundred pounds' weight.

Cassia Bark is exported to this country in enormous quantities, principally from Canton, packed in loose bundles, whilst those varieties shipped from the Philippines usually reach Spain by way of Cadiz.

Catechu.—Both the black and pale are exported to this country in very large quantities from India and Straits Settlements for dyeing and tanning purposes. Both varieties arrive in "mats" of aggregated masses, a small proportion of the paler variety coming also in what are known in trade as "gambier-free cubes."

Chamomile Flowers.—The bulk of the imported flowers is produced in Belgium and is exported to this country in one hundredweight bags. France has recently taken up the growing of this drug, and is surpassing Belgium both in the size and colour of its flowers.

Chiretta is imported in flattish bundles, about 2 to 3 feet long, tied with a slip of bamboo. It has been found occasionally "false-packed," the outside being chiretta, the inside some other herb; in the case of the bundle exhibited the interior consisting entirely of *Rubia tinctoria* (madder).

Cinchona Barks.—The "wild" bark from the forests of Bolivia and Ecuador is now almost a thing of the past, the collection of it being but poorly remunerative on account of the competition with the cultivated rks of the same continent and those of Java and ylon. Very few hide serons are now seen as compared th years since, when this package was almost uni- rsally adopted. The Indian variety of bark reaches either in pressed packed bales, when consisting of avings (chiefly used in quinine manufacture), or in ell made cases if of selected quills for use by phar- acists.

Cinnamon Bark is always repacked, or "worked," it is termed, on its arrival in the dock warehouses London. The "small" cinnamon sold for pharma- sts' use consists of the portions broken off in this ocess of working, which comprises repacking and imming the bundles.

Civet is exported from the coast of Abyssinia in orns, in which the curious secretion is placed after llection.

Coca Leaves.—The South American "wild" coca is nported principally in bales of plaited rush, whilst at from Java reaches this country in very excellent ondition in lead-lined cases. English planters in eylon, who have become dissatisfied with the low ates ruling for cinchona barks, have taken up the cul- vation of coca, and are now growing for export to the ondon market that known among trade varieties as olivian.

Colocynth.—The whole unpeeled fruit is imported rom Mogador in very small quantities, the princi- al use in this country being for the pharmacist's how-jar. The usual method of importation is as the eeled fruit, that sent from Turkey commanding early twice the price of that from Mogador. The ifference in the colour of the seeds, which causes his variation in price, as it prevents the latter variety rom being used for preparing a pale powder, appears o be due to the different degree of ripeness of the eed, but is so constant as to be relied upon by buyers s their chief distinguishing feature.

Gum Acacia.—The fine white gums, which now, nfortunately, are almost absent from English phar- nacy, formerly reached us in serons weighing about to 4 cwt. That now imported, of very inferior uality, both as regards colour and more especially dhesive properties, is shipped from the Egyptian orts in cases and barrels of varying size. A gum ery much resembling in appearance, at any rate, the ld Kordofan gum, is now reaching this country by way of Mogador, but the exact district of its actual roduction is uncertain.

Gum Benzoin.—The Siam variety, used principally or the production of incense, and distinguished by its ery agreeable vanilla odour, is imported in cases of ggregated tears. That from Sumatra is usually sent o this country in boxes containing about 2 cwt.

Honey.—Many countries furnish us with honey, each aving its own distinctive flavour and character; and o easily are these distinguished by those who are accustomed to handle them, that with ease the experienced buyer could tell blindfolded whether the sample were Californian, Chilian, West Indian, French or English. The Californian variety reaches us in tins resembling castor-oil tins, two of such being packed in a case, the Chilian in small kegs of 1¼ cwt., that from Jamaica in barrels of 3½ cwt., and the French in small kegs of 35 kilos.

Ipecacuanha Root, after drying, is stowed in a package called a "seron," made of undressed cowhide, shaped, as you will see from the one shown, by pressure whilst still fresh. A considerable quantity of this drug now reaches this country from Rio in canvas instead of hide serons.

Manna is exported to this country, principally from Palermo, in tin boxes weighing about 14 pounds each.

Mercury is sent from Spain and Italy in wrought iron bottles, the appearance of which is quite familiar to all of you, the contents of which weigh 75 pounds, most of the import into this country being under the control of Rothschilds and Sons.

Musk.—The finest variety is obtained from Thibet and reaches this country in small caddies, the value of one of which such as I have here, if of the best quality, amounts to between £80 and £100 sterling.

Oils.—*Oils of Cajeput, Citronella and Verbena* are usually sent to this country in bottles which have been previously exported, filled with brandy and spirits, to the various localities where the oils are distilled.

Castor Oil is sent to this country in enormous quantities from Calcutta in tins, 4 in a case, of about 40 pounds each. It is being increasingly exported from Leghorn.

Cod Liver Oil.—The Norwegian oil, of which upwards of 5000 casks are used medicinally every year, is always imported in tin cylinders of 25 gallons each, provided with a screw plug, with a wooden exterior. The package is a perfectly "unique" one. The inferior oil that reaches this country from Newfoundland is in unlined casks of irregular size.

Olive Oil.—The finest quality is now imported in pipes (about 110 gallons) from Leghorn. It is very seldom seen now in 10 and 20 gallon wickered vessels, known respectively as "half-jars" and "jars."

Oils of Lemon and *Bergamot*, are imported in coppers of 12½, 25, or even up to 100 pounds' weight, principally from Sicily (Palermo and Messina). These "coppers" are weighted at the bottom with lead in order to strengthen them, and consequently the oils often contain minute traces of that metal.

Star Anise Oil is exported very largely from Macao, China, (though at the present time a considerable quantity is being manufactured in Tonquin), in curiously shaped leaden tins, having two handles and bearing the label of their manufacturer. The contents of these tins average about 16 pounds and they are usually packed 4 in a case.

Orris Root of very fair quality is imported to some extent from Mogador, but large shipments of the finest pale root are made from Leghorn. The Mogador variety is in serons of about 3 cwt. each.

Otto of Rose is exported to this country in vases varying in capacity from ½ to 1 or 2 kilos. They are generally invoiced from Kizanlik (which is the centre of the otto producing district) in Turkish ounces, that ounce exceeding the avoirdupois by 11·3 per cent. (=494·7 grains). The average yearly export is 4000 pounds avoirdupois, equal to about £60,000 sterling.

Rhubarb Root is imported almost entirely from China (the greater part of that produced in England being consumed abroad, as its use in British pharmacy is precluded by the Pharmacopœia directions). The Canton and Shensi rhubarbs are imported in cases varying in weight from 1 to 3 hundredweight, and are of very variable quality, whole chests sometimes affording but a few pounds of sound root.

Saffron.—The best quality of this drug is exported from Valencia and is sent to this country in tin-lined cases containing about 100 pounds' weight. The Alicante and Barcelona saffron is invariably "loaded" with carbonate of calcium or baryta, made adherent with glycerine or some other sticky substance.

Sarsaparilla.—The Jamaica and Lima varieties are imported in bundles of about two pounds each, tied together to form a bale of about 125 pounds' weight; whilst that from Honduras, after being bundled, is formed into a package with cowhide ends.

Senna.—The Tinnevelly variety arrives in pressed packed bales, resorted to in order to reduce the cubical space occupied to a minimum, freightage being charged by vessels, as you are doubtless aware, by this method and not by weight as in overland traffic. The Alexandrian variety comes chiefly in cases.

Spermaceti.—That shipped from America is in boxes of 60 pounds' weight. A considerable amount is refined here, a large quantity of sperm oil very rich in spermaceti being shipped to this country from the Seychelle Islands and Mauritius.

Tamarinds.—The finest variety is shipped from the Barbadoes in casks, inferior qualities being imported from St. Kitts, both being known as West Indian. A black variety is imported from the East Indies and also from Egypt in a dried, pressed condition, these being used principally by manufacturers of sauces.

Vanillas are generally seen in bundles tied at the middle and both ends, though rarely only in the centre. Mauritius contributes a large proportion both to our market and those of the continent. The Seychelles also contribute largely excellent pods both as regards quality and size.

Wax.—The finest French wax is usually imported in bars of 4 to 5 pounds' weight, that from Jamaica usually in irregular sized saucers resembling the English.

Woods.—At the London Docks a large area is set apart for the reception of dye-woods, where among others are stored quassia and sassafras. Valuable wood, however, such as santal, is usually packed in what are termed "robbins," large, upright bales. All these woods are incised in this country by specially constructed machinery before they are seen in the small pieces in which the pharmacist is accustomed to handle them.

One might have extended this list almost *ad infinitum*, but I think that this cursory glance at the import of drugs and their packages will suffice. Just a few words as to one or two of the more commonly occurring admixtures and substitutions. I have placed on the table for your inspection a few of those most easily obtainable, comprising the following:—

Leaves of *Empleurum serrulatum*, substitution for long buchu.

Fruit of *Garcinia Mangostana*, substitution for bael fruit.

Fruit of *Mucuna urens*, substitution for Calabar beans.

Cetonia aurata (rose beetles), substitution for cantharides.

Ophelia angustifolia as a substitution of the true chiretta.

Root of *Psychotria emetica*, substitution for ipecacuanha.

Bark of *Stenostamum acutatum*, substitution for cinchona bark.

Fruit, *Illicium religiosum*, admixture with *Illicium anisatum*.

Florets, *Calendula officinalis*, admixture with saffron.

Also some bullets, found in opium, spurious bees' wax, etc., etc.

I have placed also on the table a few curiosities that I thought might be interesting, including one in particular, viz., several vanillas attached to one stalk, a very uncommon condition of importation; also a necklace of Spanish flies found in a bale of that article, etc.

I have to thank Mr. Holmes for some valuable suggestions with regard to this paper, and also for his kindness in allowing me the use of very many specimens from the museum of the Pharmaceutical Society.

In conclusion, I trust that in these short notes, hastily prepared, for which I have asked your indulgence this evening, I may have brought under your notice some facts that may assist your study of materia medica, and at the same time have not been altogether uninteresting.

The chief interest of the paper lay in the illustrations, nearly all the articles enumerated being actually exhibited at the meeting.

A discussion followed, in which the Chairman, Secretary, Messrs. Pears, Sherlock, W. Wilson, Cranston, Robbins, Morrow, Morley and Barnes took part.

The meeting then adjourned.

Parliamentary and Law Proceedings

PROSECUTION UNDER THE WEIGHTS AND MEASURES ACT.

Mr. J. H. Lewis, chemist and druggist, Great Portland Street, W., was on Wednesday summoned at Marlborough Street Police Court for having had in his possession, and for use in his trade, six weights which were unjust and for having two fluid ounce measures and one weight which were unstamped.

Chas. Bending, an Inspector of Weights and Measures, said that on the 12th inst. he called at Mr. Lewis's shop and found him using a set of brass weights, all of which, with the exception of the smallest, were deficient, the pound 7 grains, the half-pound 2 grains, the 4-ounce 2 grains, and the 2-ounce 3 grains. He also found two measures, one of which was being used, which were not stamped with the Government stamp, and a 2-drachm weight as well.

The defendant said that the only way in which he could account for the lightness of his weights was from the fact that they were cleaned every morning with oxalic acid.

Mr. Hannay imposed a fine of 20s. and 2s. costs in the first instance, and 10s. and 2s. costs in the second.—*Evening Standard.*

Review.

A MANUAL OF ORGANIC MATERIA MEDICA. By JOHN M. MAISCH, Ph.M., Ph.D. Fourth Edition.*

The popularity of this work in the United States is shown by the fact that it is only three years since its last edition was published, and that four editions have been published in eight years. In this country, however, the book appears to be practically unknown, as there is not apparently a single agent for it in London at present. Yet it is perhaps the most comprehensive, clearly arranged, and generally useful work of its kind. The American list of articles of vegetable materia medica comprises a great many more than those in use in this country, and the work therefore really contains more than is abseclutely necessary for the use of English pharmaceutical students, although not more than a well-informed pharmacist should be acquainted with. As a handbook for aid whilst attending lectures it should prove exceedingly useful in economizing the student's time and supplying in a well arranged form the facts and details which must of necessity be matters of memory rather than of practical study. The large number of figures illustrating structure should also prove a great help to the student in examining for the first time the pharmacognostical characters of roots, barks, etc.

The primary object of pharmacognosy, or materia medica as more especially adapted to the needs of the pharmacist, is defined by the author in the Introduction to be "to enable us to recognise drugs, to determine their quality, to detect their adulteration, and to distinguish the characteristic elements of those which are closely allied." This object is evidently kept in view throughout the work, and there can be le doubt that the plan, followed in this treatise, of nging together drugs resembling one another in ictural and physical properties, and of thus render- the special characteristics of each more promi- it by comparison, is one of the best methods of ching materia medica.

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* Philadelphia: Lea Brothers. 1890. 12mo. Pp. 5

he chief alteration that has been made in the sent edition is in the "list of drugs arranged accord- to their origin" at the end of the work, in which ntham's and Hooker's 'Genera Plantarum' has been lowed.

At the present time, when knowledge increases with id strides, great changes may occur even in three ars, and it is difficult to bring even such a subject materia medica quite up to date. Thus, although we d star anise attributed to *Illicium verum*, Hook, f., rsaparilla is still referred to *Smilax officinalis*, instead *S. ornata*, and opoponax, which is a Persian drug, stated to be procured from a plant of Greece, *opanax Chironium*, which does not even resemble e drug in odour; further, the chemistry of bella- nna and coca is not quite up to date.

We note also that the author refers Chinese or panese menthol to "*Mentha canadensis* var. *piperas- ns*," apparently considering the Chinese and Japanese ants identical, although giving no reasons for doing . Under galbanum also he remarks, "it may in part derived from *Ferula rubricaulis*, Boiss." But the eds of this plant have an alliaceous taste, which lbanum does not possess, and cannot possibly be a urce of galbanum. But with these few exceptions e work is brought close up to the date of publication, d is much in advance in this respect of many treatises materia medica of recent date.

Obituary.

Notice has been received of the death of the ollowing:—

On the 16th of May, Mr. Richard Haydon Down, harmaceutical Chemist, Torpoint, Cornwall. Aged 9 years. Mr. Down had been a Member of the Phar- naceutical Society since 1849.

On the 18th of May, Mr. John Head, Pharmaceuti- al Chemist, High Street, Lewes. Aged 79 years. Mr. Head had been a Member of the Pharmaceutical So- iety since 1842.

On the 20th of May, Mr. George Deakin, Chemist and Druggist, Blaenavon, Mon. Aged 69 years.

On the 22nd of May, Mr. William Lewis Dobinson, Pharmaceutical Chemist, Bishopwearmouth, Sunderland. Aged 55 years.

On the 25th of May, Mr. Walter Midgley, Chemist and Druggist, North Street, Keighley, who was drowned through the capsizing of a yacht on Lake Windermere. Mr. Midgley was an Associate of the Pharmaceutical Society.

BOOKS RECEIVED.

PRÉCIS D'ANALYSE MICROSCOPIQUE DES DENRÉES ALIMENTAIRES. By V. BONNET. Paris: J. B. Baillière et Fils. 1890. From the Publishers.

MANUALE PHARMACEUTICUM SEU PROMPTUARIUM. By Dr. H. HAGER. Sixth Edition. Part I. Leipzig: E. Gunther. From the Publisher.

A LABORATORY COURSE OF PHARMACY AND MATERIA MEDICA, including the Principles and Practice of Dispensing. By WILLIAM ELBORNE. London: C. Griffin and Co. 1890. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE COUNCIL ELECTION.

Sir,—There are surely very few pharmacists who will not find much, very much, that is gratifying and encouraging in the result of the Council election. The happiest feature of all is, undoubtedly, the unusually large percentage of voters who have exercised their privilege. This betokens interest in the Society's affairs, which augurs well for its future strength. Interest may 'ere long develope into something more practical and effective for good.

There is much cause for rejoicing in the fact disclosed by the poll that honourable, noble feelings are still dominant traits in the character of modern pharmacists. These are exhibited in the triumphal return of Mr. Carteighe at the head of the poll. Considering the exceedingly unhandsome treatment meted out to him at the last election, it will be somewhat of a recompense to him to see that the constituency thus expresses its regret. His most bitter opponent cannot begrudge him the result of the healthy reaction.

There is cause for satisfaction to all this side the Tweed, in that a second Scottish member has been placed upon the Council board. While this may be but just and right, yet it must not be forgotten that Scotland has now two representatives instead of one, as heretofore; and, moreover, that both members are acknowledged to be the very best that could have been picked.

To those who are more immediately concerned about trade interests, there is also cause for thankfulness. Although success in placing "trade interests" men is not apparent, there is abundant evidence that these interests can no longer be neglected. Attention thereto must be paid by the new Council; and, unless I have very much misapprehended the drift of his remarks, there is no one who will be more indefatigable in doing so than the president himself. But as he pointed out, he must receive at the hands of chemists, not a mere fraction of them, however, both faith and works.

And now, in order to reap benefit from the good, which in this Council election has been begun, it is necessary, absolutely necessary, for all chemists to put forth an effort to do good for themselves. The surest way to do this is for each individual non-member at present, *at once to become a member*. Before much good can be effected, or much progress made, there must be a strong Society. This has been, is, and should be the great desideratum of all parties, whether educationalists or "tradists." Should the new Council consider a reduction of the annual subscription as likely to accomplish this end, there are few, I should think, who would object. The scheme appears feasible enough. If carried out, the Council might then, with authority and reason, exhort the grumbler, the mere complainer, either to join the Society and help, or for ever hereafter hold his peace.

Abbey Park, Dunfermline, N.B. JOHN H. FISHER.

Sir,—Will you kindly allow me to perform the pleasing duty of thanking the numerous body of electors who voted on behalf of the candidates pledged more especially to restore the care of "trade interests" to what they consider to be their proper place in the policy of the Pharmaceutical Society.

Although it must be understood that the result of the polling is not as favourable as we had reason to expect it would have been, yet it is satisfactory to note that two of the progressive candidates recommended by the trade interests party have been returned, namely, Messrs. Evans and Storrar, and we trust that their presence in the Council chamber will constitute a guarantee that the claims of our party in favour of a bold, vigorous, defensive and large-hearted policy will not be overlooked.

The election over, let us sink all minor differences and work loyally together for the best interests of the Society and of the whole body of pharmacists. We feel confident that the Pharmaceutical Society, if properly supported, is capable of accomplishing much greater things than any yet attained. Let us therefore endeavour to foster a greater interest in the Society and its proceedings, and not rest satisfied until every qualified pharmacist is brought into the pharmaceutical hive, and becomes assured of that substantial remuneration to which his training, his status and his services so justly entitle him.

Cardiff. ALFRED COLEMAN.

Sir,—I beg to thank those of my fellow chemists who voted for me at the late election, and although the result placed me decidedly in the minority, I do not feel disappointed, but congratulate the old members of the Council, with whose views I mainly agree, on the support they received on that occasion; the advancement of pharmacy and improved position of pharmacists in general being my chief desire. The cause, I feel convinced, rests in good hands.

Exeter. J. HINTON LAKE.

THE INCREASE OF THE DUTY ON SPIRITS.

Sir,—Will you allow me space for an expression of opinion on the above question as it affects chemists and druggists? To do so clearly I will put a typical case. I take that of a man whose consumption of spirits in his business for the preparation of tinctures and perfumes is 50 gallons a year and whose rent is £50 a year. Upon those 50 gallons of spirit he pays as increased duty 25s. On his £50 rental, he also pays 25s. as inhabited house duty. The increase therefore in the duty on spirits is the same to him as if his house duty had been doubled. Why should this be, and one class of traders in none too good a position already, be selected for further taxation in order to provide funds for the compensation of those publicans who would be refused a renewal of their licences?

The case of perfumers would be equally strong with our own, and equally deserving of consideration. I would strongly urge on our Council the necessity of making an urgent representation to the Government on this point. Our case is a strong one, and it would be difficult, I think, to deny the force and urgency of our claim for exemption from this impost.

One of Mr. Goschen's chief arguments is, it will be remembered, that to produce this compensation money he taxes publicans only; but this is not so—he proposes to tax chemists also. I hope this question will be pressed on our Council, and by them brought before the House of Commons when in committee on the Bill.

I may say that my typical case is a real one, and, I think, fairly representative. OBSERVER.

THE CONDITIONS OF APPRENTICESHIP.

Sir,—At election times chemists say and write a great deal about their grievances, but at the same time they do not propose any sensible way to remedy them.

Now, I think "Apprentice" has really touched the point essential to the future happiness and prosperity of the craft. The great evil, in my opinion, lies in the fact that apprentices—who make the future chemists—are utterly ignored during their apprenticeship. How many chemists are there who take the trouble to teach their unlucky servant anything beyond the names on the shop bottles and the way to dust counter cases and dress the shop window?

"Apprentice" is right; the masters are themselves to blame for the present state of the trade. So long as they have an apprentice to do their rough work they themselves spend their time grumbling and growling at the Pharmaceutical Society for not raising the craft—that is, the chemists themselves—to a higher standard. Of course, I am not going to discuss the grievances of the trade in this letter, but my opinion is that apprenticeship is a complete farce. An apprentice, in ninety-nine cases out of a hundred, is a respectable errand boy. How much chemistry, botany or materia medica has an apprentice been taught by his master during his respectable slavery of twelve to fourteen hours a day and Sunday work? I venture to say none in the majority of cases. Of course, there are some exceptions, but ought it to be said of chemists that they take a premium of £50 or £60 and upwards from a youth and then give him nothing in return for it? Surely it is a disgrace to the craft. I have frequently during my apprenticeship asked my master how to do this and that, and my answer has been similar to that stated by "Apprentice." This ought not to be. Surely an apprentice ought to be able to go in for the Minor at the end of his time. Is not four or five years ample time to prepare the subjects if the master did what he promises to, viz., teach the business? Yet how many apprentices could go in and pass? What is wanted is a curriculum of three years at a college and no apprenticeship with a chemist at all. What with liquid extracts which simply require so much "S.V.R." adding to them to make them equal to the P.B. tinctures, and heaps of similar preparations, an apprentice learns simply nothing nowadays but to be a shopman. Chemists grumble at the time and expense of a curriculum. Serve them right, say I. If the master will not teach the apprentice, then it is a noble thing for the Society to do what the masters ought to have done. Improve the apprentice and thus improve the craft. Look at the army of unqualified assistants who have given time and money and, having been taught nothing, find at the age of twenty-one years that they have to go to the Square or some college to learn their business. STUDENT.

STATE OF TEETH IN MAORI SKULLS.

Sir,—In the letters of Messrs. Powell and Ward on teeth which have appeared recently in the Journal, reference is made to the "oblique wearing down" of teeth in some old skeletons. It may be thought worth recording that twenty years since, when I was about to proceed to New Zealand, an anthropological friend wished me to procure and send him some Maori skulls. I had an interesting hunt for them in the volcanic caves in the level plain between Mount Eden and the extinct volcanoes called the Three Kings, near Auckland, in caverns whose floor was congealed lava. While I found many bones, I could not find a complete skull, but a few days after a settler living on this plain brought me two. One of them was a fine, fully-developed man's skull, remarkable for having some of the under back teeth thus "obliquely worn down." My friend has been dead for some years, but I believe he presented these skulls to the Anthropological Society, in whose collection, probably, Mr. Powell may find them. It may help to identify them to say that they were presented by Mr. Avery in 1870, or soon after.

Bilbrook. W. SYMONS, F.C.S.

Erratum.—In the report of the President's speech at p. 974, col. i., line 45, an obvious error escaped notice, the word "seller" having been substituted in place of "stores."

C. E. Pickering.—Your letter does not appear to us to be a practical contribution towards the solution of the problem.

T. Polley.—*Menyanthes trifoliata* and *Drosera rotundifolia.*

C. Barnes.—We are of opinion that such a sale would be held to be illegal.

W. Bevis.—*Euphorbia amygdaloides, Pteris aquilina* and *Carex arenaria.*

A Beginner.—(1) *Helianthemum vulgare.* (2) *Potentilla verna.* (3) *Viburnum Lantana.* (4) *Pyrus Aria.* (5) *Smyrnium olusatrum.* (6) *Geranium pusillum* probably: geraniums should be sent in fruit. Some pounds of the flowers of *Smyrnium olusatrum* would be acceptable in the Research Laboratory, where the nature of the odorous principles of this and similar plants are being investigated.

Vanilla B.—Exhaust with proof spirit and add a sufficient quantity of sugar.

NOTICES.

Society of Chemical Industry (London Section).—A meeting will be held at Burlington House on Monday evening, June 2, when Messrs. Cross and Bevan's paper on "Some Considerations on the Chemistry of Hypochlorite Bleaching," will be read and discussed.

Chemical Society.—At the next meeting, to be held on Thursday, June 5, a "Note on the Preparation of Pure Crystalline Copper," by Mr. C. C. Duncan, will be read.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Alcock, Gall, Thompson, Pharmacist, W. H. B.

LUFFA ECHINATA, ROXB.

BY W. DYMOCK AND C. J. H. WARDEN.

Five species of *Luffa* occur in India. In Sanskrit the names Koshataki and Koshaphala (cocoon fruit) are applied to the genus *Luffa*, owing to the fibrous cocoon-like appearance of the contents of the dried fruits. Another general Sanskrit name for these plants is Goshaka, in allusion probably to the rattling noise which the seeds make when the dried fruit is shaken. The fruit of *Luffa ægyptiaca* is a much esteemed Eastern vegetable, which has assumed a variety of forms under cultivation; when ripe it affords the well-known flesh rubbers of the shops. The fruit of *L. acutangula* is one of the most important Indian vegetables, but the plant occurs also in a wild form, which has been named *L. amara*, on account of the bitterness of the vine and fruit. *L. echinata*, *L. graveolens* and *L. Kleinii* are all wild bitter plants, having small fruits, which are more or less softly spinous. They are classed together by the Hindus under the Sanskrit names of Devadâli or Devadâlika, which signify "fairies' gourd," and are sometimes confounded with *L. amara*, which is used in common with them as a bitter purgative and febrifuge. Roxburgh justly observes of *L. amara*: "Every part of this plant is remarkably bitter; the fruit is violently cathartic and emetic." The same remark would apply to the plants known as Devadâli.

From the experiments of Dr. J. A. Green and Mr. J. C. Dickenson ('Pharm. of India,' p. 97) it will be seen that the vine of *L. amara* may be safely used as a bitter tonic and diuretic. It is known as Tito-dhundul and Ghosha-lata in Bengali; Karvi-turai and Bindal (from Sanskrit Bidala or Bindala, a basket) in Hindi; Kadu-ghoshali, or Kadu-dorki, in Marathi; Chedu-bira in Telugu; Raivahiri in Canarese; Kadavi-ghisodi in Guzerathi; and Pé-pirkkam in Tamil. The three plants known as Devadâli in Sanskrit are called Deodâli in Hindi, Deodângri in Marathi, Kukurvel in Guzerathi, and Halunkabalandthaondu in Canarese. The fruit is known as Vâpala-bij, "weavers seed," from the Sanskrit Vapa, to weave.

In 1887 attention was drawn to the dangerous properties of the fruit of *L. echinata* by Dr. Kirtikar, of the Bombay Medical Service, in a paper presented to the Bombay Medical and Physical Society. One of his own servants, after taking a decoction of a single fruit, which had been recommended to him by a friend as a purgative, was attacked with symptoms resembling those of cholera, and rapidly succumbed in spite of medical treatment.

The fruit of *L. echinata* is ovoid, about the size of a nutmeg, studded with numerous long, rather soft diverging bristles; it is obscurely divided into three cells by numerous dry fibres, and closed at the apex by a perforated stopple, which falls off when the seeds are ripe. The seeds are about eighteen in number, ovate, compressed, black and scabrous, testa very hard, kernel white and free from bitterness. The fibrous substance in which the seeds are enclosed is intensely bitter (specimen of fruit forwarded for Museum).

In the 'Raja Nirghanta,' the principal Sanskrit work on Materia Medica, the following notice of this drug occurs:—

DEVADALI. *Synonyms.*—Devadalika, Vratakosha, Devatada, Garagari, Jimuta, Taraki, Veni, Jalini, Akhuvishapaha.

Properties.—It removes bile, phlegm, piles, swellings, jaundice, phthisis, hiccough, worms, fever, and acts as an emetic.

Chemical Composition.—The air-dried fruit, deprived of seeds as much as possible, was digested with 80 per cent. alcohol, the greater part of the spirit removed by distillation, and the remainder allowed to evaporate by exposure to air. During spontaneous evaporation the tincture gelatinized. When the extract no longer smelt of alcohol it was gently warmed on the water-bath, water added, and when cold the turbid mixture repeatedly agitated with ether. The ether was much coloured. Gelatinous flakes separated during agitation.

The ethereal solution contained a large amount of chlorophyll, and after evaporation of the ether, the residue became partly crystalline. The extract was repeatedly treated with light petroleum ether, which removed some waxy and much colouring matter, and a crystalline principle, in microscopic needles and stellate masses, which was not further examined. The dark residue, insoluble in petroleum ether, was then boiled with water; the aqueous solution was slightly yellow, became turbid on cooling, and possessed an extremely bitter taste. This aqueous solution was agitated with ether. On spontaneous evaporation a yellow, transparent varnish was left, destitute of any crystalline structure. The extract treated with water afforded a white curdy precipitate with tannic acid; no precipitate with Mayer's reagent; with ferric chloride it afforded a slight greenish coloration; after boiling with dilute sulphuric acid, the solution readily reduced Fehling's solution. This principle would appear to be allied to, if not identical with, *colocynthitin.* Its physiological action was tried in the following experiment:—

·0296 gram was dissolved in a few drops of alcohol and warm water and injected into a full grown, fasting cat's stomach at 10.50 a.m.

11.20 a.m.—Vomitted several times, at first contents of the stomach, and then white frothy mucus, not tinged with blood.

12.0 a.m.—Passed a solid stool, on its side, breathing slow.

1.40 p.m.—Passed a semi-solid stool tinged with blood, pupils somewhat dilated; now and again contraction of abdominal muscles; uneasy, chiefly on its side, but shifts its position frequently.

2.45 p.m.—Pupils widely dilated, loss of power in hind legs, unable to stand; appears to have some difficulty in raising its head, which it keeps between its fore paws, which are extended; expression anxious.

2.55 p.m.—Slight convulsive movements of hind legs, breathing very shallow, pupils widely dilated, position as before.

2.57 p.m.—Marked convulsive movements of hind legs, breathing spasmodic and hard.

3.4 p.m.—Spasmodic gasps at intervals of about 10 seconds.

3.15 p.m.—Died, no further convulsive movements.

Death thus resulted in 4 hours and 25 minutes after introduction of the drug into the stomach, and only one stool was passed which could be ascribed as being due to its action.

Post mortem examination 20 minutes after death :—

Both lungs pale and collapsed, no fluid in pleural cavity.

Heart contracted and empty, no clots.

Stomach contained frothy glairy mucus, and deep yellow fluid ; walls darkly congested, no effusion of blood.

Liver congested. Spleen normal.

Kidneys, central portions slightly congested.

Intestines, rectum highly congested, with bloody mucus adherent.

The lower portion of the jejunum comparatively slightly congested in patches, the upper portion more deeply congested, until the duodenum was reached, when the whole of the gut was of a dark claret colour from uniform congestion. The ileum was wholly free from congestion and was bile stained.

The gelatinous flocks which separated on agitating the aqueous alcoholic extract with ether had the following properties :—By boiling with water an opalescent solution was obtained, which was filtered. The insoluble residue on the filter was soluble in boiling absolute alcohol, on concentration microscopic needles, rods and plates separated ; this solution was not further examined, it did not exceed a trace.

The aqueous filtrate gelatinized before it was quite cold. A portion was evaporated to dryness and boiled with absolute alcohol, when, with the exception of a trace of insoluble matter, it wholly dissolved, forming a yellowish and bitter solution ; on spontaneous evaporation opalescent masses separated on the sides of the beaker, and the solution formed a jelly. On completely evaporating off the alcohol, brittle yellowish flakes were left. In ammonia the principle dissolved forming a deep yellow solution. On the addition of acids the colour was discharged, slightly yellowish flocks being precipitated which redissolved in alkalies with a deep yellow coloration. With tannin no precipitate was produced. Fröhde's reagent gave a yellow colour in the cold, becoming emerald green on heating, and changing on cooling to blue, green, and finally to yellow. Nitric acid gave a yellow colour. Mayer's reagent, after acidulation with sulphuric acid, gave no precipitate. Concentrated sulphuric acid gave a deep yellow colour ; on the addition of bichromate of potash no special colour reaction was observed. On boiling with dilute sulphuric acid, yellow flocks separated, only slightly soluble in boiling water, and not gelatinizing ; slightly soluble in ether ; dissolving in alkalies with a deep coloration, and reprecipitated in gelatinous flocks by acids. The aqueous acid filtrate after digestion with barium carbonate was slightly bitter, and precipitated an alkaline copper solution on boiling. The gelatinizing properties of this principle appear to be very marked. ·1016 gram when dissolved in 100 c.c. of boiling water, gelatinized when the temperature fell to 35° C., so that the beaker containing the solution could be inverted. We have provisionally termed this principle "*luffein*," and we think it not unlikely that it will be found in the fruit of other plants of the same and allied orders. It differs from pectin, vegetable mucilage, etc., by being soluble in alcohol.

From the original aqueous solution, after dissolved ether had been expelled, agitation with acetic acid yielded an extractive highly bitter, which afforded reactions similar to those of colocynthin. We were unable to obtain the principle in a crystalline form.

The seeds contain a bland oil, free from bitterness, and which possesses some siccative properties.

SPINIFEX RESIN.*

BY J. H. MAIDEN, F.L.S., F.C.S.

Last year Sir William Macleay was kind enough to give me "a sample of gum used by the blacks for cementing the heads of spears† and prepared from Spinifex roots," which had been collected by Mr. Walter Froggatt in the Napier Range (locally called Barrier Range), 100 miles inland from Derby, North-west Australia.

I was dubious as to it being the product of a "Spinifex," never having heard of a grass yielding a resin, but Mr. Froggatt is emphatic that he is not mistaken, nor is so experienced a collector likely to be. The Spinifex is probably *Triodia irritans*, R. Br., but further information on the subject, giving the mode of preparation of the resin would be very acceptable. Mr. Froggatt states that it is obtained from the roots, and local Europeans and aboriginals all make similar statements as to its origin.

It is in a cake about 4 inches in diameter, and 1¼ inch in thickness. The smell is something like beeswax, but at the same time it has an exceedingly disagreeable and persistent odour which is not easily described. It reminds one of the smell of the fabric known as corduroy. It is of especial interest, because it is of aboriginal preparation. Its colour is that of a dirty dark bronze-green, or almost of a slaty colour with a little green in it. To the naked eye it looks very like finely chopped hay or grass-seed cemented into a compact mass. It is exceedingly tough, a sharp blow with a hammer on a cold chisel being necessary to fracture it.

Petroleum spirit extracts 3·2 per cent. of a transparent, colourless fixed oil or fat, which possesses a little of the disagreeable odour of the original substance. The solvent extracts no resin. As the substance has been made up into cakes by the blacks, and is to that extent not an absolutely natural product, it may be that the fat or a portion of it has been introduced.

The substance was then digested in alcohol, which extracts a transparent, hard, golden-yellow resin possessing some odour, and which appears to be an interesting substance. The amount of this resin is 67·3 per cent., and it darkens on keeping.

Water digested on the residue dissolves out 6·9 per cent. of colouring matter and salts. It contains no arabin. The remainder, 23·1 per cent., consists of dirt and particles of chopped grass. This also is quite free from gummy matter.

Summary :—

Fat, soluble in petroleum spirit . . .	3·1
Resin, soluble in alcohol	67·3
Extractive and salts, soluble in water .	6·9
Accidental impurity	23·1
	100·4

A second sample, treated with alcohol direct, yielded 70·8 per cent. to that solvent.

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* From Vol. IV. (Series 2nd) of the "Proceedings of the Linnean Society of New South Wales."

† "The heads of spears from Western Australia in my collection are coated with a hard gum, forming a ridge on one side, in which pieces of glass are impacted." Brough Smyth's 'Aborigines of Victoria,' etc., i., 336. Mr. Froggatt informs me that Spinifex resin is put to such a purpose in the locality from which he obtained it.

The Pharmaceutical Journal.

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SATURDAY, JUNE 7, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

At the first meeting of the newly constituted Council last Wednesday there was a full attendance of members, and the chair was taken by Mr. Carteighe. Before proceeding with the election of President, Vice-President and Treasurer, Mr. Cross brought forward a motion that the honorary officers should be first nominated and seconded by two members of the Council. A long discussion took place in reference to this proposed innovation, which showed that it met with little approval. Although the object contemplated by it was appreciated, the general opinion was that it could be attained better by other means than those suggested. An amendment, moved by Mr. Gostling and seconded by Mr. Abraham, that the election of the honorary officers should be proceeded with at once, was eventually carried by a considerable majority, and afterwards as a substantive resolution. The result of the ballot was to confirm the indubitable indication of the general election by placing Mr. Michael Carteighe again in the position of President. Mr. Alexander Bottle was again elected Vice-President, and Mr. Robert Hampson was elected Treasurer to fill the vacancy made by the retirement of Mr. Robbins. The appointment of the Secretary and other officers of the Society followed, and the President then moved that the Council should express its regret at the retirement of Mr. Robbins, and record its appreciation of the services he had rendered during the past seventeen years as a member of Council and as Treasurer, supporting that motion by a fitting reference to Mr. Robbins's work in connection with finances of the Society and the Benevolent Fund, in the promotion of which he has always taken an active interest. This motion was seconded by the Vice-President and carried unanimously. The additions to the Society consisted of two pharmaceutical chemist members, one chemist and druggist member, nineteen associates and eleven apprentices. Votes of thanks were next passed in acknowledgment of the valuable assistance furnished by various persons in connection with the Society's Conversazione last month and of the energy displayed on that occasion by the Secretary. The several standing Committees of the Council were then appointed, and the ordinary routine business proceeded with.

The report of the Finance Committee recommended that a further payment to the contractors for the new buildings should be made upon the certificate of the architect, and in moving the adoption of this report the President pointed out that the greater part of the receipts in the month of May came from the publishers of the Journal. The subscriptions to the Benevolent Fund, which are always small at this time of the year, have amounted to twenty-five pounds in all. The donation account now stands at sixty-six pounds, and it may be expected that this sum will soon be augmented sufficiently for adding to the invested capital. Mr. Abraham thought it was desirable, since many members are dissatisfied if a Conversazione is not held, that they should be made to realize the fact that the giving of a Conversazione costs money, even when held on the Society's own premises, and that in the present instance the expense had amounted to between five and six shillings a head. Several other members expressed the great satisfaction the success of the Conversazione had afforded them, and their sense of the credit to the Society and utility to its members resulting from such opportunities of meeting now afforded by the Society's new premises. On the recent occasion the expense, as mentioned by the President, was greater than it need be in future, because of the building being new and unfurnished, and the necessity of making special provision for those deficiencies. On the report of the Benevolent Fund Committee two grants of ten pounds and five pounds were made, and Mr. Gostling mentioned that he hoped one of the grants of ten pounds recently made had been the means of placing the recipient in a position to earn her livelihood in future. In the report of the Library, etc., Committee there was a recommendation that a grant of twenty pounds should be made to the Chemists' Association at Nottingham. It appears that the association of the pharmacists of that town with the local University College will be of much benefit to apprentices and assistants, as well as of great advantage to the trade. Though the work now being beneficially done in that town has been more largely due to the activity of the College authorities than to the Society's local representatives or the trade, the opportunities offered for improved education by the classes connected with the College make it desirable to encourage those who wish to avail themselves of them. On those grounds, the President, in moving the adoption of the report, expressed a hope that the grant recommended would prove useful in keeping the subject of education well to the front. The discussion of this recommendation led to some remarks by Mr. Schacht and Mr. Atkins as to the desirability of issuing an enlarged syllabus of the examinations, such as might induce students to go through a course of study of the kind that is needful for them, and thus make up to some extent for the deficiency resulting from the failure to establish a suitable systematic training or curriculum. The President pointed out that the draft of such a syllabus had been before the General Purposes Committee, and its consideration had been adjourned only on account of the Pharmacy Bill. In his opinion it is incumbent on the Society to have a proper syllabus, whatever may be done in the way of legislation, and the present is a favourable time for proceeding with it.

Among other matters that came under consideration, one of the most important was that of a Bill for the amendment of the Pharmacy Act. The motion of the Vice-President that a draft should be at once prepared and submitted to the Council was unanimously agreed to, and this step should afford opportunity for the Bill being fully discussed, so as to obviate opposition arising from misunderstanding, as in the case of the Bill that has recently been withdrawn. In connection with this subject reference may be made to the letter received from the Honorary Secretary of the Nottingham Association, expressing a desire for an extension of the poisons schedule, and to the letter received from the Privy Council office, requesting the opinion of the Pharmaceutical Society as to the recommendation of a coroner's jury that the conditions imposed by the Pharmacy Act as to the sale of scheduled poisons should be applied to the sale of such articles as hydrochloric acid. These matters have been referred to the Law and Parliamentary and General Purposes Committees, and the reports thereupon will no doubt be looked for with much interest. In another communication, from the General Medical Council Office, the Chairman of the Pharmacopœia Committee of that body forwarded a list of the medicines and compounds that have been selected for the proposed Addendum to the B.P., and requested the President and Council of the Society to consider and report to the Committee the best means of defining and preparing the articles named. It will be seen, therefore, that this first meeting of the new Council has resulted in the inauguration of a considerable amount of work that is of very great importance in regard to the interests of chemists and druggists.

THE ADDENDUM TO THE PHARMACOPŒIA.

THE thirty-six articles named in the list referred to in Dr. QUAIN's letter to the Council (see p. 1009), as having been recommended by the Pharmacopœia Committee to be included in the proposed Addendum to the British Pharmacopœia, have been selected from a much larger number of additions that have been suggested for consideration. The list as it stands is subject to some amplification according to the number of preparations to be decided upon in two cases. The selection of these articles has been carried out on the basis of the replies received from the medical authorities of the Kingdom to a circular letter addressed to them by the Chairman of the Pharmacopœia Committee, requesting information as to which of the comparatively new medicines and compounds are to be regarded as possessing well recognized medicinal value, and as having from that point of view received the general approval of the medical profession. Out of twenty medical authorities represented on the General Medical Council, and so addressed, lists of such new compounds and medicines have been sent in by the Royal Colleges of Physicians of London and Edinburgh, the Royal Colleges of Surgeons of England and Edinburgh, the Apothecaries' Society of London, the Faculty of Physicians and Surgeons of Glasgow, the Universities of Durham, Edinburgh, Aberdeen and St. Andrews, the King and Queen's College of Physicians in Ireland, and the Apothecaries' Hall of Ireland.

We gather from the report of Professor ATTFIELD that the number of articles suggested in these lists for insertion in the Addendum amounted to one hundred and thirty. Among them there was only one that was recommended by all, viz., the substance known by the trade names of "antipyrin." Next comes strophanthus, recommended by ten of the above authorities; then the articles known by the trade names of "lanolin," "saccharin," "antifebrin," and "sulphonal," recommended by from seven to nine medical authorities, and so on throughout the list, most of the articles eventually adopted by the Committee having been recommended by five or more medical authorities. The remainder have been regarded as not having yet received general approval from the medical profession as possessing well-recognized medicinal value. As stated in the report of the Council proceedings of last Wednesday, the list of articles finally selected has now been submitted to the Pharmaceutical Societies of Great Britain and of Ireland in order to receive through those bodies pharmaceutical assistance as to the preparation and definition of the medicines and compounds. Within that range a variety of points will arise for consideration, but as to these, as well as some other suggestions submitted to the Pharmacopœia Committee, we must postpone further comment to a future week.

At the last meeting of the North Kensington Chemists' Association, recently formed through the exertions of Mr. H. Long, several new members joined the Association, a paper was read by Mr. Hyslop on the "Aspects of Trade Interests as presented by some of the new Candidates for Election to the Council," and the remainder of the evening was passed agreeably in general conversation on trade topics. We understand that the next meeting will take place on the evening of Tuesday, the 17th inst., and that the President of the Pharmaceutical Society has promised to be present on that occasion.

* * *

At an inquest recently held by Mr. Danford Thomas, in reference to the death of a man who had drunk spirits of salts in mistake for whiskey, the jury returned a verdict of death by misadventure, adding as a rider that they desired to call the attention of the Home Secretary to the dangers continually arising from the sale of poisonous acids at oil shops, etc., in any sort of bottles and vessels without labels or any indication of the contents, and they suggested that all persons selling poisons should do so only under the conditions imposed by the Pharmacy Act in regard to poisons sold by chemists and druggists In the sale of such articles precautionary measures are, no doubt, needed in the public interest; but fresh legislation would be required for that purpose, since the articles referred to are not poisons in the eye of the law, and hitherto the Privy Council has declined to approve any extension of the Pharmacy Act poison schedules that would bring them within the scope of that Act, as recommended by the Council of the Pharmaceutical Society.

* * *

In an interesting communication to the *Times* of May 29, on "Two Centuries of Quakerism," reference is made to William Allen, F.R.S., the first President of the Pharmaceutical Society, as having been held in such high respect by the late Duke of Kent, the father of our present Queen, that the Duke repeatedly sought from him advice and assistance in his affairs, and constituted him one of his executors. Long before Queen Victoria sat upon the throne of England, the writer says, she sat as an infant upon the knee of her father's Quaker friend. It is also known that Mr. Allen was frequently consulted by the Duke of Wellington, Lord Brougham, and other statesmen in relation to educational and philanthropic subjects. In addition, he had several interviews with the Emperor Alexander I. of Russia, who is said to have offered him, on one occasion, a monopoly of the supply of medicines to the Russian army, a promising overture that appears to have been declined on conscientious grounds, lest it might be deemed, even indirectly, to favour the militarism against which Quakers have so consistently set their faces.

* * *

A correspondent of the *Yorkshire Post* asks whether it is a fact that the provisions of the Pharmacy Act, 1868, do not apply to the Isle of Man, and urges that if this be the case it is desirable, in the interests of visitors to the island, that so anomalous a condition of the law should be rectified.

* * *

The Pharmacy Act (Ireland) Amendment Bill is set down for Committee on Wednesday, June 11.

* * *

We have just received a copy of the syllabus for the summer session of the classes for pharmaceutical students in connection with the Leicester and Leicestershire Chemists' Association. It includes a series of Botanical Demonstrations by Mr. S. F. Burford, at the Botanical Garden, Abbey Park, on Tuesday mornings, from 7 to 8 o'clock, the first demonstration taking place on the 10th inst.; as well as Lectures on Structural Botany, by Mr. G. A. Weall, at St. George's Chambers, on Wednesday evenings at 8·45 o'clock, the introductory lecture being delivered on the 11th inst. Further information may be obtained from the Honorary Secretary, Mr. J. J. Edwards.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, June 4, 1890.

Present—

Messrs. Abraham, Allen, Atkins, Bottle, Carteighe, Cross, Evans, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Schacht, Southall, Storrar and Watt.

Mr. M. Carteighe took the chair.

The minutes of the previous monthly meeting and of the special meeting on May 21, were read and confirmed.

Election of President.

Mr. Cross said he had always held, and had not been convinced by the former discussions on this subject, that it would be advantageous to the Council, first of all to nominate the gentlemen who should hold honorary offices in the Society, and afterwards elect them by ballot. To his mind the advantages of the course were obvious, because the members would then know exactly the gentlemen who would accept office, and he took it that anyone who was nominated, and did not wish to stand, would have the opportunity of publicly stating his decision, and altogether they would be more in each other's confidence if this course were adopted. There was nothing in the bye-laws to prevent this being done, and he would suggest that some member should first nominate one of their number for President, and then if anyone chose to nominate another he could do so. He took it that any friction arising from a second nomination would be no greater than arose when the result of the ballot was read out, and more than one person was voted for.

The Chairman said he was entirely in the hands of the Council in this matter. He did not remember that there was anything in the Charter which would prevent the suggested course being adopted.

Mr. Cross said the Charter simply stated that at the first meeting of the Council it should elect a President, Vice-President and Treasurer, and also a Secretary. There was no bye law which could over-ride that.

Mr. Richardson said he was responsible for the present form of balloting, he believed, because some years ago the practice was for each member to have a blank piece of paper, on which he wrote the name of the gentleman he voted for, which was a very crude method, and as he maintained was not a ballot. There was a great deal in what Mr. Cross had said, but he thought it would be better if a little private conference took place before-hand as to who should be elected. It might be done in a very proper manner by having a private meeting of the Council the evening before, when the name of some gentleman should be decided upon. That was frequently done at the election of mayors; first of all there was a private meeting, so that when the public election came on it might be unanimous.

Mr. Watt agreed with what Mr. Cross had said, and thought that would be really the best way of proceeding. Mr. Richardson's suggestion was rather an antediluvian kind of proceeding. It was one which he had the pleasure of taking part in some forty years ago, but it was done away with now.

Mr. Richardson said it was carried on at the present day.

Mr. Watt thought it must be in some very antiquated place. The proper business manner was, as Mr. Cross suggested, that they should really know who was proposed.

Mr. Harrison did not at all agree with Mr.

Richardson. The President to be elected was not only President of the Council or of that meeting, but of the whole Society, and on those grounds it was not sufficient that they should satisfy themselves in their election, but they ought to be able to state publicly to their constituents why a particular person was selected. He took it, therefore, the proper method was to have a nomination made, and seconded, and then a vote taken. He did not agree that the vote should be by ballot; he thought it should be open, and there was nothing in the Charter to say it should not. It simply said, the Council shall at the first meeting elect a president, vice-president and treasurer, but did not provide how it was to be done, nor, as far as he was able to see, was there anything in the bye-laws to provide how the election should take place. In the absence of such instruction, the proper method was to have a nomination, and a vote openly taken. There might be a previous meeting, if required, but he did not agree with that idea. He thought the Council was fully competent to discharge a duty of that kind.

Mr. Evans supported the suggestion, and would be glad to see open voting with a nomination. He did not see that any offence could be taken if two or three gentlemen were put up for election, and it was very much better to have open voting.

Mr. Martindale said he should support Mr. Cross's suggestion, but at the same time he should prefer the vote being taken by ballot.

The Chairman pointed out that under the bye-laws any member of the Council could demand a ballot upon any motion.

Mr. Cross said he could quite see the advantage of the ballot, but he did not see any objection to the nomination.

Mr. Hills asked if it was to be understood that the merits of the candidates were to be discussed in open Council before the vote was taken.

Mr. Evans said the pharmaceutical merits.

Mr. Cross said the merits of each gentleman around that table were so distinguished that there was not the least fear of their being discussed too freely. He should leave that entirely to the discretion of the gentlemen nominating.

Mr. Watt did not see any objection to the merits of the candidates being stated, as was done in municipal councils.

Mr. Schacht ventured to point out that a decision on this point ought to be arrived at once for all. It would be a great pity to change frequently the method of electing officers. The Council had now gone on for a great many years on one plan, and he did not think any practical difficulties had been found to arise. He did not want to be too conservative, but would venture to argue that the method now proposed to be adopted should be one which could be continued in the future.

Mr. Atkins hoped the Council would continue to elect its officers as it had previously done. It appeared to him that while the members of Council would be perfectly within their right to stand up and nominate and compare the respective merits of various gentlemen for an office he hoped that course would not be adopted. He must support Mr. Richardson's statement to this extent, that in that antiquated place called Salisbury they were always accustomed to have an informal meeting in order to find out who had the largest support, and then at the public meeting the gentleman selected was unanimously elected in order to save the unpleasantness of a gentleman being elected only by a majority. They liked to find out what was the decisive majority, and if they could get unanimity it strengthened the position of the gentleman elected. That strengthened materially the view which Mr. Harrison had in his mind, that the Council was not simply electing a chairman of that body, but a President of the whole Society. If therefore a very large agreement of opinion could be obtained it would strengthen the position of the President, but he hoped the Council would proceed as it had done in the past.

Mr. Evans remarked that under the present arrangement if a few gentlemen met, as people did meet occasionally, and arranged to support one man for a particular office, and the rest came with a free hand unless nominations were made, the few who had arranged beforehand as to one particular man would, of course, carry their point.

Mr. Gostling thought such a meeting might be held by the General Purposes Committee.

Mr. Richardson said he wished to put himself right as to the suggested antiquated method of electing mayors. In the town of Leicester, which he had in his mind, some 100 years ago the mayor used to wear a chain, but the present Radical Corporation of Leicester had done away with the chain of office, though he believed the custom was still followed in the northern counties of dangling the chain of office round the neck of the mayor.

Mr. Allen said he had listened to all that had been said in favour of departing from the traditions of the Council, and failed to see any reason for departing from the manner in which the voting had been conducted for the last fifty years. He could imagine that on this occasion the voting might be very straightforward, and there might not be very much opposition, but Mr. Schacht suggested that if a change was going to be made it should be one which ought to operate in the future; the next election of President would naturally take place on the same lines, and he thought there might some day be a considerable amount of wrangling over the election of President. It seemed to him it would be impossible to nominate gentlemen without going a great deal into what must, to say the least, be distasteful to the men nominated, and he could not see any good reason for departing from the usual practice.

Mr. Gostling said he was entirely in sympathy with Mr. Allen on this matter. It must be very distasteful to members of the Council to have their various merits discussed. There might be many men on the Council perfectly eligible for the office, but the other members knew the circumstances, the ability, competence and tact of each individual member, and certainly under the present circumstances their minds must be pretty well made up, and he hoped the usual custom would not be departed from. If any change were to be made notice of motion ought to be given before the next election took place.

Mr. Abraham thought it would be a great mistake to alter the present method without formal consideration upon due notice given.

The Chairman thought this was the main objection to the proposition, that it was making a change without full consideration. But he ventured to point out one objection to it which would be inevitable. It was often said that members of Council might be trusted to speak with discretion and care, and not to hurt one another's feelings; but it required a considerable amount of skill and discretion when gentlemen got warm in describing the merits of one man not to say something to decry the merits of another, and unintentionally the very man who was wanted to be President might get his nerves very rudely shaken in the course of a discussion. He did not see how the observations to be made on a nomination should be limited.

Mr. Cross said he did not wish to spring anything on the Council without notice, and could hardly be charged with doing so, because he had brought this forward on several occasions since he had been a member of the Council. He felt very strongly that this would be to the advantage of the Society, and he should like to press the matter to a division, as he believed that unanimity would be much better secured in that way. When a gentleman was temperately nominated, and he did not apprehend there would be any intemperate language ever used at that table, persons would be chary of putting forward a second nomination, but if such a thing did take place, and there were rival candidates, it would not be a very serious matter; the ballot would still take place, and those who preferred to nominate in secret could still do so, and need not say anything about the gentlemen they nominated. He failed to see any objection to the change. With regard to the alteration in the traditions of the Council, he would call attention to what Mr. Richardson had said; it was only a short time since, on that gentleman's suggestion, the way in which the election took place had been altered, and he believed when the method which he suggested was introduced, as he hoped it would be, every member of the Council would be quite content to adhere to it in the future. He begged to move:—

> "That in electing the honorary officers of the Society a nomination be moved and seconded by two members of the Council, and that the election be then proceeded with by ballot."

Mr. STORRAR asked if Mr. Cross meant to restrict the voting to those who were nominated publicly. If so, he should be inclined to support it; but if that were not meant, if gentlemen could vote outside the nomination, he did not see the use of it.

Mr. CROSS said he meant that only those who were nominated could be voted for.

Mr. MARTIN asked if Mr. Cross had given notice of this motion.

Mr. RICHARDSON said if Mr. Cross moved the resolution all the members of Council would be entitled to speak on it, and the discussion might go on until two o'clock. He would suggest that before the next election the method might be reviewed and considered, but a proper notice of motion should be given.

Mr. WATT thought the motion as a matter of order could not be refused, and there was no necessity to give formal notice of it since it was a matter of business arising out of the meeting.

Mr. SCHACHT said it was perfectly in order for Mr. Cross to propose this change of method with reference to the day's proceedings, and he could not see that any resolution then arrived at could be binding on future Councils. The next Council might consist of very different gentlemen, who might have very different opinions as to the mode in which they should conduct the elections, and unless there was a positive alteration in the bye-laws as to the method of election of officers, it would not be understood to apply to the next Council. He ventured to urge, therefore, that the old method be continued.

Mr. RICHARDSON asked if the point could be met by a standing order.

The CHAIRMAN said the standing orders had to be adopted that day.

Mr. RICHARDSON said that the Council might pass a standing order that the officers should be elected in a certain manner, but the next Council could alter them.

Mr. CROSS also pointed out that the present Council could not bind a future one.

The CHAIRMAN said any resolution the Council now passed would naturally be held to be binding on their successors unless it were rescinded, and therefore at the first meeting of the next Council the Chairman would assume, unless some one proposed another method, that this resolution if carried should hold; at the same time it would be within the powers of that meeting to rescind it.

Mr. ATKINS said if Mr. Cross pressed this motion he should feel inclined to move an amendment that the election should take place according to the usual practice. He had the strongest conviction, whilst perfectly independent about open voting, which seemed to him unimportant, that it would be undesirable to be running candidates and discussing them. He failed to see that the interests of the Council or the Society had suffered by the present practice.

Mr. HILLS said if this motion were pressed he should vote against it. It was very unwise, on the spur of the moment, to overthrow the traditions of so many years, and all the arguments adduced had failed to convince him that there would be any advantage in discussing the merits and sometimes the private circumstances of the candidates for various offices. Mr. Cross's remarks with regard to what Mr. Richardson had said were not quite to the point, because Mr. Richardson's suggestion some few years ago was merely on a question of detail as to the way in which the vote should be taken. The names of the whole twenty-one members were now printed on a piece of paper, and the voter put a cross against one instead of writing a single name on a slip of paper. The only advantage he could see in the new method was that it would afford pabulum to the press and induce the discussion of personal matters.

Mr. HAMPSON said this was a very important proposal, but after thinking it over for a few minutes he was disposed to look upon the resolution as a desirable one. It was not after all a great hardship to undergo, and he was quite sure members of the Council would so acquit themselves that such a process might be carried out without detriment either to individuals or to the Society. In fact it would be a sort of training for them. He thought members might be trusted to say what was right and proper, and that it was a more open and straightforward way of proceeding than the present, and on that ground he felt bound to support the motion.

Mr. EVANS suggested as a compromise that the names only be mentioned without any remarks.

Mr. CROSS said he should leave that to the discretion of those nominating.

The CHAIRMAN thought that the object of the motion would be defeated if no observations were made.

Mr. NEWSHOLME said he believed Mr. Cross's sole idea was that members of the Council should know who they were going to vote for, and he went with him to a certain extent, but certainly could not support the motion. The difficulty had been in recent years that there had been just one or two odd names which received a vote or two each, besides the man elected, and Mr. Cross thought that it would be well to get over that by obtaining a unanimous vote, but he believed those who had been voted for in the way he had mentioned had not been aware of what was intended.

Mr. CROSS said he knew perfectly well that some gentlemen thus voted for would have strongly objected to it, and they ought to have an opportunity of objecting publicly.

Mr. RICHARDSON said he was still of opinion that an informal meeting held previously would be the best way of getting over the difficulty. They all knew who would be elected that day, and he was very sorry that so much discussion had taken place. He thoroughly entered into the spirit of Mr. Cross's motion, but it ought to be carried out in a different form, viz., by holding an informal meeting on the evening previously, and deciding who should be elected as the three principal officers of the Council.

Mr. MARTINDALE said that would necessarily lead to a caucus; a nomination would be made and seconded, and if there were no opposition that would be carried without ballot at all, and he thought that was not to be desired.

The CHAIRMAN reminded the Council that it was departing from the true democratic constitution of the Society, and he must say he was surprised to hear Mr. Evans and Mr. Watt so enthusiastic about it. The Society was constituted on the broadest democratic principles, but if this motion were carried, individual members would be deprived of the privilege of voting for the persons whom they thought most fit to be officers. If the system were to work at all, members could only vote for those who were nominated. The principle on which former Councils had elected the President was that every member was equally eligible, and if any one or two gentlemen thought they could show some regard for any member by putting a cross opposite to his name they were entitled to do so.

Mr. EVANS said he was certainly a democrat, so far as voting by ballot in constituencies was concerned, but when they sent representatives to Parliament, they expected them to vote openly, and not by ballot. The members of that Council were the representatives of the chemists of the country, and it was only right that they should vote openly, so that all the constituents should know what their views were.

Mr. MARTIN remarked that the Prime Minister and members of the Cabinet were not voted for openly in the House of Commons.

Mr. ALLEN remarked that the members of the Council were the representatives of the Pharmaceutical Society, not of the chemists of the country.

Mr. CROSS having expressed his desire to go to a vote,

Mr. GOSTLING proposed an amendment—

> "That the Council proceed forthwith to the election by ballot of the President, Vice-President and Treasurer of the Society."

Mr. ABRAHAM seconded the amendment. He thought if the motion were carried it would resolve itself into a discussion of about half an hour on the virtues of the various candidates, and nothing else. No one would like to say anything against any of the candidates, and it would really amount to nothing but a discussion of their merits, which were generally known,

On being put the amendment was carried by a considerable majority. It was then put as a substantive motion and carried *nem. con.*

The ballot was then taken, and

MR. MICHAEL CARTEIGHE

was re-elected President.

The PRESIDENT begged to thank his colleagues for this renewed mark of their confidence, which was quite as gratifying as if someone had spent half an hour in describing his virtues. He hoped they would collectively be able to carry on the work of the Society during the coming year with satisfaction to themselves and the members. He was the successor of a long line of distinguished men, and not the least distinguished of those who had occupied that chair was the first President, William Allen. He might mention as an interesting fact, which he had lately become aware of in reading an account of some distinguished members of the Society of Friends, that William Allen was on terms of intimacy with the Duke of Kent, the Queen's father, and that in her early days Queen Victoria used often to sit on his knee. William Allen was not only distinguished in pharmacy, but in many other ways, besides being associated in a pleasant way with royalty, and he understood that he was executor to the Duke of Kent.

Mr. ATKINS said Mr. Allen was alluded to in a very pleasant manner in the 'Greville Memoirs.'

ELECTION OF VICE-PRESIDENT.

On a ballot being taken,

MR. ALEXANDER BOTTLE

re-elected Vice-President.

The VICE-PRESIDENT said he had great difficulty in finding words to convey his thanks for this renewed mark of kindness and confidence, but he would endeavour in the future, as in the past, to support the honour and dignity of the noble institution whose representatives they all were.

ELECTION OF TREASURER.

On a ballot being taken—

MR. ROBERT HAMPSON

was elected Treasurer for the ensuing year.

Mr. HAMPSON thanked his fellow members for having elected him to this honourable office. He did not suppose there was very much to do, but he hoped to succeed in doing what there was to be done to the satisfaction of the Society.

STANDING ORDERS.

The standing orders of the Council were re-enacted for the ensuing year.

SECRETARY AND REGISTRAR.

Mr. RICHARD BREMRIDGE was reappointed Secretary and Registrar for the ensuing year.

EDITOR AND SUB-EDITOR OF THE JOURNAL.

Dr. B. H. PAUL was reappointed Editor, and Mr. F. PASSMORE Sub-Editor of the Journal for the ensuing year.

CURATOR.

Mr. HOLMES was reappointed Curator of the Society's Museum for the ensuing year.

ASSISTANT SECRETARY.

Mr. J. R. HILL was reappointed an Assistant Secretary of the Society for the ensuing year.

EXAMINERS FOR THE JACOB BELL AND REDWOOD SCHOLARSHIPS.

Messrs. SAUL and DAVIES were appointed to conduct the examinations for these Scholarships during the present year.

RETIREMENT OF MR. ROBBINS.

The PRESIDENT moved:—

> "That this Council much regrets the retirement of Mr. John Robbins, and desires to record its appreciation of the services he has rendered to the Society during the seventeen years he has been a member of the Council, and also for the able and efficient manner in which he has filled the office of Treasurer for the past ten years."

He did not move this resolution because he felt that he could do more justice to it than anyone else, but with the view of giving it as much weight as the dignity of the office he held could add to it. Mr. Robbins had been an active worker in the Society from very early days; he was the successor in business of one of the founders of the Society, Mr. Garden, of Oxford Street, and he had a son in the Society's School who would probably in time to come occupy as high as or perhaps even a higher position in the Society than his father. The association he had had with Mr. Robbins during the greater part of his term of office had impressed him very much indeed; he was a very active and capable financier, and took great interest in all financial matters, and his judgment on all questions of investment and re-investment of the funds, such as came up in connection with the Benevolent Fund, had been of the greatest value. The members did not always give as much credit as was due to some of their colleagues whose duties did not involve their speaking much at the Council table, and Mr. Robbins had done a great deal of work, although he did not often make speeches. He should have much pleasure in sending him a copy of this resolution if it were adopted.

The VICE-PRESIDENT had much pleasure in seconding the motion, with which he entirely agreed, and regretted that Mr. Robbins had seen fit to retire. Mr. Robbins was not a frequent speaker, but he had been a constant worker, and had done good work, especially in connection with the Benevolent Fund, in which he had always taken a very great interest, shown not only in the disbursement of the money, but in collecting it.

Mr. **Watt**, coming from another part of the country, desired to endorse all that had been said, and to express his regret that Mr. Robbins had retired from the Council. Mr. Robbins had been of special service in connection with the Benevolent Fund, concerning which he (Mr. Watt) held much the same views as Mr. Robbins. The only mitigation of the regret which he felt at his retirement was the feeling that a very efficient successor had been appointed.

Mr. **Schacht** wished to add a word, not merely in endorsement of what had been said with regard to Mr. Robbins, but also to express his great satisfaction at what had fallen from the President with reference to Mr. Robbins, junior, who he was glad to hear was on the road to attain a high position in pharmacy. The earlier portion of that gentleman's career had been passed in the establishment in which he (Mr. Schacht) was then a partner, and the present members of the firm would be delighted to hear what the President had said as to the promise of his future career.

The motion was then carried unanimously.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Boucher, Charles Ernest	Bristol.
Richards, Thomas	Treherbert.

Chemist and Druggist.

The following, who was registered as being in business before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society:—

Sherratt, William	Manchester.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Fargher, Charles	Cardiff.
Hill, John	Bacup.
Horry, William Tom	Boston.
Jameson, Walter George	London.
Jeans, Alfred	Manchester.
Lockwood, Johnson	Burley in Wharfedale.
Pugh, Edward Lister	Rhyl.
Skinner, Donald McDougall	Oban.
Willcock, Frederick Albert	Wolverhampton.

Modified.

Jewell, Joseph Robert	London.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Blyth, William Brew Adam	St. Andrews.
Brearley, Richard	Torquay.
Hoseason, James Henry	Edinburgh.
Moore, Leopold Frank	Leicester.
Thornhill, Ernest	Brighton.
Tweedie, Thomas Shortridge	Annan.
Walton, Samuel Archibald	London.
Weston, John Henry	Holyhead.
Wippell, Alice Mary	Perth.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Addison, Charles Samuel	Hitchin.
Bately, Stephen Briggs	Great Yarmouth.
Day, William	Hull.
De Carle, George	Norwich.
Evans, David Llewellyn	Llandyssul.
Gelling, William Clucas	Douglas.
Jackson, Joseph Gilbert	Sheffield.
Michell, Samuel C. Frederick	St. Austell.
Montgomery, James Smith	Glasgow.
Vessey, George Nicholas	Torquay.
Whitehead, Fredk. Nathaniel	Morecambe.

The Conversazione.

The **President** moved that the thanks of the Council be presented to Messrs. C. V. Boys, Henry Crouch, Daniel Morris, Percy Newbery, W. A. Shenstone, Thomas Shepheard, the Staff of the Society's School and others for their valuable assistance in connection with the Society's Conversazione last month. The Society had had the assistance also of a great many of its own officers, but it would be impossible to enumerate all who had helped, and he could only express the gratitude of the Council to them all for their kind efforts. All meetings of that kind always involved a great deal of work, which had to be done under pressure, and he could not put the motion without bearing special tribute to one officer in particular, the Secretary, although his name did not appear in the resolution.

The **Vice-President** seconded the motion, which was carried unanimously.

Appointment of Committees.

The Council went into Committee to consider the arrangement of the different Committees, as the result of which the following arrangements were made:—

General Purposes.—The whole Council. To meet on the evening before the meeting of the Council and at such other times as may be necessary.

Finance.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Abraham, Allen, Cross, Harrison, Hills, Leigh, Martin, Martindale and Schacht. To meet the day preceding the Council meeting, and at such other times as may be required.

Benevolent Fund.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Atkins, Evans, Gostling, Greenish, Hampson, Newsholme, Richardson, Southall, Storrar, and Watt. To meet the day before the Council meeting, and at such other times as may be necessary.

Library, Museum, Laboratory and House.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Allen, Atkins, Cross, Evans, Greenish, Hampson, Hills, Martindale, Newsholme, Richardson and Schacht. To meet on the second Wednesday in each month except August and September, and at such other times as may be required.

Law and Parliamentary.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Abraham, Allen, Atkins, Hampson, Harrison, Hills, Martin, Martindale, Newsholme, Richardson, Storrar, and Watt. To meet as occasion may require.

Building.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Allen, Gostling, Hills and Hampson. To meet as occasion may require.

Research.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Greenish and Schacht.

Evening Meetings.—The staff of the Society's School, the Editor and the Curator, were requested to assist the President and Vice-President in making arrangements for the Society's evening meetings in London.

Freehold Investments.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), the Treasurer and Mr. Hills.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee was of the usual character, recommending certain accounts for payment, including a sum not exceeding £1200 to be paid to the contractors during the month on the certificate of the architect.

The PRESIDENT, in moving the adoption of the report, said the greater part of the receipts this month came from the publishers for advertisements, though there were some subscriptions and examination fees. The Benevolent Fund subscriptions were always small at this time of the year, but they had received £20, and a donation of £5. The donation account now stood at £66 odd, and he hoped it would soon be made up to £100, so that it could be invested. There was nothing special in the case of the payments, except the expenses of the Conversazione and the architects' commission.

Mr. ABRAHAM drew attention to the expenditure on the Conversazione which amounted to between 5*s.* and 6*s.* a head. Many of their members were dissatisfied if a Conversazione were not held, and it would be well for them to know what it cost, even although it was held in their own premises.

Mr. WATT thought nothing could be more satisfactory than the last Conversazione, which did great credit to the Society, and was the means of bringing the members together who otherwise had no opportunity of meeting. He came up from Scotland on purpose under great pressure of public and other engagements, and never attended any meeting with greater satisfaction and pleasure. He trusted that no one would grudge the expenditure which had been incurred.

Mr. LEIGH, while rejoicing in the success of the gathering, still felt it was a great deal of money to pay for it, and hoped it might be arranged more economically in future.

Mr. ATKINS remarked that this was essentially a pharmaceutical Conversazione, which was not the case when the meetings took place at South Kensington.

Mr. RICHARDSON was sorry to hear any deprecation of the Conversazione, which he understood was a great success, though he had not the privilege of attending it himself. It was very satisfactory to find that their own building afforded the opportunity of holding such a meeting.

Mr. ABRAHAM said he must not be understood as deprecating what had been done in any way. He only wished members to realize that it cost money.

Mr. EVANS thought the money was well spent. There were a great many obstacles to be overcome, and the Committee and officers who had the management of the matter deserved the sincere thanks both of the Council and of the Society.

The PRESIDENT remarked that the expense on the recent occasion was greater than it need be again, the building being new and unfurnished, and Councils, like individuals, could always learn by experience. He thought the Society could in future at a moderate expense give a pleasant evening, and the opportunity for inter-communication between members from a distance, which was after all the main object in view.

The motion was then put and carried unanimously.

BENEVOLENT FUND COMMITTEE.

The report of this Committee included a recommen-ion of the following grants:—

£10 to a registered Chemist and Druggist (age 59), who had an attack of paralysis in 1886, which led to his failure in business. His wife is now carrying on a temperance hotel with the assistance of two of the children (Hants).

£5 to an Associate and Member from 1841 to 1850 (age 63). He suffers from heart disease, and is unable to follow any active employment, and is mainly dependent on his daughter (London).

An application from a person who received a grant of £10 in December last had not been entertained.

The VICE-PRESIDENT moved the adoption of the report and recommendations, which was carried unanimously.

Mr. GOSTLING remarked that the grant recently made to an applicant in Norfolk had been very much appreciated, and he hoped had placed her in a position to be able to earn her own livelihood in future.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

LIBRARY.

The report of this Committee stated that the report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
April	Day . .	515	34	10	22
	Evening .	150	15	3	8

Circulation of books.	Total.	Town.	Country.	Carriage paid.
April	241	129	112	£1 8 8½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Hooker, Flora of British India, part 16.
From H. M. SECRETARY OF STATE FOR INDIA.

Société des pharmaciens de l'Eure, Bulletin, nos. 14, 15. From the SOCIÉTÉ.

Fraser (T. R.), Strophanthus hispidus, part 1, Natural History and Chemistry, 1890.
From the AUTHOR.

Digest of Criticisms on the United States Pharmacopœia, part 3.
From the COMMITTEE OF REVISION.

St. Thomas's Hospital Pharmacopœia, 1890.
From the HOSPITAL.

Medical Register, 1890.
Dentists Register, 1890.
From the GENERAL MEDICAL COUNCIL.

Radcliffe, Library, Catalogue of books added during 1889. From the RADCLIFFE TRUSTEES.

California, Pharmaceutical Society and College of Pharmacy, Abstract of Proceedings for 1888-9.
From the SOCIETY.

Curtman (C. O.), Uses of Chemical reagents, 1890.
Mathematical Questions, vol. 52, edited by W. J. C. Miller. From the EDITOR.

London University Calendar, 1890.
From the UNIVERSITY.

Institute of Chemistry, Register, 1890.
From the INSTITUTE.

Acta horti Petropolitani, tom. 11, fasc. 1.
From the GARDEN.

New Zealand, Pharmaceutical Register, 1890.
From the PHARMACY BOARD.

Ephemeris, vol. 3, no 5. From Dr. SQUIBB.

For the Library in Edinburgh—

Ephemeris, vol. 3, no. 5. From Dr. SQUIBB.

The Committee recommended that the undermentioned works be purchased:—

For the Library in London—

Clinch (G.), Bloomsbury and St. Giles's: past and present.

Bagnall (J. E.), Flora of Warwickshire.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
April	Morning	524	34	12	22
	Evening	98	16	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of leaves of *Chavica Betle*.

From Mr. J. Moss.

Specimen of Copaiba resin from C. America.

From Messrs. Schœllkopf, Hartford and Maclagan.

Specimen of leaflets of *Narthex Pollakii*.

From the Director, Kew Gardens.

Specimen of Cinnamon bark and galls, bark of *Syzigium album* (rich in tannin), tuber of *Mirabilis Jalapa*, oil of *Gaultheria fragrantissima*, gum bark, "Pisin puttah," and fruit of *Diospyros montana*.

Specimen of "Bauhinia" root from Japan.

From Professor Van Eeden, Haarlem.

To the Museum in Edinburgh—

Specimen of dried Kola nuts.

From Mr. J. C. Pottage.

Specimen of essential oil of *Myrcia acris*.

From Mr. D. N. Wylie.

This Committee also recommended that a grant of £20 be made to the Nottingham and Notts Chemists' Association.

The **President** moved the adoption of the report, the most important part of which he said was the recommendation that the application from Nottingham for a grant be acceded to. The Committee had been satisfied that the association of the Nottingham pharmacists and their assistants and apprentices with the University College at Nottingham would be of great advantage to the trade, and that it was doing about the best work of any of the centres of education in the country. That was very largely due, he regretted to say, to the activity of the authorities of the College, rather than to that of the local representatives of the Society or the trade. The latter felt the present trade depression very keenly, and seemed inclined at times to lose heart. He should be very glad if any words of his might encourage them to take a more cheerful view, at any rate on behalf of their apprentices, and not allow needless difficulties to be placed in the way of those who were beginning the battle of life, and who might possibly find it more fierce even than their predecessors; but rather endeavour to fit them for the struggle by giving them the best possible training and education. There was a place now available in Nottingham, where, in conjunction with the University College, there were classes in all the principal subjects, and he could say from his experience in the examination room that many men from that district had displayed very sound knowledge. The prosperity of Nottingham was very much affected by circumstances he need not go into, beyond saying that the bogus company question especially affected their friends there, but he hoped they would be encouraged by this grant to keep the question of education well to the front.

Mr. **Schacht** asked who were referred to in connection with the college who had shown so much activity.

The **President** said he referred especially to Professor Clowes, the Professor of Chemistry, who was in constant touch with all the chemists, and moved the authorities of the college in their favour. He also induced the local people to move on their side, and the result was that while the college helped them they also helped themselves, and now that the Council also was about to help them he trusted the results would be very satisfactory. There were special classes at the college for pharmaceutical students.

Mr. **Richardson** thanked the President for the kind remarks he had made with regard to Nottingham. What he had said as to the local difficulties was quite correct, and a great debt of gratitude was due to Professor Clowes, who had showed the greatest courtesy and kindness to the chemists of Nottingham, especially to the students. He was very glad to hear that good results had been noticed in the examinations of young men from the district, results which only could arise from sound teaching. He hoped there would be an increasing effort made on the part of principals throughout the country to assist and encourage the young men in their studies, for in many places there was not that co-operation which there ought to be. In his own town they were doing something, though not so much as at Nottingham, and he hoped that Birmingham also would come to the front again.

Mr. **Evans** asked if the demand for books from the Library was pretty equally distributed over the country, or whether it was greater in places where there were local associations.

The **President** said as a rule the books went to places where there were no Associations.

Mr. **Allen** observed that one of the objects of a local Association was always to provide a Library for the use of students.

Mr. **Evans** said he wished to know whether there was a pretty general demand for the books all over the country.

The **President** said yes; they were distributed all over England and Scotland, too, not only amongst students, but to their own members.

Mr. **Schacht** said it was very gratifying to hear the report of what was being done at Nottingham, especially as it showed what use could be made by pharmaceutical students of the institutions which were now springing up all over the country under the name of university colleges. There ought to be a greater desire than ever on the part of rising pharmacists to avail themselves of all possible opportunities of qualifying themselves for the examinations. The Council had been trying for some years to emphasize this by making it compulsory that young men should go through a certain training which was called a curriculum, and perhaps if it had passed a resolution to that effect no one would have applied for a mandamus to prevent that being carried into force, so that the desired end might have been attained even without the aid of an Act of Parliament. The attempt to do it by legislation had failed, but it had occurred to others besides himself that although defeated for a time in that direction, the Council might at any rate issue such an enlarged syllabus of examinations as would, so to speak, by induction compel students to go through such a course. He was somewhat surprised to hear that any professor of any college should be able to induce young pharmacists to attend his classes, and did not understand how the professor could arrange his syllabus without knowing what the Society required.

The **President** said the professor applied for the particulars.

Mr. **Schacht** said no doubt he obtained what particulars he could, but something more complete was required, and hoped the matter would be considered.

The **President** said there was a draft schedule of examinations now before the General Purposes Committee, the consideration of which was adjourned when the amended Bill was put forward, but it could be brought forward again at any meeting of that Committee. He quite agreed that whatever might be done in future in the way of legislation it was incumbent on the Society to have a proper schedule, and as the

Society was not in Parliament this session the matter might be proceeded with at once. The schedule had been very carefully drawn up; a great many fresh details were proposed to be given in it, and practically it only awaited the final approval of the Committee and the Council.

Mr. Atkins supported the idea of a schedule. It was very desirable to place before young men a scheme for voluntary study, which might hereafter be made compulsory, especially as the question was sometimes asked, what was the proposed enlarged idea. He was glad to hear what had been said about Nottingham, which he had recently visited, and no one who had not been there could realise the intensity of the competition, which no doubt strained the loyalty of the members there very much. He hoped what had been said would in some degree tend to their encouragement. Their hopes in regard to provincial education must largely gather round centres where there were university colleges. However much education might grow in future, when there were more numerous institutions on a smaller scale, at present there was a group of these institutions doing magnificent work, presenting facilities in the shape of laboratories and lecture rooms which that Society could not possibly establish, and it was very desirable that every advantage should be taken of them in Sheffield, Bristol, Nottingham, Manchester, Newcastle, Birmingham, and wherever they existed.

Mr. Martindale thought it very important that the schedule should be brought forward even as a voluntary measure. The regulations of the Board of Examiners were a little indefinite, and if the Council could, in conjunction with the Examiners and Professors, draw up a schedule giving the students a better idea of what they had to go through it would be a great assistance to them.

The motion for the adoption of the report was then put and carried.

The Sessional Address.

It was resolved that the Library, Museum and Laboratory Committee be authorized to make arrangements for the delivery of the Sessional Address in October.

Sale of Poisons.

The President read the following letter which had been received from the Privy Council:—

"Privy Council Office,
"*May* 23, 1890.

"Sir,—I am directed by the Lord President of the Council to transmit to you the enclosed copy of a letter from the Coroner for London in which is embodied a recommendation of the jury in the case of George Warwick, who met his death by drinking a poisonous acid (hydrochloric) in mistake for whiskey, and I am to request that you will move the Pharmaceutical Society to favour his lordship with their opinion in regard to such recommendation.

"I am, sir,
"Your obedient servant,
"C. L. Peel.

"The President of the Pharmaceutical Society,
"17, Bloomsbury Square, W.C."

"Coroner's Office, Paddington, W.
"*May* 15, 1890.

"Sir,—I beg to inform you that at an inquest held on the body of George Warwick, aged 57 years, who died on the 1st inst., in St. Mary's Hospital, Paddington, from poisoning by hydrochloric acid from drinking same from a bottle in mistake for whiskey, the jury appended the following rider to their verdict of accidental death:—'And the jurors desire to call the attention of the Home Secretary to the dangers to life constantly arising from the sale of acid poisons at oil shops and other places—in any sort of bottles and vessels—without labels or any indication of the contents, and would suggest that all persons selling poisons should do so only under the conditions imposed by the Sale of Drugs and Poisons Acts.'

"I am, sir,
"Your obedient servant,
(Signed) "Geo. Danford Thomas,
"*Coroner for London.*

"To the Right. Hon. H. Matthews, M.P.,
"H.M. Secretary of State for Home Affairs."

It was resolved to refer the above to the General Purposes Committee for consideration and report.

Amended Pharmacy Bill.

The President read the following letter from the Nottingham Association:—

"Nottingham and Notts Chemists' Association,
"183, Radford Road, Nottingham,
"*May* 29, 1890.

"Mr. R. Bremridge,
"Registrar of the Pharmaceutical Society.

"Dear Sir,—At the annual meeting of the above Association, held last evening, a hearty vote of thanks was passed to the Pharmaceutical Society for the *Pharmaceutical Journal*, which has been regularly received during the past year.

"A discussion also took place with regard to the sale of poisons by unqualified assistants. The meeting felt that the poison clause of the Pharmacy Act could only be of real benefit to the public and the trade by the incorporation of all poisonous drugs in the schedule, and the following resolution, proposed by Mr. Beilby and seconded by Mr. Middleton, was unanimously carried:—'That this Society pledges itself to give its hearty support to the Pharmaceutical Society in promoting a new Pharmacy Bill, which shall give an extension of the list of drugs comprised in the poison schedule.

"I am, yours faithfully,
"William Gill, *Hon. Sec.*"

It was resolved to refer the letter to the Law and Parliamentary Committee.

The Vice-President moved

> "That the Law and Parliamentary Committee be requested to draft a Bill to amend the Pharmacy Acts, and to report to the Council."

He would rather have given notice of this motion, but there was a special reason for moving it now, viz., that the matter might be considered by the Committee, reported on, and dealt with by the Council before the summer holidays, so that whatever the decision of the Council might be there would be an opportunity for the Bill to be fully discussed by the members before any action was taken. He had framed the resolution in very general terms, because he did not desire to commit the Committee or the Council to the draft Bill of the previous session, although he was strongly of opinion that that was a very desirable Bill to pass, though in the face of opposition, internal or external, which was raised to it, he entirely agreed with the policy of its withdrawal at the time. His conviction was that it was opposed because it was not understood, and he was desirous that the country should have every opportunity of discussing the next Bill before it was introduced into Parliament. He should very much like, before he retired from the Council, to assist in carrying a measure which would improve the position of pharmacists, especially with reference to the curriculum, which he was quite convinced was a most desirable thing in the interest of students. There were other provisions he was equally strong about, and there might be still others which might be suggested in committee. He simply asked that the subject should be referred to the Committee.

Mr. **Allen** seconded the motion. He endorsed all that had fallen from the Vice-President, especially with regard to not committing the Council to any particular Bill. As a new Council it was quite prepared to consider the subject *de novo*, and he hoped it would be printed and published in time to allow of full consideration and discussion, and then there might be some hope of getting a Bill passed.

The **President** said there was no reason why a resolution of this kind should not be passed without notice, and he presumed the Council would agree to it. There was another question which had been in abeyance for some years, namely, amended bye-laws. There were a number of skeleton bye-laws lying by, on which were engrafted many other things which were abandoned because a portion of them were not within the powers of the present Act, but there were other portions with reference to the admission of members and associates, composition fees, and some details of the examinations, including a new subject which had been proposed to be included, viz., a knowledge of pharmacy law. He thought perhaps the question of proceeding with amended bye-laws might be referred to the same Committee.

Mr. **Richardson** thought the drafting of a new Bill could not be commenced too soon, so that it might be put before the chemists of the country.

The **Vice-President** thought it would be better to get an Act of Parliament first before attempting to deal with the bye-laws. At the same time he had no objection to the matter being considered.

Mr. **Hills** strongly supported the motion of the Vice-President. It was very important to make one decided effort now to get a Bill passed, and he thought it would be better to defer the question of bye-laws for the present and devote all their energies to the Bill.

Mr. **Evans** suggested that if the members saw the bye-laws would be altered, it might be an inducement to them to support the Bill rather than oppose it.

Mr. **Watt** supported the motion, and thought it would be better to get the Bill first and then deal with the bye-laws.

The **President** said he was willing to leave the question of bye-laws for the present, but one or two distinguished members had stated their view that facilities should be given for coming into the Society, and that could be done by bye-laws without the aid of Parliament. He would propose a separate resolution dealing with the matter.

The motion was carried unanimously.

The **President** then moved—

> "That the General Purposes Committee be instructed to consider the desirability of amending the existing bye-laws and to report to the Council."

This motion also was unanimously agreed to.

ADDENDUM TO THE PHARMACOPŒIA.

The **President** read the following letter from Dr. Quain:—

"General Medical Council Office,
"299, Oxford Street, London, W.
"*June* 2, 1890.

"To the President and Council of the
Pharmaceutical Society of Great Britain.

"Mr. President and Gentlemen,—Following our previous correspondence respecting an addendum to the British Pharmacopœia, I now beg to forward to you a list of thirty-seven medicines and compounds which the Pharmacopœia Committee of the Medical Council have, after full consideration, selected to form the proposed addendum.

"Will you be good enough, in accordance with your kind assurance of assistance, 'to consider how best to define or prepare each of these articles and present the results to the Pharmacopœia Committee of the Medical Council' before the end of September. Meanwhile, in order that the Editor (Professor Attfield, F.R.S., 17, Bloomsbury Square, London), may prepare preliminary drafts of the addendum, and in order that there may not be unnecessary duplication of labour and expense, will you please promote full intercommunication between your own body, the Pharmaceutical Society of Ireland and the Editor.

"I am,
"Mr. President and Gentlemen,
"Yours faithfully,
"Richd. Quain, M.D.,
"*Chairman of the Pharmacopœia Committee.*"

List of the Thirty-seven Selected Medicines and Compounds.

Acetum ipecacuanhæ.
Adeps lanæ (lanolin).
Emplastrum menthol.
Eucalypti gummi.
Euonymus atropurpureus (a preparation of).
Extractum hamamelidis liquidum.
Extractum hydrastis liquidum.
Ferri subchloridum (preparations of).
Hamamelis virginica.
Homatropinæ hydrobromas.
Hydrastis canadensis.
Liquor cocainæ hydrochloratis.
Liquor morphinæ sulphatis.
Liquor trinitrinæ.
Magnesii sulphas effervescens.
Mistura olei ricini.
Oleum cadinum.
Paraldehydum.
Phenylon (antipyrin).
Pilula ferri (Blaud).
Picrotoxinum.
Saccharinum.
Sodii benzoas.
Sodii nitris.
Sodii phosphas effervescens.
Sodii sulphas effervescens.
Stramonii folia.
Strophanthi hispidi semina.
Sulphonal.
Suppositoria glycerini.
Tinctura hamamelidis.
Tinctura hydrastis.
Tinctura strophanthi.
Trochisci sulphuris.
Unguentum conii.
Unguentum hamamelidis.

It was resolved to refer the above communication to the Pharmacopœia Committee.

GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor stating the progress of cases which had been placed in his hands. Judgment had been obtained against one defendant who had failed to comply with the terms offered him. Two others had paid the penalty and costs sued for.

In two other cases which had been brought before the Committee proceedings were recommended.

The Council went into committee to receive and consider the report.

On resuming, the report and recommendations were unanimously adopted.

Pharmaceutical Society of Ireland.

SPECIAL GENERAL MEETING.

On Thursday evening, the 29th May, there was a special general meeting of the Pharmaceutical Society at No. 11, Harcourt Street, at seven o'clock, for the purpose of considering the Bill which is now being promoted in Parliament by the druggists of Ireland.

There were present the President, Mr. Charles Evans; the Vice-President, Mr. W. F. Wells, Junr.; G. D. Beggs, G. Grindley, G. McCormack, W. J. Baxter (Coleraine); P. Merrin, Dr. R. Burnes, R. Simpson, R. Sumner (Cork); and M. M. J. D'Arcy (Tipperary), members of the Council; and Messrs. P. J. Devlin (Thurles), P. Kelly, H. Conyngham, R. J. Downes, Joseph Edmondson, Bernard Costello, Henry Boyers, John Smith, J. A. Ray, T. J. English, J. N. Hardy,

M. F. O'Donnell, John Evans, C. J. O'Donnell, John Burnett, T. W. Robinson, R. J. Galwey, Samuel Curham, E. R. Whitby, James Guiler, Dr. Montgomery, Arthur Reynor, T. T. Holmes and W. H. Gamble (Dublin and vicinity); P. S. Pearse and Joseph Stewart (Limerick); J. P. Timmons (Navan); and E. M. Darcy (Dingle).

On the motion of Mr. John Evans, seconded by Mr. Grindley, the chair was taken by the President, Mr. Charles Evans.

The President said: Gentlemen, I am obliged to you for attending in such numbers in response to the summons which I sent out. Having regard to the serious condition of affairs it became necessary to afford you an opportunity of expressing your views as to the proposed Bill. The Council did not wish to accept the entire responsibility in the matter; and I therefore called you together to enable you to say whether you will accept the Bill as it stands, oppose it altogether, or make some compromise with the druggists of the north of Ireland. The principal items in the Bill are the clauses proposing to constitute a grade of druggists, to give them the title of chemists and druggists, and also to give them representation on our Council; they first claimed nine, but now they say they will be satisfied with seven. You have all seen the answers to the circular sent out by the Pharmaceutical Society, which appeared in the *Chemist and Druggist* of May 24. I had not intended replying to this document, but as there are so many here it may be well to make a few replies to the statements which it contains. It admits that the first four statements in our circular are correct. The fifth statement in our circular is, "It was intended that as this latter class (the old chemists and druggists) died out, the qualified men who would be dispensers of medical prescriptions should take their place." The answer given to this is "Incorrect and misleading. The Act of 1875 contemplated two grades and provided in detail for the continuance of these. Clauses 15, 16, 17, 18, 19, 21, 22, 24, 27, 30 and 31 provide for the grade of chemist and druggist as much as for that of pharmaceutical chemist." I am not aware that anyone contends that the Act of 1875 did not contemplate the two grades. It did provide in detail for the organization of the two; but the Society have always maintained that it gave no power to register them merely as "druggists." But if a second grade had been adopted they would have been merely dispensers of medical prescriptions; and it nowhere speaks of granting licences to anyone to sell poisons unless they are dispensers of medical prescriptions at the same time, guarding the right of those who were in business previous to 1875, and who are termed the "chemists and druggists." The natural conclusion from reading the Act is that the intention of the Legislature at that date was to have none but qualified dispensers of medicine through the country as sellers of poisons. Therefore No. 5 of our statements is not "incorrect and misleading." No. 6 says, "There are now not less than 360 licentiates of the Pharmaceutical Society, of whom upwards of 160 are in the country outside Dublin, Belfast and Cork, and there is a steady annual increase in the number of candidates for the licence." The answer given to this is, "Wrong. If the Society's own calendar can be relied on, as they gave the number in 1890 as 335, of whom 30 have left the country, leaving 305 as principals and assistants, from which may be deducted 20, who are practising physicians or dispensing in public institutions, showing 285, of whom not one half carry on business on their own account, a number utterly inadequate for the country." Mr. Gibson, one of the gentlemen in the North of Ireland, estimated in 1888 that there were 300 pharmaceutical chemists, of whom 200 were keeping open shop; and if two years ago there were 200 keeping open shop in the country as pharmaceutical chemists, it is not likely that they have dwindled down now to the half. The explanation of the error is that at the end of last year 28 names were wrongfully erased from our calendar, whilst there are in addition those who passed at the last April examinations. Our 7th statement is—"It is estimated that there are upwards of 400 apothecaries keeping open shop, as well as many of the old chemists and druggists, so that the wants of the public are very well supplied. There are, however, some towns in which there are no qualified men keeping open shops for the dispensing of prescriptions; but this deficiency is caused not by lack of pharmaceutical chemists, but by so many illegal traders dealing in poisons, and in many cases dispensing prescriptions, thus making it impossible for a qualified man to live in such towns." The answer to this is—"Grossly incorrect. The old licentiates of the Apothecaries Hall do not as a rule conduct their business personally, but are medical men carrying on their practice, and at most there would be not more than 100 actively engaged. By recent decision should these men be absent from their shops on professional or other business, the public could not be served. The words 'some towns' should be 'hundreds of towns,' and it is a question for Parliament whether it will allow a few pharmaceutical chemists to inconvenience the country for their own personal gain." Who are the best judges as to the number of apothecaries? I should say the apothecaries themselves. In his evidence given before the House of Lords a couple of years ago, Mr. Brunker said there were certainly 300; while the apothecaries themselves estimated the number at 500, and one gentleman, who perhaps has a greater knowledge of the apothecary's profession than any other man living, and for a greater number of years, estimated the number at a much higher figure. The last list published by the Apothecaries Hall,—they do not send out an annual list as we do—contained 1183 apothecaries; so that to estimate their number at upwards of 400 is scarcely "grossly incorrect," unless on the side of being much below the real number. No. 8 of our circular says—"If this amendment as introduced into the House of Commons be passed it will do away with the benefits of the Act of 1875 and give the entire management of pharmaceutical affairs into the hands of the druggists." The answer is, "The amendment is on constitutional grounds, and carries out the principle of taxation and representation which the Pharmaceutical Council ignores." The Pharmaceutical Council does not ignore the principle of taxation and representation, but it says that a druggist, even if he passes the very elementary examination which is proposed, should not have equal rights with a pharmaceutical chemist, who has to pass a preliminary examination—which it is now under consideration to raise to a higher standard than at present—to serve a four years' apprenticeship, and to pass an examination in pharmacy, materia medica, botany and chemistry. A great deal has been said about the English chemists and druggists, but the comparison with them does not hold good. The English chemists and druggists were dispensers of medical prescriptions before the English Pharmacy Act passed at all. No. 9 of our statement says, "We think it well to point out to you that the promoters of this new Bill are gentlemen connected with the wholesale and young men who have gone into business since the passing of the Act of 1875, and hence the latter have no legal standing as chemists or druggists, some of whom were summoned at the instance of the Pharmaceutical Society in April, 1890, for the illegal dispensing of prescriptions and the sale of poisons." The climax is reached in their answer to this—"Utterly untrue. The promoters of the Amendment Bill are traders scattered over the entire country, and number vastly in excess of the pharmaceutists, who though a highly respectable body, display the narrowest possible views on a question of public interest and convenience." I think the only answer I can give to that is to read the names attached to their "Answers." So far as Dublin goes we have Mr. W. J. McNaught (Messrs. Hugh Moore and Co.), President; Vice-President, Mr. Samuel P. Boyd (Messrs. Boileau and Boyd); Honorary Secretary, Mr. Joseph J. Dowling; and then for Belfast we have Sir James H. Haslett, Knight, President; Mr. Samuel Clotworthy, Vice-President; and Mr. W. J. Rankin, Honorary Secretary. Any gentleman here from the North of Ireland will be better able to inform the meeting of the position of those gentlemen than I am; whether they are not chiefly wholesale, and those who have gone into business since 1875. And there is no doubt that in Belfast the other day six persons were summoned at the instance of the Society for the illegal dispensing of prescriptions and the sale of poisons. Only two of the cases were tried—one for dispensing and the other for the sale of poisons—and both resulted in our favour. The President then mentioned that letters regretting their inability to attend the present meeting had been received from Professor Tichborne and Messrs. P. N. White, Sligo; G. L. Slack, Listowel; E. A. Whelan, Rathkeale; Henry Johnston, Croom; R. C. Webb, Wexford; H. Lancashire, Ballymena; Joseph Calvert, Lurgan; James Nethery, Dungannon; J. J. Macaulay, Hollywood; J. N. Harris, Sligo; and James Walker, Ballinahinch. The President also read a letter from the Belfast Pharmaceutical Association, supporting the views of the Society, and letters promising support and making suggestions which had been received from Messrs. T. M. O'Connor, Dungarvan; Henry Lyons, Omagh; J. F. McGuire, Listowel; J. G. Fyvie, Colerane; R. W. Carter, Naas; W. Ellis, Coleraine; C. S. Cosgrave, Belfast; J. H. Boardman, Kingstown; P. S. Pearse, Limerick; and P. J. Devlin, Thurles.

Mr. R. Sumner said he had been requested by a meeting of licentiates of the Society held in Cork to state that they entirely objected to the Amendment Bill of the chemists and druggists; that they approved of the Bill which was framed by Mr. Brunker; and that they protested against any further concessions being made to the chemists and druggists. He had the signatures of 14 Cork licentiates to those views.

The Vice-President then pointed out the differences between the Bill introduced by the Pharmaceutical Society and the Amendment Bill now before Parliament. The former as amended in the House of Lords was a Bill that they would have been all satisfied with. There were a few clauses in it to which the druggists objected. One which required them to put over their doors a statement that they were not qualified to dispense prescriptions, the Council would have been willing to omit. There were some other things also, with respect to which they were anxious to meet the other side. Mr. Brunker was deputed to go to London and was authorized to meet them as far as possible; but as a matter of fact he gave the whole situation away, so much so that had the Bill passed in the form in which he agreed to it a great injury would, in the opinion of many of the Council, have been done to pharmacy in Ireland. So much did he give away that the North of Ireland Pharmaceutical Association got their representatives in Parliament to block the Bill. It had become in fact a druggists' Bill, and the licentiates of the Society succeeded in getting it thrown out. The druggists stated in their circular that they introduced their present Bill "exactly as agreed upon with the Pharmaceutical Council two years ago, excepting in clauses 12 and 13, and these the chemists and druggists have since the printing of the Bill agreed to amend in committee." Mr. Brunker wished this Bill all success, thinking that it was what they called his Bill. After it was read a first time he discovered that it was not his Bill. The latter gave them power to put seven of their men on the Council if they were strong enough, but if the pharmaceutical chemists were stronger than they were they could put in their own nominees. But the druggists altered the Bill so as to give themselves nine representatives on the Council as against twelve pharmacists, and they also put in a provision that it was enough for a man to be registered either as a druggist or as a pharmaceutical chemist in order to give him a vote for members of the Council. The result of that would be to do away with the subscriptions of members to the Society, because at present in addition to the Journal, all that the subscribers get for their money is the privilege of voting and of having the control of the affairs of the Society by putting their own members on the Council. The effect would also be to give to the druggists of Ireland, or, more properly speaking, to the hucksters of Ireland, the same powers of control over the affairs of the Society as the pharmacists; for out of twelve pharmacists on the Council the druggists would be sure to find some pharmacists who would go with them. They would then naturally make the examinations so easy that any of them could pass them. Mr. Brunker's Bill simply gave them the title of "registered druggists," save those who were in business prior to 1875, from whom the title of "chemist and druggist" could not be taken away. But all through the Bill now before Parliament the title used was "chemist and druggist," so that if it should pass they would have all the sellers of poisons throughout Ireland registered under that title. He (the Vice-President) was present at the Belfast prosecutions, and was astonished at the class of gentlemen that were dispensing medical prescriptions in that city. One of the gentlemen who was convicted appealed to the Recorder, who in his charge said he was perfectly satisfied by the evidence that it was not a druggist's shop at all, but a provision shop in which the prescription was made up. They were bad enough in Dublin, but they were certainly not equal to that. Another difference between the two Bills was this: According to Mr. Brunker's Bill, every person who served an apprenticeship of four years with a "registered druggist" was to be entitled to present himself for examination, and on passing, to be registered as a "druggist"; and it was also provided that every person who had served such apprenticeship and who should have passed the Preliminary examination of the Pharmaceutical Society and complied with the other regulations then in force as to examination for the degree of pharmaceutical chemist, and who should have in addition served an apprenticeship of two years either to a pharmaceutical chemist or to a licentiate apothecary keeping open shop, should be entitled to present himself for examination, and on passing to be registered as a "pharmaceutical chemist." But in the present Bill the words "complied with the other regulations, etc.," were left out and the two years' apprenticeship was reduced to one year. The effect of that alteration would be that the person seeking admission would avoid the Society's curriculum, which included 100 hours at the chemical bench. That was a serious difference. There was in the present Bill a provision for the registration of all those gentlemen who had been in business up to 1889 as "chemists and druggists" without any examination; and there was to be a modified examination afterwards for their assistants. Was the Society prepared to adopt a Bill which would give the arrangement of its examinations into the hands of at least seven of these druggists? At present illegal dispensing went on very largely, but if complaints of such law breaking should come before a Council constituted as it would be under the proposed Bill, he did not say that the druggist members of it would not be "all honourable men," but he did say that it was hardly likely that the law would be enforced against their colleagues in Dublin or Belfast. There were a few other differences between the two Bills; but the present one was on the whole pretty much the same as that of Mr. Brunker, which was not adopted by the Council, and in consequence of which that gentleman resigned his seat on the Council.

Mr. Stewart said he had come up from Limerick with his friend Mr. Pearse as a deputation from the pharmaceutical chemists there. They were all opposed to the Bill in its present form. Mr. Brunker's original Bill would, he thought, be the best form of Bill. The pharmaceutists of Limerick were all anxious to do the best they could for the Society. There had been a poisoning case lately in Limerick, and he might mention that the party who bought the poison, after having failed to obtain it in every pharmaceutist's shop in the town, succeeded in getting it in the shop of a druggist who retailed poisons. That showed that the Limerick chemists were careful as to whom they sold poisons to.

Mr. T. W. Robinson (Kingstown) said he represented the rising generation of pharmaceutical chemists, who had qualified on the understanding that that Society would protect their interests and prevent illegal compounding. That was apart altogether from the important question of the safety of the public. He and those whom he represented had gone in for a higher education and had taken out diplomas which they believed would give them a position beyond that of ordinary druggists; and yet now they found themselves confronted with a Bill which proposed to confer the power of compounding on hucksters and grocers all over Ireland. He did not want to say anything disagreeable, but he thought that the licentiates all over the country had just cause of complaint against the Council for having allowed this matter to go so far. It was very hard to grapple with a Parliamentary Bill after it had been read a second time. The licentiates should have been called together long ago and asked what they were prepared to do, and if necessary they should have been called on to put their hands in their pockets, which they were perfectly prepared to do. It was too bad that they should have been called there at the eleventh hour in order to try to do something. If these chemists and druggists were so intellectual and so well able to look after business and sell poisons why did they not pass the Society's examinations? The Act of 1875 was framed on very liberal lines and provided a modified examination for those gentlemen, and gave them every facility for becoming pharmaceutical chemists; but no—they were not satisfied. And now they wanted the Legislature to legalize what had been illegal ever since, and to be admitted into the fold of the Society and to be enabled to take the business of its members from them. Everyone knew that the compounding part of pharmaceutical business was small enough; and if these unqualified persons were to be allowed to retail medicines and poisons a very serious inroad would be made on the incomes of pharmacists. He was sure that he had the support of every member there in what he was saying, and he was equally sure that his observations would have the approval of pharmacists all over the country. He hoped that something definite would be done at once.

At this stage of the proceedings Dr. Montgomery entered the room and was warmly applauded.

Mr. Downes (Dublin) said he was in sympathy with what he believed to be the purpose of the Amendment Bill to a certain extent. It was the shutting of the door of the examinations of that Society against the assistants and the apprentices of the druggists of 1875 which had thrown him into sympathy with them. But as regarded the Bill now before them, he did not accept it as it was. If the object of section 6 was to let in as chemists or druggists all who had been trading as such from 1875 up to the present time he certainly was opposed to it, because—as he had stated in a letter to the Attorney General—that would let in nearly every grocer in the country. But if it only referred to those chemists and druggists who were the legitimate offspring of the Act of 1875, he would be willing to look at it differently. He also objected to section 11 giving the title "Associates of the Pharmaceutical Society" to druggists. He would have no objection to their being styled "Associate Druggists." As he read clause 18 it appeared to provide that a chemist or druggist should not be at liberty to have a pharmaceutical chemist as his assistant.

The Vice-President: That is so.

Mr. Downes said that as the Bill in question had passed the second reading, he thought the best course for the Society to pursue was to try to make use of it and weed the objectionable matters out of it. He was certainly in favour of some benefits being conferred on the legitimate offspring of the 1875 druggists, but he was not in favour of extending those benefits beyond them. One thing which they ought to try to get into the Bill was a definition of wholesale dealing. At present the wholesale dealer was as such exempted from certain operations of the Pharmacy Act; and yet at the same time he had it in his power to sell by retail to any person offering him cash. Also the Council should be empowered to hold some examination by which they could test the fitness of assistants. At present he himself made use of the examination of the Apothecaries' Hall for that purpose. Other points might also be worked into the Bill in order to guard their interests.

Mr. J. Guiler (Dublin) said that before 1875 he himself was an apprentice to a chemist and druggist; and when he saw that the Act of 1875 was about to come into operation he took the precaution of passing the Preliminary examination of the Society so as to guard himself against any restriction that should otherwise be put upon his passing the final examination. There was nothing to prevent other apprentices doing the same thing; and in his opinion they were afforded every facility to which they were entitled at the time. A modified examination was also provided for the assistants, and the majority of them went in for it, but, he believed, failed to pass it. And it was those assistants who were not able to pass that modified examination that were now clamouring to be admitted to connection with the Society. He himself had no difficulty after 1875 in finding a place in which to take out his practical pharmacy, and he had thus placed himself in a position to come up for the licence of the Society. He thought that both the apprentices and the assistants were very well done for at the time in question.

Mr. Downes said he had been speaking of apprentices down to the present time.

Mr. Hardy maintained that the Society should not ask too much and offer the chemists and druggists too little. In 1888 he (Mr. Hardy) wrote a letter to the then Lord Mayor of Dublin, Mr. Sexton, M.P., in which he proposed that there should be (1) a modified examination for a second grade of persons to be denominated "registered druggists," with liberty to sell poison but not to dispense medical prescriptions; (2) that the titles "chemist and druggist," "chemist," or "druggist," should still be preserved to anyone practising as such on his own account on the 11th August, 1875, with the addition of the word "registered," provided he otherwise complied with the provisions of clauses 2 and 3 as amended by the then select committee; and (3) that in the final examination for pharmaceutical chemist a certificate of having been two years engaged with a registered chemist and druggist, and two years subsequently with a pharmaceutical chemist should be substituted for the present four years with the latter. He thought that the Society should insist on those points. If it asked for more it would not get more. He held that the Council should consist of none but pharmaceutical chemists, and that the chemists and druggists should have only power to elect a third or a fourth of the members of the Council. He thought the present attempt of the Belfast chemists and druggists to obtain legalization for men who had been in an illegal position for years an outrageous thing.

Mr. Boyers said that Mr. Brunker in his Bill did the best that he could; but the Council did not agree about it and broke up, and the outcome was that the druggists came forward and put their foot on the Council of the Society. That was the way in which the outside licentiates looked at the matter. Some time ago he gave the Society a cheque for £10 to cover the expenses of a prosecution for illegal dispensing and of another for the illegal sale of poisons on the understanding that the money would be refunded, but the expenses had come to so much that he did not expect even to get his £10. The licentiates should now pull together and put their hands in their pockets in order to knock the bottom out of this nefarious Bill.

Mr. Pearse (Limerick) suggested that the medical men of the various cities and towns of Ireland should be asked to support the Society against the Bill, which would come on for final reading on the 11th of June. He thought the licentiates throughout the country had not received sufficient notice of the present state of affairs from the Council. He thought also that the chemists and druggists should not be crushed altogether —at least those that were in business previous to 1875.

Dr. Burnes said the Legislature had never contemplated giving to the Pharmaceutical Society the power of creating a grade of chemists and druggists not qualified to dispense. The title "chemist and druggist" should not be perpetuated. The title "chemist" should be reserved for the qualified pharmacist. The title "druggist" belonged to those who sold drugs only, and had nothing to do with the sale of poisons and the dispensing of medical prescriptions. The sale of poisons and the dispensing of prescriptions were the birthright of the pharmaceutical chemist, and if these privileges were handed over to unqualified persons, there would be no security for the country. He believed it was the unanimous feeling of those present that this Bill should be opposed.

Mr. John Evans, L.A.H. (Dublin) said it was monstrous that men in the country who sold every mortal thing—drapery, ironmongery, groceries and liquor of all sorts—and had little corners in their shops where they sold corrosive sublimate, should claim to be "chemists." He maintained that the title of "chemist" should not be allowed except by examination. He was greatly afraid that the Government would never take away the right of selling poisons from the druggists; but then they should be registered as druggists; and any druggist who had the brains to do so could come there, pass the examinations, and become a pharmaceutical chemist. The percentage of men plucked at their examinations was as high as in any other similar society in the world—it had reached 60 per cent.—and that showed how hard their examinations were and how good the men were that had passed. As to representation of druggists on the Council he was greatly against it. He knew that some of them could not write the Queen's English. As to the Belfast prosecutions some gentlemen had condemned them; but in his opinion they were quite right. If a man acts illegally he must abide the consequences. As to the registration fee a guinea would be little enough to ask. The Society must have money. This Bill ought to be opposed as long as the objectionable clauses were in it.

Mr. Baxter (Coleraine) said he agreed with many of the things that had been said, but with some he did not. He thought the best course for the Society to pursue was to formulate amendments to the Bill and make the most of the situation, instead of opposing it as a whole, tooth and nail. They should insist on a two years' apprenticeship for druggists seeking to become pharmacists; there should be no "associates" of the Pharmaceutical Society, and the title "chemist" should be exclusively retained for pharmacists, the right to it of persons who had been in business before 1875 being of course allowed. As to the licentiates not having received notice of the state of affairs with respect to the Bill, the fact was that it had been sprung on the Council.

Mr. Edmondson observed that the third subsection of section 7 of the proposed Bill mapped out the examination for druggists who were to be licensed to sell poisons. Now the examinations for pharmaceutical chemists were not defined in their Act, but were left to be arranged by the Council with the consent of the Privy Council. So that if the chemists and druggists should be admitted to the Council or allowed a voice in its election they would be able to take from the pharmaceutical examinations, whilst their own could not be interfered with.

Mr. Kelly (Dublin) said the pharmaceutical examinations had been made much more difficult of late years. When he passed the period of apprenticeship was only two years; now it was four. Again, at the time he passed, only twenty-seven lectures in chemistry were needed; now the student had to spend one hundred hours at the chemical bench. The difficulty of the Preliminary examination had been also augmented.

Mr. Merrin moved that the opinion of the meeting ought now to be taken as to whether they were for rejecting the Bill *in toto*.

Mr. Downes moved an amendment to the effect that the meeting recommend the Council to endeavour to obtain amendments in the Bill.

Dr. Burnes seconded Mr. Merrin's motion.

Mr. Downes asked to have his amendment put, but The President ruled that Mr. Merrin's motion should be put first.

Mr. Downes retired from the room.

The President then put Mr. Merrin's motion, and on a show of hands it was found that there were 29 for, and 6 against it.

Mr. Robinson: The reason why I have voted for opposing the Bill *in toto* is that I do not believe it can be amended so as to suit us. I believe that the powers conferred on us in 1875 are ample, save that the penalties for illegal trading are not heavy enough. If any amendment be wanted in the existing Act it is one which will impose heavier penalties and give us more power to enforce prosecutions. Again, if we agree to have any parley with our opponents now we shall stultify ourselves, because we said some time ago that we did not think any Bill was necessary. We should therefore oppose this Bill tooth and nail and do our utmost to have it thrown out. I propose that a committee of five be appointed now to take charge of the whole business and to confer with the licentiates; that three of that committee be a quorum, and that they have unlimited power in the matter.

The Vice-President said the members of Council were not to blame in the matter, as the Bill was sprung on them. They were not aware of its introduction till they saw in the daily papers that it had been read a second time. The President immediately held a consultation with some members of the Council and decided to take steps to have the Bill blocked to enable the Council to express an opinion, and called on the law agent, who telegraphed to his partner in London to oppose the Bill on behalf of the Society. We did not know what was in the Bill—we knew nothing about it until we saw that it was proposed in the House. The circular was sent out which the druggists have replied to, and they are leaving no stone unturned to wreck our interests. Some members of the Council with whom the President and myself conversed on the subject thought that we should go to London at once, and accordingly we did, and spent three days in the House of Commons speaking to different members of Parliament. Dr. Kenny told us that he would block the Bill and keep it blocked until we should have had a conference with him and the representatives of the druggists in Dublin. On that agreement we left London and came home. Dr. Kenny wrote to Mr. McNeight asking him to bring three representatives to meet us, but Mr. McNeight replied that the notice was too short, and that he would not be able to meet us on the following night. Then the President, Professor Tichborne and myself met at Dr. Kenny's house, and we went into the matter very fully with him. He said we should meet Mr. McNeight, but the latter intimated that unless we were in a position to bind the Pharmaceutical Society to any conclusions that should be arranged between the representatives of the druggists and ourselves there would be no use in his coming to meet us. The President told him that we would bind ourselves to nothing, that we had not authority from the Council to do so, that we could only go for a conference and report to the Council. Mr. McNeight, on behalf of the druggists, refused to meet us on those terms. It is right that you should know this, because it has been said that we are not prepared to meet the druggists. I say that we are prepared to meet them and to give them very great concessions; but they are not prepared to meet us fairly, because when they did meet us they arranged certain things, and they afterwards came back and wanted a great deal more from us. As matters went we would not have had a slice of the loaf at all. The result of the circular to the licentiates, which most of you have received, is that a great many licentiates have used their influence with their local members of Parliament, and this Bill will be blocked and thrown out, for that is still possible even though it has received a second reading. Every member of Parliament to whom we spoke told us that they are so busy in the House at present that any matter which is opposed has no chance of getting through at all. They may influence the Attorney General to get their Bill through, but even if they should we have the House of Lords; and if Lord Miltown has not changed very much since the year before last he will not accept the Bill which is now offered to him. I have the report of the Committee of the House of Lords and will read a little from it. Mr. Rankin in his evidence says, "We wished this not to continue, and we sent a resolution in the month of November last to the Pharmaceutical Council when they proposed registering all who were in business at that time (up to 1888) without examination. We framed a resolution in reply to that, stating that we would rather that all those who had gone into business since 1875 would undergo an examination in order that they might prove that they were qualified to act as chemists and druggists, because a danger would arise to the public if they were not examined. Of course those who were in business in 1875 were provided for by the Act of 1875." Yet they now ask you to accept a Bill giving every apprentice boy up to 1889 a power to sell poisons without ever passing a separate examination. Your Council offered to register every apprentice, every employer, every proprietor and every assistant up to 1875, and that all who went into business afterwards and were in business up to 1888 should undergo a modified examination, and we stopped there. They are not satisfied with that, and you have before you in this Bill what they do want. Mr. Brunker in his evidence before the House of Lords said,—speaking of giving them representation on the Council—"It was recognized when the Act of 1868 was given to the Pharmaceutical Society of Great Britain, that if there was to be a governing body it should consist of those who had distinguished themselves from the rest of the body of the Society by superior education and intelligence. Only pharmaceutical chemists were entitled to sit upon the Council. The same provision was adapted in Ireland. If such a distinction was necessary under the Act of Great Britain, where the margin of education is so very small between the Minor and Major candidate, the objection still more strongly applies to the marked distinction between the educated pharmacist and the gentleman who has passed this very modified examination or perhaps no examination at all; and it would be quite inconsistent with everything that is known in these countries that men, comparatively uneducated, should be daily dealing with the higher education of the pharmacist. Every day questions are arising before the Council which depend very much upon the scientific and professional knowledge of members of the Council; and it would be quite absurd if uneducated men should have any voice in regulating its affairs. In the Act of 1875 the same distinction was drawn between the chemist and druggist and the pharmaceutical chemist. The chemist and druggist might become an associate, have a voice at the annual meeting, might vote for the representation on the Council, but could not take a seat upon the Council." Mr. Brunker said that before the House of Lords, and yet Mr. Brunker now wants to put seven of these men on the Council. What I rose specially to ask you to do is this. It has been proposed that you should select a committee to work this matter. As a member of the Council, knowing what has been done, I think it would be a slur upon the Council if you do anything implying that we are not competent to deal with the matter. Of course if the meeting think it right to do so they can appoint a committee; but I think you would be quite safe in leaving the matter in the hands of your President and Council.

Dr. Montgomery said he had that day had a conversation with Dr. Kenny, who said he would go on with the Bill unless the Council gave up their demand for a monopoly of the sale of poisons. He said that the power to sell poisons ought to be more extensively given than it was at present. In the Apothecaries Act of 1791 there was a provision that any apothecary who sold poisons should keep a separate department of his shop for the purpose. The rule at the present day seemed to be that the druggists could keep the poisons where they liked; but the provision in the Act of 1791 showed how careful the Legislature of that day was about the matter.

Mr. Robinson said he did not mean to throw any slur on the Council; and he was quite willing to alter his resolution to one recommending that a committee of five members of the Council should be appointed with full powers to oppose the Pharmacy Act Amendment Bill; three of said committee to form a quorum.

Mr. Cunningham seconded this motion, which was unanimously agreed to.

Mr. Grindley having been moved to the second chair,

On the motion of Dr. Burnes, seconded by Mr. Beggs, a vote of thanks was passed to the President for his conduct in the chair and for the trouble he had taken in connection with the business which had been the subject of discussion; and the vote was also extended to the Vice-President.

The proceedings then terminated.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual meeting of this Association was held on Wedneday evening, May 28, at the Masonic Hall, and was well attended. The President, Councillor Fitzhugh, J.P., occupied the chair.

The Secretary presented the Council's annual report, which showed that the educational work of the Association had been well sustained, two classes having been held during the session at University College, one on pharmaceutical chemistry, by Professor Clowes, and another on materia medica, by Dr. Haydon White. The chemistry class had, as usual, been very successful. Thirty students entered for the course of lectures, with an average attendance of twenty-four. An examination was held at the end of the session, at which Mr. J. T. Shaw, with Mr. Dixon, obtained the first place; Mr. E. M. Gee, with Mr. Dixon, the second place; and Mr. E. Burdett, with Mr. Middleton, the third. The students at the materia medica class had done excellent work under the able and careful tuition of Dr. White. Some of the more enthusiastic associates had formed a class for the study of pharmacy, which was conducted by Mr. Flint at the room of the Association. The Council was pleased to report that seven old students of the Society had successfully passed the Minor examination of the Pharmaceutical Society during the year, and one had also passed the Major examination. During the coming session the Council contemplate holding a class on botany, and, if possible, the founding and holding of a class on practical dispensing at University College. The annual dinner was held at the Masonic Hall, on December 11, when about sixty members and friends were present, and a very pleasant and sociable evening was spent. The second picnic of the Society was held on August 22 at Hazelford Ferry, when there was a fair attendance of members and friends. The Association at the present time consists of forty-eight members and thirty-one associates, three new members having joined during the year.

Mr. Wilford read the Treasurer's report, which showed that the balance in hand had been considerably reduced by the educational work of the Society.

The election of officers was then proceeded with, the result being as follows:—President, Mr. Councillor Fitzhugh, J.P.; Vice-President, Mr. W. H. Parker; Treasurer, Mr. J. Wilford; Council, Messrs. Beilby, Bolton, J. E. Dennis, T. B. Fletcher, Middleton, Savage, Sergeant and W. Widdowson; Secretary, Mr. W. Gill.

An animated discussion on "Our Position as a Trade in view of the Decision in the Wheeldon case" was introduced by Mr. A. E. Beilby, who, in the course of an able speech, remarked that chemists and druggists could not refute the decision, and must accept it as a true interpretation of the Act; but after carefully considering the case, he thought the action of the Pharmaceutical Society in prosecuting to be injudicious, inasmuch as the decision would inflict great hardship on chemists in poor districts who could not afford to keep a qualified assistant, and who would have to stand behind the counter thirteen or fourteen hours per day, making their lot as bad as that of a galley slave. Moreover the protection afforded to the public was somewhat fictitious, seeing that so many really dangerous drugs were not in the schedule, and could be sold by any one, no matter how ignorant they might be. The decision would certainly improve the position of qualified assistants, and if an extension of the schedule could be secured and the Act rigorously enforced, it would be a protection to the public and of benefit to the trade.

Mr. Wilford said it was most unjust that a chemist should be compelled to superintend the sale of every pennyworth of paregoric, etc., while carbolic acid could be obtained from ironmongers and grocers without any such supervision.

Mr. Rayson, endorsing the remarks of Mr. Beilby, said the Act would prove most harassing to chemists in a small way of business, who, if it were properly enforced, would frequently have to pay the £5 penalty, as it was absolutely impossible for a chemist to stay behind the counter all the hours the shop was open.

Mr. W. Parker thought the decision was the most beneficial thing for the trade that had happened for many years. A short time ago chemists were crying out for more protection, and now they had it they were not satisfied. The best thing to do was to cease croaking, join the Pharmaceutical Society, and endeavour to mould its policy according to their views. He advocated the inclusion of more drugs in the schedule.

Mr. Fitzhugh said the stores were compelled to comply with the Act, and chemists should do the same. He felt that to do so entailed great hardship on many, and there was really a just cause for complaint because chemists did not get sufficient compensation for the strict examinations they were obliged to pass.

Mr. Beverley referred to the fact that it was possible for children to go to a photographer's in the town and obtain cyanide of potassium in direct contravention of the Act; the Society would do much good by stopping such practices.

Mr. R. Widdowson pointed out that the Council of the Pharmaceutical Society had been obliged to prosecute, as the Coroner had threatened to obtain a mandamus. If the Act was to be carried out, he would like to see all patent medicines containing poison included in the schedule. He did not see how the majority of chemists could possibly carry it out to the letter, and suggested that in the event of prosecutions taking place, a fund should be formed with which to pay the fines.

Mr. C. A. Bolton said that this was no new interpretation of the Act, but was the view taken by the House of Lords when the stores case was tried. He believed the Society would carry out the Act, as anyone could obtain a mandamus compelling them to do so. The best interests of chemists would be served by their joining the Society, and electing men to the Council who represented their views. He was in favour of an extension of the poison schedule, and thought much might be done towards bettering the condition of chemists by encouraging local fraternization.

Mr. Middleton felt the decision to be a personal hardship, but believed it was good for the trade, and thought the slavery which was feared might be modified by combining for Thursday half-holiday.

Mr. Sergeant thought the sale of poisons, except in dispensing, was scarcely worth the trouble and risk involved. He considered it very hard that if he took a short walk, his assistant, who was thoroughly competent but not qualified, should not be allowed to make up a prescription containing small quantities of any of the scheduled poisons.

In replying, Mr. Beilby said the meeting was divided in opinion as to whether the decision was of benefit to the trade, but it was unanimously in favour of an extension of the schedule, so he had great pleasure in moving the following:—"That this Society pledges itself to give its hearty support to the Pharmaceutical Society in promoting a new Pharmacy Bill which shall give an extension of the list of drugs contained in the poison schedule."

This was seconded by Mr. Middleton and carried unanimously.

The Thursday half-holiday question was raised by Mr. Parker, the general feeling being that it was most desirable that chemists should join the movement.

On the motion of Mr. Bolton, seconded by Mr. Ball, the Secretary was instructed to ascertain the opinion of the trade with respect to the matter.

The President proposed a vote of thanks to Mr. Widdowson, who had conscientiously filled the post of Secretary for three years. This was carried unanimously, and Mr. Widdowson suitably replied.

A vote of thanks to the President for occupying the chair, and also consenting to continue in office during the ensuing year, receiving the hearty and unanimous support of the meeting.

In replying, the President expressed the hope that the Society would continue its educational work with vigour, and that more chemists would become members.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, May 29, Mr. Edmund White, Vice-President, in the chair.

The first paper was read by Mr. W. F. Shepheard, on "Pepsin." The nature of the digestive ferments was first briefly treated of, and the properties and methods of preparation of pepsin more particularly described. The details of the process by which the strength of a sample of pepsin is ascertained were explained, and the results of an examination of commercial specimens enumerated as follows:—

	Description of Specimen.	Time required for 2 grains to dissolve 100 grains of albumen.
A	Proprietary preparations. . .	25 minutes.
B		35 ,,
C		30 ,,
D	Ordinary official	40 ,,
E	,, ,, ...	60 ,,
F	,, ,, ...	60 ,,
G	,, ,, (German) . .	60 ,,
H	,, ,, (some years old)	125 ,,
I	,, ,, ,, ,, ,,	150 ,,

Two specimens of acid glycerole of pepsin were also tested, with the result that 2 fluid drachms dissolved 100 grains of albumen in fifteen and in twenty-five minutes respectively, while in the case of a pepsin wine 2 fluid drachms had dissolved apparently none at the end of an hour and a half. The author concluded with notes on the dispensing of pepsin in the form of powders, pills, or solutions.

A discussion followed in which the Chairman, Messrs. J. Ince, Browne, and the Secretary took part.

A paper on "Colour" was then read by Mr. C. Morley, who described colour as the sensation communicated to the retina by the impact of light vibrations of a particular wave-length. The composition of ordinary white light was then explained, and illustrated by means of the spectrum, and synthetically by the revolving disc. The cause of colour in coloured bodies by selective absorption was also illustrated. The production of colour by interference of light-waves and by rotatory polarization of light was also explained, and fluorescence and phosphorescence alluded to. The paper concluded with a reference to the colours of animals and plants, and to colour-blindness.

A discussion followed in which the Chairman, Secretary, Messrs. Browne, Sherlock, Hayton, Cranstone, Robbins and Shepheard took part.

A modified form of the apparatus used for sublimation on a small scale, was shown by Mr. Browne, who explained its advantages over the ordinary form.

NOTICE.

School of Pharmacy Students' Association.—The next meeting will be held on Thursday, June 12, when Mr. H. Fairburn will read a paper on "The Iron Scale Preparations," and Mr. H. D. Fuge a note on "The Testing of Ferrum Redactum."

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE FUTURE OF PHARMACY.

Sir,—The result of the recent Council election must be gratifying to all loyal adherents to the Society. Still the warning admonition conveyed by the opposition of the more advanced members of the Society—although ineffectual as regards the return of new blood to the Council Chamber—conveys a distinct expression of dissatisfaction with the past action of the Council, which will not, I trust, be without influence upon its future deliberations.

Personally, I believe legislation can do but little for us. We must sink or swim as the result of individual and combined effort or supineness. I regret exceedingly to feel obliged to come to this conclusion, but after deliberate consideration it is, in my humble judgment, the only rational opinion to be deduced from the premises. Still, there seem to be two desirable conditions, the attainment of which would materially strengthen our position. They are intimately blended and inseparable, and are, I think, if not easily accomplished, at any rate within the range of practical pharmaceutical politics. I allude to the burning questions, the suppression of illegal trading and the consolidation of the Pharmaceutical Society.

The distribution of drugs and non-poisonous medicines by unqualified men will always exist and is, in many cases, a necessity, therefore we may content ourselves, the practice is not likely to be interfered with by Parliament. But these same men, whose rights so far we are willing to recognize, overstep the boundary of legitimate trading by supplying poisons, dispensing prescriptions containing poisonous ingredients and virtually, if not actually, holding themselves out to be unqualified men. If a remedy for this state of things had been easy to find we should not now have to look for it, but in my opinion the only way to restrict the practice within limits as narrow as possible, is by the appointment of a secretary of the Society in each parliamentary division throughout the country similar to what has been done in London; this would bring into the service of the Society, and indirectly of the craft generally, a number of willing and capable men, who would look after the interests of their respective neighbourhoods and report to the Council cases of flagrant illegality. In large towns this course, under the present system, is physically impossible, no matter how energetic and enthusiastic the local secretary may be. These divisional secretaries would be (I venture to hope) on friendly terms and in constant communication with their brother chemists, to whom they would explain the advantages of belonging to the Society, the claims of the Benevolent Fund, the latest interpretation of the Pharmacy Acts, and the thousand and one matters of common interest to us all, with the result that illegal trading would be curtailed, unfair competition diminished, our lives, of little better than slavery, somewhat ameliorated, and the Society strengthened, whilst further consolidation might be brought about by the admission of all its examinees to full membership of the Society on some such lines as the following: For Minor and Modified men make a five years' probationary associateship a necessary preliminary to membership, whilst Major men should be eligible for that honour on passing the examination.

In publishing these statements, I do not wish to pose before my fellow craftsmen as a Solon, or even to suggest that there is any new theory involved in them; I merely place them on record as an expression of individual opinion and as a small contribution to a discussion which affects us all, in the hope that other and abler men will come forward to aid in the solution of a difficulty with which the future welfare of pharmacy and pharmacists is so intimately, and, as at present appears, almost inextricably interwoven.

St. Mary's Pharmacy, Manchester. CHAS. SWINN.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Harrison, Parry, Grierson, Hill, Tubby, Miller.

ULEXINE AND CYTISINE.

BY A. W. GERRARD AND W. H. SYMONS,
Pharmaceutical Chemists.

Through your valuable summary, "The Month," we find that Professor Kobert has drawn attention to what he considers the close resemblance between cytisine, the alkaloid of *C. Laburnum*, as described by Husemann and Marmé, and ulexine, the alkaloid of *Ulex europœus*, described by us, and he appears to think that if analysed by the same hands these two substances would be found to be identical. Will you therefore allow us a little space to enumerate some physical differences which, if the properties assigned to cytisine are correct, alone prove them to be separate bodies, even if the chemical evidence is not considered sufficient to show them to be distinct alkaloids.

For convenience we will tabulate these differences:—

CYTISINE.	ULEXINE.
$C_{20}H_{27}N_3O$.	$\frac{1}{2}C_{22}H_{28}N_4O_2$.
Permanent in air.	Very hygroscopic.
Sublimes completely, forming splendid crystals.	Refuses to sublime in air without decomposition, and when heated *in vacuo* does not sublime to any extent at 225° C.
Scarcely soluble in chloroform.	Freely soluble in chloroform.
Formula weight 324·41.	Formula weight × 2, 379·34.

These results, as regards ulexine, we have carefully repeated, and have made the test *in vacuo* even more severe, by enclosing the alkaloid in a vacuous tube bent twice at right angles and surrounding one limb with small fragments of ice, while the other containing the alkaloid was immersed with a thermometer in a double bath of syrupy phosphoric acid, which we find to be the best liquid for high temperature work. Only a few small crystals were formed above the heated portion of the tube. The temperature of the bath was slowly raised to about 300° C., when the alkaloid appeared to boil; it gave off bubbles of gas and a small quantity of colourless liquid distilled over. When cooled by ice and opened under mercury the tube was found to contain a considerable quantity of carbon dioxide. This, we think, proves that neither in air nor *in vacuo* can ulexine be sublimed unchanged.

That ulexine and cytisine have much in common there can be no doubt, but so they have with eserine and sparteine, both of which are alkaloids obtained from plants belonging to the same natural order, and in percentage composition they are not far removed from pyridine, nicotine and pilocarpine. The following table arranged according to the percentage of carbon is instructive.

		Carbon.	Hydrogen.	Nitrogen.	Oxygen.
*Sparteine	$C_8H_{13}N$?	78·05	10·57	11·38	—
Pyridine	C_5H_5N	75·90	6·34	17·76	—
Nicotine	$C_{10}H_{14}N_2$	74·08	8·64	17·28	—
*Cytisine	$C_{20}H_{27}N_3O$	73·85	8·31	12·92	4·92
*Ulexine	$C_{11}H_{14}N_2O$	69·42	7·38	14·77	8·43
*Eserine	$C_{15}H_{21}N_3O_2$	65·49	7·64	15·27	11·60
Pilocarpine	$C_{11}H_{16}N_2O_2$	63·42	7·71	13·50	15·37

It is to be noted that when arranged in this way there is a difference of approximately 4 per cent. in carbon less, and an increase of over 3 per cent. in oxygen, between each member of this group of alkaloids of leguminous plants. Furthermore their physiological action, as far as we are capable of judging, seems to become more powerful as the percentage of carbon decreases; the dose of sparteine sulphate being 0·1 gram, and that of eserine sulphate 0·003 gram, and intermediate to these are cytisine and ulexine. They likewise become more unstable in the same order, thus:—Sparteine may with care be distilled unchanged; cytisine may, we are told, be sublimed, yielding splendid crystals; but ulexine becomes red on continued exposure to air, and rapidly decomposes at a temperature a little above its melting point. Eserine is still more unstable, its decomposition product (rubreserine) having been examined and described, and it is entirely decomposed at 100° C.

We do not know that any special relationships exist between nicotine and the other alkaloids we have mentioned, but it is a singular fact that the formula we have given to ulexine only differs from that of nicotine by CO, and that if the formula usually ascribed to eserine be multiplied by two and that of nicotine by three the difference is O_4. The elements of water added to the formula for ulexine give us the formula for pilocarpine, and these alkaloids have a physiological likeness, although quite different in their behaviour to chemical reagents.

We are at present engaged on the preparation of cytisine, and hope soon to be able to report the results of our examination of this alkaloid.

London, June, 1890.

NOTE ON "SCOPOLA HLADNIKIANA."

BY E. M. HOLMES, F.L.S.,
Curator of the Museum of the Pharmaceutical Society.

In November last the root of the plant grown in the Botanical Garden of the University at Marburg under the name "*Scopola Hladnikiana*," and presumably the same as that examined by Professor Schmidt, was kindly forwarded to me in the living state by Professor K. Goebel.

In April it flowered in my garden, and produced not green flowers, which *S. Hladnikiana* is said to have, but bright primrose-yellow flowers, and the plant must consequently be referred to the variety *concolor* of De Candolle, 'Prodromus,' xiii., pt. I., p. 556, which is described as having corolla conico-campanulatâ totâ flavâ.

On pointing this out to Professor Goebel, he replied as follows:—"All the *Scopola Hladnikiana* in our garden has either yellow or brown flowers. I think, therefore, the plants hitherto have been erroneously labelled (many years since) in our garden." Anyone who has had experience of a large garden knows how difficult it is to keep plants properly labelled when the stems disappear in winter and the borders have to be dug over, manured, etc., so that it is not surprising that errors occasionally occur. As a point of scientific accuracy, however, it is well to point out that the plant examined by Professor Schmidt, if obtained from the Marburg garden, was most probably not *Scopola Hladnikiana*.

There are some points in connection with *S. carniolica*, var. *concolor*, that came under my notice, and that I believe have not before been recorded, which may throw some light upon its value as a variety.

S. carniolica sends up in early spring an erect shoot of more or less closely overlapping leaves, the flower-buds being concealed between the leaves, and only appearing as the leaves become more distant from each other by the elongation of the internodes, so that the plant is about 1 foot high before the flowers open; these are then of a brownish colour, but yellowish toward the calyx.

In var. *concolor* the young stem forms a distinct curve, all the leaves being bent on one side, and the flowers come out of the ground hanging from the leaves on the concave or drooping side of the stem; the flowers, which are of a beautiful pale primrose or sulphur yellow colour, being expanded before the corolla tips are out of the ground, only the upper flowers, which are then half exserted or included between the smaller upper leaves, being still unopened. On examining the flowers they are seen to be *proterandrous*, the anthers being expanded, whilst the stigma is not visible, the style being slightly shorter than the stamens.

In *Scopola carniolica*, on the other hand, the flowers are proterogynous, and the style is curved downwards so as to be brought below and in front of the anthers, so that cross fertilization is evidently intended to take place. The var. *concolor* opens first, the *S. carniolica* being several days later in blooming, so far as my observations go. It is noteworthy that this feature of the curved style is described by Maximowicz as characteristic of *S. japonica*. In dried specimens this appearance will probably depend on the care taken in drying the plant in accordance with its natural habit, a very little twisting of the flower (which is likely to occur from the pendulous character of the flower and the slenderness of the pedicel) being sufficient to bring the style on a level with the stamens. There is therefore little left to distinguish *S. carniolica* and *S. japonica*, except the more vigorous growth of the latter.

NOTE ON CARBONATE OF POTASSIUM.

BY F. H. ALCOCK.

During the preparation of Blauds's pills one of our leading pharmacists observed the odour of ammonia coming from the ingredients as they were being mixed in the mortar. He complained that the pills had been giving trouble for some time and would not keep in circular form.

An examination of the several ingredients showed that the K_2CO_3 was at fault, in that it contained about 20 per cent. of ammonium carbonate.

No doubt the gradual evolution of ammonia gas was the cause of the pills crumbling and being otherwise unmanageable, hence it will be advisable to examine this chemical for ammoniacal impurities before using it for Blaud's pills.

COD LIVER OIL.*

BY M. GAUTIER AND L. MOURGUES.

Richter, Schenck, De Jongh, Trousseau and Pidoux, Walsche, Oberghaus, Bouchardat, and a great number of other French, Dutch and German medical men consider the light-coloured and brown cod liver oils to be the most efficacious. On the other hand, English doctors generally, and a number of medical men in other countries recommend by preference the white oils, on the ground that they are more acceptable to patients, especially to infants, who are the principal consumers, and that they are often better digested; further, the objection is sometimes raised that the brown oils may be the product from altered livers.

The authors describe the preparation of the oil in Newfoundland and Bergen. The fresh livers heated to about 60° C., either in a water-bath or in the presence of steam, yield an oil which, filtered through flannel, constitutes the white oil. If the livers are not treated immediately, they quickly undergo a commencement of fermentation, or rather of auto-digestion, which is not a putrid or ammoniacal fermentation under the influence of bacteria, for the mass does not become alkaline or rancid, but acquires an acidity that amounts to 0·4 to 0·8 gram of monohydrated sulphuric acid per kilogram. The envelopes of the hepatic cells are broken and partly liquefied and the minute drops of fat from the hepatic tissue saturate more and more the coloured substances that exist in the liver. The ferments of the biliary parenchyma determine an action comparable to the lactic and butyric acidification of flesh after the cessation of life. The oil obtained under these conditions, after some hours' or days' standing of the livers, is pale coloured or brown, and it owes its colour and greater activity to the biliary matters that it holds in solution. It requires days, and even weeks, before the livers, left to themselves, undergo putrid fermentation in the cold countries where the industry is carried on.

The residue from this first treatment is subjected to boiling with water, but the oil so obtained is thick, dark and rancid, and has a fetid odour; it is employed for industrial purposes, not in pharmacy. It follows therefore that the pale coloured and brown oils, properly manufactured, are not derived from livers tainted by putrid fermentation, and their great activity is explained by the fact that the fatty matter is charged with biliary principles to which reference will be made subsequently. This was the conclusion arrived at also by De Jongh.

It must not be lost sight of, however, that in special cases, the white oil may be preferable, not only because it is better tolerated, but also because it contains a larger proportion of phosphorus and extractive matters, to which the authors, like others, attribute a great part of the efficacy of cod liver oil in the reconstitution of the system.

In operating for the separation of the alkaloidal and other principles from cod liver oil the authors treated 100 kilograms of oil methodically with an equal volume of 85° alcohol, containing 3 grams of oxalic acid per litre. The oil was shaken with the alcohol in twenty glass bottles each of fifteen litres capacity, the free part of which was filled with carbonic acid to avoid the action of air upon the oil. After standing, the alcoholic liquid was siphoned off, exactly neutralized with milk of lime and evaporated *in vacuo* at a temperature not exceeding 40° C. Under these conditions the mixture remained limpid and nearly colourless. When it had been reduced to one hundredth of its original volume it was neutralised by precipitated calcium carbonate, filtered, and the desiccation finished *in vacuo*.

If it be desired simply to extract from this residue the total basic substances it contains, without regard as to the manner in which they are combined, the product of the evaporation is treated with 80° alcohol, and the extract is filtered or distilled until all the alcohol has passed over and concentrated in vacuo. In this way a syrupy extract is obtained to which caustic potash is added in fragments to liberate the bases. These are separated by shaking the mixture with ether, then precipitating the bases from the ethereal solution by means of an ethereal solution of oxalic acid, washing the precipitate with ether and drying. The scarcely coloured dry oxalates obtained from 100 kilograms of oil weighed 52 grams.

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* Translated from an extract from a work by Messrs. Gautier and Mourgues, published in the *Journal de Pharmacie*, March 1, p. 253.

In order to obtain the bases free, the salt is dissolved in the smallest quantity of water and the solution is treated with caustic potash. Under this treatment the alkaloids usually rise to the surface like a thick brown oil, which is due to the solution of two fixed bases in the oily bases.

The treatment with alcohol acidulated with oxalic acid removes from the oil nearly the whole of the bases. In the authors' experiments the quantity obtained varied between 0·380 gram and 0·485 gram per kilogram of the brown oils; but from the pale oils the yield was inappreciable, even when operating upon ten kilograms. If account be taken of the fact that a trace of basic substances remain in the oil after treatment with acidulated alcohol it will be seen that the total bases contained in a kilogram of brown oil amounts to about half a gram. That would be about 6·5 milligrams of base, or 10 milligrams of the sulphates in each table-spoonful (13 grams) of oil, a quantity that, considering the powerful action of these bases, cannot be without effect on the economy.

Twenty-five grams of the mixture of oxalates dried over recently fused caustic potash yielded 12·5 grams of anhydrous bases. These were submitted to careful fractionation, first in air up to a temperature of 120° C. and then *in vacuo*. Different alkaline liquids passed over in succession, and there remained a brown magma of bases that were solid or undistillable without decomposition. These were separated by converting them into hydrochlorides or platinochlorides.

After careful repetition of these operations the bases in cod-liver oil were classified as follows:—

(1) Fraction boiling at 87°–90°, under a pressure of 770 millimetres:—*butylamine*. This portion constituted about one-sixth of the total bases.

(2) Fraction boiling from 90° to 100°, under the same pressure, with a fixed point 97° and 98°:—*amylamine*. This fraction constituted one-third of the whole.

(3) A small fraction boiling above 100° and below 115°, consisting especially of *hexylamine*.

(4) Fraction boiling towards 100°, under a pressure of 6 centimetres of mercury, or at from 190° to 200° under ordinary pressure. This consists of a new base, *dihydrotoluidine*, and constituted about one-tenth of the total alkaloids.

(5) The fifth portion included the fixed bases. The basic residue that could not be distilled, being treated with dilute hydrochloric acid, dissolved almost completely. This solution, which was slightly coloured, gave immediately with platinic chloride a flesh-coloured precipitate, alterable in light, which was separated from the mother-liquor, and dried upon biscuit porcelain. From this platinochloride a hydrochloride was prepared from which a fixed base, named by the authors *aselline*, was obtained by precipitation with potash.

Upon concentrating the mother-liquor a second platinochloride, much more soluble than the first, was deposited of constant composition to the end. From this was obtained a sixth alkaloid that constituted about one-third of the total alkaloids of the oil. This substance, which is considered by the authors to be one of the most efficacious principles in cod liver oil, has been named *morrhuine*.

There remained in the potassic liquor, after the basic substances had been removed, the different fixed and volatile acids with which the bases were combined when dissolved out by the acidulated alcohol. To this liquor, exhausted by ether, was now added a little sulphuric acid, and the following acids were obtained:—

(1) A remarkable acid, which appears—especially when the liquor is heated a little—as a brown viscous mass, slightly soluble in water, having a disagreeable, slightly aromatic odour, recalling that of oils derived from marine algæ. It solidifies slowly in the cold and may be obtained crystalline after purification. The authors have named it *morrhuic acid*.

(2) Upon distilling the acidulated liquor, after the morrhuic acid had been separated, there passed over a mixture of *formic* and *butyric acids*.

(3) There still remained in the liquor (*a*) a small quantity of morrhuic acid in solution, removable by alcoholic ether when the solution had been evaporated; (*b*) a certain proportion of phosphoric acid, derived from the phosphates, phosphoglycerates and lecithines of the oils; (*c*) a little sulphuric acid having the same origin.

(4) These various acids having been separated, the residue was finally precipitated with subacetate of lead. After having filtered and removed the lead strong alcohol took up an extract having a nauseous odour. In the fractions of this extract boiling towards 180° *in vacuo* the presence of glycerine was determined by converting it into acrolein. Glycerine, therefore, accompanies phosphoric acid in the complex substances removed by alcohol from cod liver oil, being partially combined with it, for after neutralization of the acid extract with lime phosphoric acid again makes its appearance in the liquor if it be boiled with a mineral acid. Phosphoric acid and glycerine are in fact contained in these oils in the form of lecithines.

The foregoing, with traces of colouring matters, are the alkaline and acid constituents separable from cod liver oil. Among them, only butyric, phosphoric and sulphuric acid had been noticed before. The special constituent which communicates to cod liver oil the characteristic property of giving a fine violet colour when treated in the cold with strong sulphuric acid is not met with in the acidulated extract, alcoholic or aqueous.

Referring to the properties of these constituents the authors state that butylamine, in sufficient dose, produces in animals fatigue, stupor, vomiting and a certain degree of paresia; it excites the production of urine.

The amylamine from cod liver oil is a very active base. In a small dose it excites the reflexes and promotes the urinary secretion. In a large dose it provokes convulsive trembling, then true convulsions and death.

Hexylamine has an action very similar to that of amylamine, but much less intense.

Dihydrotoluidine ($C_7H_{11}N$) occurs as a colourless oil, having a brisk, not unpleasant odour, very alkaline and slightly soluble in water, upon which it floats. It attracts carbonic acid strongly from the air. Its hydrochloride is bitter, and crystallizes in very soluble confused needles or lamellæ. The nitrate reduces silver nitrate. The yellow platinochloride is readily precipitated, but is re-dissolved by heat. The aurochloride, soluble in the cold, forms long needles arranged like a fan. Dihydrotoluidine is a convulsivant toxic base.

Aselline occurs as a non-hygroscopic amorphous mass, with a density of 1·05. It turns yellow in air and light. When cold it is odourless; but it melts at about 100° C., and the viscous liquid has a sweetish aromatic odour, recalling that of some ptomaines. Aselline is very slightly soluble in water, to which it communicates a faint bitterness and alkalinity. It is soluble in ether and especially in alcohol. The salts formed by it with acids are crystalline, but dissociate partially in water, especially when heated. In a sufficient dose aselline produces dyspnœa, stupor, convulsive disturbances, and with a still larger dose death.

Morrhuine ($C_{19}H_{27}N_3$) is a very thick oily liquid, with an odour recalling that of lilac or acacia flowers. It is lighter than water, in which it is slightly soluble, and is very soluble in alcohol and in ether. It is very alkaline and caustic to the tongue and attracts a little carbonic acid from the air. The hydrochloride crystallizes in stars formed of acutely pointed needles, which are very deliquescent. The aurochloride forms a yellow precipitate. The platinochloride, which is rather soluble and alters rapidly in warm aqueous solution, crystallizes in microscopic barbed needles. The salts of morrhuine are not precipitated by mercuric chloride, but are by the double iodide of mercury and potassium. Morrhuine is a powerful stimulant of the functions of nutrition and assimilation; it produces a rapid circulation of the extractive residues of cell life towards the blood and the kidneys, where they are eliminated, provoking in this way indirectly a powerful movement of assimilation correlative of the losses consequent upon the inverse movement of de-assimilation. This is considered to have been demonstrated by the super-excitation of appetite in animals brought under its influence.

As before stated a portion of the bases just described are combined in the oil under the form of lecithines. It is impossible, in fact, to concentrate an alcoholic extract made in presence of a mineral acid, although dilute, without the gradual deposition in the cold of a viscous acid to which the bases were originally joined; at the same time phosphoglyceric acid makes its appearance. The lecithines do not exist in the white or slightly coloured oils; neither do the alkaloids, which is considered to be another proof that these bases occur under the form of complex phosphoglyceric compounds.

According to De Jongh the brown oils contain per kilogram 0·789 gram of pre-existing phosphoric acid, removable by saponification, while the total phosphoric acid obtained by oxidation of the oil was 1·047 grams, but in the pale oil the quantities obtained were respectively 0·913 gram and 1·397 gram. It follows therefore from these figures that the phosphoric acid and phosphorus are not entirely derived from lecithines, for the oils yielding the most are those that do not contain phosphoglyceric compounds. Moreover, the organic phosphorus occurs in these oils in a form other than that of phosphoric acid capable of combining with alkalies; the phosphorus that becomes apparent only upon total oxidation of the oily substance is sensibly more abundant in the pale oils free from lecithines. Consequently, this phosphorus occurs in all the oils, pale or brown, in a form other than that of lecithines; and since it is not fully saturated with oxygen and constitutes part of a complex organic molecule, there can be no doubt that it is essentially assimilable and suitable to the reparation of tissue.

Morrhuic acid ($C_9H_{13}NO_3$) is peculiar to cod liver oil, from which it is deposited slowly and gradually in the cold, more rapidly when the acidulated alcoholic extracts are concentrated by heat. It follows the bases in the various processes of extraction, and appears to be united with the principal of them in very instable combination. In order to separate simply the morrhuic acid it suffices to exhaust the oil with hydrochloric acid diluted with twenty times its volume of water, separate and filter the supernatant liquor, saturate with potassium carbonate and concentrate *in vacuo* at 45° to 50°. The acidulated residue is taken up by strong alcohol, and upon evaporating the alcohol and adding water, the acid is precipitated as a brown resin that rises to the top of the water, in which it dissolves partially when heated. To purify this acid it is dissolved in dilute potash solution, the liquor neutralized with nitric acid and acetate of lead carefully added. The first brown precipitates that form are separated and rejected, and there is obtained afterwards a greyish-white plumbic precipitate, from which can be separated by treatment with sulphuretted hydrogen, a dirty yellow body that crystallizes in prisms or in square plates bristling with points. The formula attributed to this acid, as the result of analysis, differs from that of tyrosine ($C_7H_{11}NO_3$) only in containing two atoms of hydrogen more.

Morrhuic acid is a weak acid, which reddens litmus, decomposes carbonates, is easily soluble in alkalies, with which it forms salts that precipitate the acetates of lead and nitrate of silver, but not acetate of copper. It is slightly soluble in hot water and separates from it partially on cooling in the form of an emulsion. The solutions have a slightly bitter disagreeable taste; their aromatic odour sometimes recalls that of cod liver oil and sometimes that of seaweed. Upon very slow evaporation of a dilute alcoholic solution the acid crystallizes in prisms having a square base, or in large plates, but a considerable proportion remains a long time in the form of oleaginous drops. Morrhuic acid belongs to the pyridic series of compounds, though it cannot be properly called a carbopyridic acid for it is not precipitated with heat by acetate of copper, but a pyridic acid having a constitution recalling that represented by phenyllactic acid ($C_6H_5-CHOH-CO_2H$) or cinnamic acid in the benzene series. It behaves both as a moderately energetic acid and as a weak base.

The substance described by De Jongh under the name "gaduine" appears to correspond with morrhuic acid. This substance, which is perfectly harmless, possesses most powerful diuretic properties, quite similar to those the authors have recognized in morrhuine. Under the influence of morrhuic acid, the urine of guinea pigs, usually scanty and turbid, augments considerably in quantity and rapidly become clear, at the same time the animals attack food with avidity. These characters show, in the authors' opinion, that morrhuic acid, like morrhuine, excites the assimilatory functions and the appetite. The bases properly so-called exist in cod liver oil in small quantity, but morrhuic acid occurs in it to the extent of upwards of a gram per litre. It would appear therefore to be one of the most important agents in the efficacy of the oil.

But the authors do not consider that the undeniable reparative action of the oil is entirely due to the alkaloids and morrhuic acid, since this is attributable to three groups of special agents. In the first place the oil acts by its fatty bodies, which are eminently assimilable in consequence of their slight acidity and partial saponification, the latter being due to the influence of hepatic ferments and the solution in the oil of a certain quantity of biliary matters that render emulsification easy, especially under the influence of the pancreatic juice. These fatty bodies are energetic reconstituents of the tissues through their richness in phosphates, phosphoglyceric acid, lecithines and organically combined phosphorus, the phosphorus being presented to the system under the form in which it exists in milk, eggs, the brain, legumin, nuclein, etc. Secondly, bromine and iodine, which are present in the oil in minute quantities (0·030 gram to 0·040 gram of iodine per litre), contribute doubtless also to the reparative action. Lastly, cod liver oil acts by the morrhuic acid it contains, as well as by its bases, several of which, butylamine, amylamine, and especially morrhuine, excite the nervous system, accelerate denutrition, as indicated in the considerable increase of urine and sweat excreted, and correlatively augment the appetite.

DISSOCIATION.*

BY C. E. BOUCHER.

The subject of dissociation is far too important a one to need any introduction from me, and its very importance is the reason why it should be brought before the members of the School of Pharmacy Students' Association.

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* Read at a meeting of the School of Pharmacy Students' Association.

I have divided my paper into three parts, and propose to consider—

(1) Very briefly the history of the laws relating to the combination of gases by volume.

(2) The apparatus used in studying the phenomenon of dissociation, and the behaviour of a few of the most important dissociating substances.

(3) To give a very short and cursory account of the various theories which have been advanced to explain the phenomenon.

In 1805 Gay Lussac and Humboldt were engaged on the determination of the composition of air. They were using an instrument called a eudiometer, which was a simple glass tube, graduated and closed at one end. The idea was that the quality of the air depended on the amount of oxygen present. A certain amount of air was admitted to the tube standing over water, nitric oxide gas was then let in, which combined with the oxygen, forming soluble oxides of nitrogen (N_2O_3 and NO_2), and the water then rose in the tube, leaving the insoluble nitrogen. This instrument is called the eudiometer, from the Greek words *εὔδιος μέτρον*, meaning a measure of fine weather. The method was not a very accurate one, and Volta suggested mixing the air with a certain quantity of hydrogen, and exploding the mixed gases. This gave much better results. Gay Lussac and Humboldt noticed what Volta failed to do; viz., that the volumes of the oxygen and hydrogen reacting were as one to two. Gay Lussac then ceased making experiments on air, and pursued the subject of gaseous combination and compositions, which culminated in 1808 in his beautiful discovery that, "When gases combine they do so in equal volumes, or in volumes which have some simple relationship to one another, as one to two, one to three, two to three, and so on." He found one volume of hydrogen combined with one of chlorine to form two of HCl. Also two volumes of hydrogen combined with one of oxygen to form two of H_2O. One volume of nitrogen combined with three of hydrogen to form two of NH_3. And the conclusion was drawn that "Equal volumes of gaseous substances, measured at the same temperature and pressure, contain equal numbers of atoms." The theory was not accepted by Dalton, who on the knowledge of the times said, and said very justly, one volume of nitrogen and one of oxygen form two volumes of NO, but one atom of nitrogen and one atom of oxygen form one atom of NO. Therefore if the above statement were correct the volume of the NO should have been equal to and not twice as great as that of the oxygen. If Dalton's definition of atoms is to be adopted, Gay Lussac's statement that equal volumes contain equal numbers of atoms must be abandoned.

The difficulty was removed by Avogadro, who in 1811 introduced the idea that there were two kinds of atoms, integral atoms or molecules and elementary atoms, and enunciated the hypothesis that "equal volumes of gases contain equal numbers of molecules." The reaction between nitrogen and oxygen now becomes clear. Each molecule of oxygen and each molecule of nitrogen divides into two parts, and these parts unite to form a new molecule of NO, hence there are twice as many molecules of NO produced as there were molecules of nitrogen or oxygen originally present.

This hypothesis was not received, the times were not yet fully ripe. And it was not until some years after that the hypothesis was accepted by Dumas and understood and applied by Gerhardt and Laurent.

Now if Avogadro's hypothesis be assumed correct it follows that the weights of equal volumes of gases under similar conditions must be proportional to the relative weights of the molecules. And this gives us a definition of the term "molecular weight," which is the weight of that volume of a gas which is equal to the volume occupied at the same temperature and pressure by two parts by weight of hydrogen. So that in the case of elements, if we take the weight of a given volume in the state of gas compared with that of an equal volume of hydrogen gas taken as unity we find that the number so obtained is identical with the atomic weight of the substance. Similarly we judge since when we combine 2 vols. of hydrogen each weighing 1 and 1 vol. of oxygen weighing 15·96 and we get two vols. of H_2O weighing 17·96, that one volume of steam is 8·98 times heavier than an equal volume of hydrogen, and we say that "the vapour density of compound substances is half their molecular weight." Now we find several bodies which do not conform to these laws.

And now I think we may define dissociation. Dissociation is generally used to indicate the resolution of more complex into less complex molecules by the action of heat, the amount of resolution increasing as the temperature increases and decreasing as the temperature decreases. For each substance there is a temperature at which the whole, or almost the whole, is converted into two or more new bodies. If the temperature be allowed to fall the products of the original change gradually recombine until the initial state of the system is attained. There is a great difference between decomposition and dissociation, but I think it will be advisable to study the behaviour of two or three dissociating bodies before we consider the differences between these phenomena.

The process of dissociation resembles in some respects that of evaporation.

In both cases heat is applied and change is produced. When a liquid is heated there is a definite amount of pressure exerted by the vapour of the liquid, and this is called the vapour pressure of that temperature, and the rate of evaporation depends on the pressure exerted on the liquid by the vapour. Similarly the rate of dissociation is conditioned by the sum of the partial pressures of the gaseous products of the action. For any temperature there is a certain pressure, such that when this is reached the process stops, but it may be started either by decreasing the pressure or increasing the temperature.

Let us now take three typical cases and let us consider the action of heat on these bodies, and see what we can gather from the facts presented to us.

When nitrogen tetroxide is heated we find that its specific gravity varies, and taking air as unity the real specific gravity of the body N_2O_4 should be 3·178. Below −10° it forms colourless crystals which melt at higher temperatures forming a yellow liquid. The liquid boils at about 22°, giving off a yellow vapour which darkens in colour till it reaches 100°, and above it becomes orange red in colour. Let us note the specific gravities of the gas at different temperatures.

Temp.	Sp. gr. of gas.	P.c. dissociation.	Mean increase in pctage diss. for 10° rise. *
26·7	2·65	19·96	
35·4	2·53	25·65	
39·8	2·46	29·23	6·5
49·6	2·27	40·04	8·1
60·2	2·08	52·84	11·
70·	1·92	65·57	12·1
80·6	1·80	76·61	13·
90·	1·72	84·83	10·4
100·1	1·68	89·23	8·8
111·3	1·65	92·67	4·4
121·5	1·62	96·23	3·1
135·	1·60	98·69	3·5
154·	1·58	100·	1·8

Now taking air as unity NO_2 has a specific gravity of 1·59, and such a specific gravity we see at 154°, and we see a gradual decrease of density as the temperature increases. From this we conclude that N_2O_4 exists at low temperatures, but as the temperature rises the molecules break down, until at 154° you have only NO_2 molecules present. Now if you continue to heat the gas up to between 400° and 500° it suddenly becomes colourless. This is probably due to the breaking down of the NO_2 molecule into NO and O, although the vapour density in this condition has not been ascertained.

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* Muir.

Würtz worked at the vapour density of amylene hydrobromide, and he got the following results:—

Temp.	Sp. gr. of gas.	Percentage dissoc.	Mean increase in p.c. dissoc. for 10° rise. *
152	5·37		
155·8	5·18		
160·5	5·32		
165	5·14	1·6	
171·2	5·16		
173·1	5·18		
183·3	5·15	1·4	2·7
185·5	5·12	2	7·7
193·2	4·84	7·9	
195·5	4·66	12	9·2
205·2	4·39	18·9	
215	4·12	26·7	
225	4·18		4·5
236·5	3·83	36·3	
248	3·30	58·2	
262·5	3·09	68·9	
272	3·11		
295	3·19		1·2
305·3	3·19		
314	2·98	75·1	
360	2·61	100	5·4

Now we notice that the vapour density is practically normal to within 40° to 50° above the boiling point, and the variation in the vapour density is attributed to the fact that when amylene hydrobromide is heated it is resolved into amylene and hydrobromic acid gas, $C_5H_{11}Br = C_5H_{10} + HBr_2$.

Now if this be true we should expect to find a temperature when the whole of the bromide was dissociated into amylene and hydrobromic acid. So we do. For if you look at the table you will see that at 360° it has a specific gravity of 2·61, corresponding to the specific gravity of a mixture of equal volumes of C_5H_{10} and HBr, whereas the true vapour density or specific gravity of amylene hydrobromide is 5·22.

Wurtz also worked at the behaviour of amyl iodide. When amyl iodide is heated decomposition ensues; but let us compare the following results:—

Temp.	Sp. Gr.	Percentage dissociation.	Mean increase in percentage of dissociation per 10°.
143·	6·05	13·1	
153·5	5·97	14·6	
168·	5·88	16·3	1·4
160·	5·73	19·4	1·2
210·	4·66	46·8	5·5
262·	4·38	56·2	1·8

Now we notice here again that the specific gravity falls if the specific gravity of the iodide is 6·84, but when it has completely dissociated into C_5H_{10} and HI it should have a specific gravity of 3·42.

Similarly it was found that at 182° C. the specific gravity of phosphorus pentachloride was 5·08, at 250° it was 4, and finally at 300° 3·65, and Wurtz has also found that at low temperatures between 160° and 175°, and pressures varying from 168 to 413 mm., the specific gravity is nearly 7·2. Now the calculated specific gravity of PCl_5 is 7·2 and that of a mixture of PCl_3 and Cl_2 is 3·6, so it seems probable that PCl_5 dissociates into PCl_3 and Cl_2, and that the dissociation between 182 and 288 is partial but becomes complete at 300°.

Now let us refer to the three tables showing the specific gravities of N_2O_4 of $C_5H_{11}Br$ and $C_5H_{11}I$, and we notice that the amount of dissociation is at first small, then it increases as the temperature increases until about 50 per cent. of the original compound has been dissociated, after which the amount of dissociation decreases for the interval of temperature until the change is complete, the pressure remaining constant the whole time, and we can map out a general curve representing the amount of dissociation, choosing as ordinates the temperature and the vapour density.

If we do not accept the explanation given by the dissociation hypothesis of the observed variation in the densities of such gases as PCl_5, N_2C_4, $C_5H_{11}Br$ we must fall back on the hypothesis that the co-efficients of expansion by heat of these gases are abnormal. The rate of increase of the co-efficients of expansion of these gases appears to increase as the temperature increases until a maximum is reached, and then it decreases to a constant value. Such an idea is fanciful and far-fetched in the extreme, and I shall try to show that the facts are totally against this view and quite in favour of the dissociation hypothesis.

From the three cases we have just considered, we can show the differences between decomposition and dissociation.

(1) Although decomposition takes place at the high temperature to which the system is raised, yet the constituents recombine if they are allowed to cool in contact with one another.

(2) Heat is absorbed and the temperatures rise throughout the process.

(3) The change of composition is gradual, and the degree of dissociation is partial, although the whole amount of substance is submitted to the same conditions of heat.

(4) The amount of dissociation depends on the temperature and the pressure of the gaseous products.

Between the years 1840 and 1850 Dumas determined the vapour density of acetic acid, and found it to be about 39, but according to the law just enunciated it should have been 30.

It was then found that the vapour density of ammonium chloride was about 13, but calculated according to our rule it should be 26·7. Before it was vaporized it had the composition NH_4Cl, and when it had cooled it still had the same composition. So people were reduced to two alternatives, either

1. Many gases did not obey Avogadro's law, and therefore from the great number of exceptions this law must be judged to be incorrect.

2. Or some change takes place in the constitution of the body when in the state of vapour.

But as the law of Avogadro has been proved correct from general considerations of the kinetic theory of gases we may conclude that the second of these two alternatives is the correct one.

Now let us turn to the apparatus employed in studying thermolysis.

The apparatus is of three kinds:—

I. For raising gases to a high temperature and removing at that temperature the products of dissociation by taking advantage of the laws of gaseous diffusion.

II. For raising gases to a high temperature, and preventing recombination by an admixture with an inert gas.

III. For raising gases to a high temperature and preventing recombination by sudden cooling. This apparatus took two forms: (α) the hot and cold tube; (β) apparatus for sucking the hot gases into a tube through which H_2O is circulating.

Apparatus I.—A glazed porcelain tube is fitted with corks at each end; through these, concentric with the axis of the tube, another tube of unglazed earthenware is passed. The porcelain tube can be heated by a suitable furnace to a high temperature. The gas to be decomposed is made to circulate through the annular space between the tubes, and through the unglazed earthenware tube sweeps a current of an inert gas, as CO_2, and this inert gas sweeps away the products of dissociation with it. Deville used this for decomposing steam.

Apparatus II.—The porcelain tube of the previous experiment was filled with pieces of porcelain to expose a large surface to the action of heat. The gas to be decomposed was mixed with a large volume of some inert gas and passed through the tube heated to a high temperature as before. The apparatus is not as good a one as the former, and is less applicable for performing quantitative experiments, owing to the complication introduced by the large extent of porcelain surface exposed. The dissociation of water and carbon dioxide has been studied with this apparatus.

Apparatus III (*a*) is very similar to the first experiment, only the porous earthenware tube is replaced by one of silver, and a stream of cold water is kept flowing through it. The decomposition of CO was shown by this apparatus, the C being deposited on the tube, the CO_2 passing out.

(β) apparatus is similar to the former one but a small hole 2 mm. diameter is bored in the side of the metal tube, by means of which when a stream of water is allowed to flow through the tube, air is sucked in. Deville used this to examine the constitution of the gas in a candle flame, Cailletet to extract the gases from a blast furnace.

The question as to the fact whether dissociation did take place or not was fought out over the substance ammonium chloride. As we have seen before, ammonium chloride has just half its theoretical density, and this abnormal density would be explained if we can understand that two volumes of NH_4Cl become four volumes of NH_3 and HCl. St. Claire Deville it was who made the great advance. He showed that many bodies, and among them NH_4Cl, are split up by heat and recombine again upon cooling. A few weeks later Kopp, Canizzaro and Kekulé published papers independently and simultaneously on the subject.

Now, curiously, Deville was unable to allow that the dissociation which he had discovered explained the abnormal vapour densities, but preferred to state that all vapours did not obey Gay Lussac's law. In 1862, however, Pebal showed that when NH_4Cl is heated in the presence of asbestos it is split up into NH_3 and HCl, of which the lighter, NH_3, diffuses through the asbestos, while the HCl remains for the most part undiffused. In reply to this Deville said that the asbestos caused the splitting up of the NH_4Cl. Than then replied to this by replacing the plug of asbestos by a slab of solid NH_4Cl, and he got similar results. Wanklyn and Robinson then showed that the NH_4Cl dissociated. They used two flasks, the neck of one fitting over that of the other, and into the base of the one flask a tube was fused. By means of this hydrogen was let in and it filled the flasks. In the lower flask the NH_4Cl was placed, and at the aperture between the two flasks the NH_3 was given out and it was collected and tested. Now if the vapour were the vapour of NH_4Cl and not that of NH_3 and HCl the result is inexplicable. Deville next argued that NH_3 gas is decomposed at 500° C., and as this is the case the mixture of gases should contain no free NH_3. Than, however, showed that NH_3 does not decompose at 500° C. in the presence of another gas. Deville then reported that heat was given off when NH_3 and HCl were combined at 300° C. Than repeated the experiments and found this was not the case. So from this exhaustive work we may judge that NH_4Cl, when heated does really decompose into a mixture of NH_3 and HCl.

Another substance which has definitely been proved to dissociate is phosphorus pentachloride. A few years ago it was generally thought from some experiments of Cahours that the molecule of PCl_5 answered to a condensation of elements into three volumes. Wurtz has shown, however, that when PCl_5 is vaporized into air that the vapour has a composition of PCl_3 and Cl_2, which has been shown by dissolving the residue in water, after the Cl has diffused out in Wanklyn's apparatus. If any PCl_3 be present it will decompose water, forming phosphorus acid, which will reduce $HgCl_2$ when brought in contact with it, which reaction H_3PO_4 derived from PCl_5 is unable to accomplish. It is interesting to know that when PCl_5 is vaporized into an atmosphere of PCl_3 no dissociation takes place.

By using an apparatus similar to the one described previously, Wanklyn and Erlenmeyer were able to show that sulphuric acid dissociates completely into H_2O and SO_3, and by drawing out a tube from the flask to a capillary point, the H_2O being less dense than the SO_3 escapes more easily and in a larger quantity.

Ammonium carbamate when heated has been found to have a vapour occupying six volumes, a mixture of two of CO_2 and four of NH_3, $CO\left\langle\begin{matrix}ONH_4\\NH_2\end{matrix}\right.=CO_2+2NH_3$. Chloral hydrate is another body which has occasioned a great deal of discussion. The molecule reduced to vapour occupies four volumes, if we regard an atom of hydrogen as occupying one volume, and these four volumes are composed of two of steam and two of chloral vapour in a state of mixture. Troost attempted to show that no water gas was free in the vapour. He placed in the vapour potassium oxalate, a substance containing water of crystallization. Now according to the principles of Deville and Debray the dissociation of a body capable of forming a volatile or gaseous product ceases for a certain temperature, when this gaseous product has acquired in the atmosphere in which it has been formed a certain tension which is the tension of dissociation for that temperature.

Therefore at 79° crystallized oxalate of potassium cannot continue to produce aqueous vapour when the vapour of chloral hydrate contains aqueous vapour at a tension equal to or greater than that of crystallized potass-oxalate at 79°. Therefore if chloral hydrate breaks down into aqueous vapour and chloral there should be no difference in pressure. Troost asserted that there was an alteration of pressure, and consequently inferred that chloral hydrate does not dissociate. Wurtz has, however, shown that the experiment was incorrectly performed, and that when the oxalate is heated to a temperature of 79° or 100° in an atmosphere of chloral hydrate no water was given off from the oxalate.

Acetic acid in its behaviour presents some curious features. Between the years 1840 and 1850 Dumas worked on it and found its specific gravity to be 2·7, whereas its theoretical density should be 2·08. Cahours then worked on it and obtained the following data:—

Temp.	145°	150°	210°	230°	250°	300°
V.D.	2·75	2·72	2·17	2·09	2·08	2·08.

Bineau next investigated its behaviour, and found that at low temperatures and reduced pressures it had a vapour density of 3·96.

Drs. Ramsay and Young have worked at it, and found that at very low temperatures, if any dust was present, the acetic acid vapour condensed on it.

From this work we gather that at very low temperatures the molecules have a composition of say $C_4H_8O_4$, which breaks down on heating until above 250° they are all resolved into molecules of the formula $C_2H_4O_2$.

When solid $CaCO_3$ is heated in a closed space, CaO and CO_2 are formed, which recombine on cooling to form $CaCO_3$. Debray has found that at a red heat this depends on the pressure; for each temperature there is a maximum pressure exerted by the CO_2, at which the direct change $nCaCO_3 = CaO + CO_2 + (n - 1)CaCO_3$ stops. At 860° this is 81 mm. of Hg, and at 1000° it is 520 mm. If the mixture of CaO, CO_2, and $CaCO_3$ be slowly cooled the lime and carbon dioxide recombine.

If it be rapidly cooled, however, all the CO_2 is not absorbed by the lime. When the temperature is slowly lowered CO_2 is absorbed, the pressure is altered, and the equilibrium is destroyed; then equilibrium is again attained only to be again destroyed. When the mixture is rapidly cooled the absorption of CO_2 corresponding to each change of temperature cannot be completed, hence the cooled system is composed of $CaCO_3$, CaO and CO_2.

With regard to the dissociation of calomel there are a great many mis-statements as to its action. Mitscherlich found the vapour density of calomel to be 117·5. If its formula is HgCl this is its right vapour density but if Hg_2Cl_2, when heated to correspond with this density calomel should split up into two volumes of Hg and two of $HgCl_2$. To see if this were the case Debray used the apparatus with a silver tube through which the stream of cold water is circulating. Inside the outer tube he placed some gold foil. If Hg is formed when calomel is heated the gold foil should be acted upon by the Hg to form an amalgam. He found this was not the case.

Hermann Meyer and Odling found that at 360° the gold was acted upon. Debray then repeated his experiments, and pointed out that at a temperature of 446° the gold was very little acted upon, and a large quantity of calomel was deposited on the inner tube.

There is yet another kind of dissociation to which we must allude.

A crystal of copper sulphate remains unaltered when exposed to moist air, but if moderately heated it crumbles to a powder. The same kind of thing takes place with many substances at the ordinary temperature of the air. Sodium sulphate, phosphate and carbonate are examples of this kind of dissociation, which is only peculiar in that it occurs at comparatively low temperatures. There are several salts which are deposited from their solution at ordinary temperatures void of water of crystallization. These are found in every case to combine with water when crystallized below zero, *e.g.*, if saturated solution NH_4Cl be allowed to cool down at the ordinary temperature of the air crystals separate out. If these are separated from the liquid as they are formed, the solution on reaching 15° C. solidifies to a crystalline mass, $NH_4Cl, 12H_2O$ (cryohydrate). The existence of anhydrous salt at ordinary temperature is explained in that dissociation of the salt from the water occurs at or below the temperature at which the crystals are deposited. Salts which crystallize with water of crystallization at ordinary temperatures may be made to separate out in a lower state of hydration, or in a state destitute of water, by raising the temperature. Sodium sulphate at ordinary temperatures crystallizes out with a composition of $Na_2SO_4,10H_2O$, at 18° as $Na_2SO_4,7H_2O$, and at 34° as the anhydrous salt. Similar phenomena occur when solutions of some coloured salts are heated; for example, cobalt chloride forms red crystals $CoCl_2, 6H_2O$, which when dissolved in water give a red solution; if the temperature be slightly raised, the liquid changes in colour, becoming purple and blue; which colours are probably due to increasing quantities of $CoCl_2, 4H_2O$ and $CoCl_2, 2H_2O$. As the temperature falls the solution reassumes its red colour.

Lemoine has studied the conditions determining the equilibrium of gaseous systems originally consisting of equal volumes of H and I at 260°, 350° and 440°. He finds that at 440° equilibrium ensues in about an hour, at 350° after some days, and at 260° after months. The rate of chemical change he finds dependent on the pressure at any specified temperature. But when equilibrium has been attained it is scarcely conditioned by variations of pressure. He finds that before equilibrium is reached the rate of change varies almost directly as the pressure. The interaction of H and I is hardly a case of dissociation, as before combination takes place a decomposition of the H and I molecules must take place. Lemoine concludes from his work, that in the case of dissociation of a body whose production from its constituents is attended with condensation, the amount of dissociation depends on the pressure as well as on the temperature, but in a case where the constituents of a compound combine without condensation, the influence of pressure on the amount of dissociation at a specified temperature is small.

To account for the fact of dissociation there have been five theories.

(1) Pfaundler's theory of reciprocal reactions.

(2) A theory deduced from the behaviour of vortex atoms by Prof. Thomson.

(3) A theory deduced from the general equations of dynamics by Prof. Thomson.

(4) Theories which endeavour to account for dissociation based on the principle of the action of mass.

(5) Theories based on the generalization of the principles of thermodynamics.

Of these I will briefly mention two.

The first of these accounts for dissociation from the standpoint of the molecular theory of matter. According to the kinetic theory of gases, although the sum of the energies of rotation and translation of the molecules must be a constant quantity as long as the temperature remains constant, yet the distribution of this energy of motion may differ much as regards the individual molecules. If we call the energy of translation of the molecules of gaseous system *a*, and the energy of rotation of the parts of the molecules *b*, then there are four limiting cases for the distribution of this energy.

(1) When *a* and *b* are both at a maximum.
(2) When *a* and *b* are both at a minimum.
(3) When *a* is at a minimum and *b* a maximum.
(4) When *a* is at a maximum and *b* a minimum.

When two molecules come into collision *a* may be increased at the expense of *b*, or possibly both may be unaltered, so we can have the temperature of individual molecules much removed from the mean temperature of the whole.

If heat be added to such a system the energy of rotation and translation is increased, and this will split up some molecules into their component parts. As the temperature rises at first the separation into parts will be rapid, but as fewer and fewer of the molecules remain unseparated, as the temperature rises the amount of separation will decrease. All this time recombination of the molecules is going on, and this will depend on the relations between the energies of rotation and translation of the molecules; those constituents only will unite which by their union can produce molecules whose energy of rotation is not too great to cause their separation into parts. If temperature remains constant, separation and recombination will take place until equilibrium is reached.

The second theory I will touch on is that propounded by Professor J. J. Thomson.

The theory regards a molecule as consisting of two or more vortex atoms which may be separated by a physical force, as heat, light, electricity, or even by other vortex atoms in the neighbourhood. A compound gas differs from a gas which is a mechanical mixture of the constituents in the same proportions, in that the time during which the atoms of different kinds are paired together is relatively very large compared with that when they are free and alone. The former time he calls the paired time, the latter the free. The ratio between the paired and the free time will be diminished if the gas be disturbed, and if the disturbance is great enough the ratio will be so much reduced that the substance will no longer exhibit the characters of a compound, but those of a mixture of its components. The molecules may be separated into their constituents by action of light, heat or electricity, or by the action of high temperature without any external disturbance.

Professor Thomson shows that an equation may be got showing the ratio of the number of paired to the number of free atoms, and it may be expressed so as to give the density of the gas. The equation differs according to whether the dissociation is caused by collisions between the molecules or by some external agency, as heat, light or electricity.

PROTOPLASM AND ITS HISTORY.*

BY PROFESSOR GEORGE L. GOODALE.

You are invited to examine the more recent additions to our knowledge of protoplasm, restricting the examination to discoveries in the field of botany.

The word protoplasm was coined by Hugo von Mohl in order to designate certain active contents of the vegetable cell. We shall gain in clearness of vision by letting our glance rest first on the results of investigating vegetable cells and cell contents, anterior to von Mohl's time, in order that we may see some of the steps by which this term was reached by him. In 1667, Robert Hook, of England, published on account of his investigations of minerals, plants and animals under the microscope. His first reference to the structure of plants is in his description of charcoal, and this is followed by a good account of common cork. In these brief and fairly accurate descriptions the author makes use of the word "cell," applying the term to the cavities in charcoal and in cork.

Hooke's interesting treatise was soon followed by two remarkable memoirs—one by an Italian, the other by an Englishman. Malpighi, of Bologna, sent to the Royal Society of London, in 1670, a work entitled Anatome Plantarum. At the period these volumes were in the hands of the Royal Society, Nehemiah Grew, Secretary of the Society, was engaged in work almost identical with that of Malpighi. By Grew the word "cell" appears to have been applied to the cavities in what we may call the softer tissues of the plant. It is certain that neither Malpighi nor Grew recognized, as we can now, the multifarious forms of vessels, fibres, long cells and the like as referable to a common source.

In 1804, the Royal Society of Sciences at Göttingen proposed for competition certain questions relative to the structure and the mode of growth of the tissues. The chief contestants for this prize were Link, Rudolphi and Treviranus. The memoirs of the first two received the prize, that of the latter honourable mention. The names of others should be referred to as having worked at or about this time in the same field, namely, Bernhardi, Mirbel and Moldenhauer, the latter making a great advance in certain directions. But to all of these whom I have mentioned, including the winners of the prize, the important question seems to be, how are the structural elements distributed, rather than how they are related to each other in manner of growth and as respects their origin. With the cell contents they had comparatively little to do. They were busy with the constituents of the framework.

Noting the more important discoveries of the next period in their order, we come first upon that of the nucleus of vegetable cells by Robert Brown in 1833 and one mode of cell division by Mohl in 1835. In 1838 the eccentric Schleiden published his contributions to Phytogenesis, in which he states substantially that cells of plants can be formed only in a fluid containing, as chief ingredients, sugar and mucus (*schleim*). By this latter term he designated the nitrogenous matters taken collectively, and for the first time the vegetable cell was distinctly recognized as a unit of structure always serving as the common basis for the formation of the innumerable shapes of the structural elements.

Next comes the master, Mohl. In 1844, in a paper on the circulation within vegetable cells, he speaks of the living mass in each active cell, and distinctly recognizes it as that which is the treasury of stored energy and the vehicle of energy under release. He describes it as that which builds shapely forms out of unformed matter and at first hands. This substance he names *protoplasma*.

The term plotoplasm was at once adopted by Schleiden, as a good substitute for the indefinite and misleading word *schleim*, which he had employed to designate essentially the same substance, and it became thoroughly established in scientific terminology. In 1850, Professor Cohn (and Unger in 1855) showed that the protoplasm of vegetable cells is identical with what had been described, in 1835, in animal structures as *sarcode* by Dujardin.

Mohl gives the following account of protoplasm:—"If a tissue composed of young cells be left some time in alcohol, or treated with nitric or muriatic acid, a very thin, finely granular membrane becomes detached from the inside of the walls of the cells, in the form of a closed vesicle, which becomes more or less contracted, and consequently removes all the contents of the cell which are enclosed in this vesicle from the wall of the cell. This inner cell he calls the *primordial utricle*. In the centre of the young cell, with rare exceptions, lies the so-called *nucleus cellulæ* of Robert Brown ('*Zellenkern*;' '*Cytoblast*' of Schleiden). The remainder of the cell is more or less densely filled with an opaque, viscid fluid of a white colour, having granules intermingled in it, which fluid I call *protoplasm*."

Hofmeister's description of protoplasm, given in his 'Vegetable Cell' (1867), is: "The substance protoplasm, whose peculiar behaviour initiates all new development, is everywhere an essentially homogeneous body. It is a viscid fluid containing much water, having parts easily motile, capable of swelling and possessing in a remarkable degree the properties of a colloid. It is a mixture of different organic matters, among which albuminoids and members of the dextrin group are always present. It has the consistence of a more or less thick mucus and is not miscible with water to any great extent."

From these accounts we see that the following points were regarded as established: (1) All of the activities of the vegetable cell are manifested in its protoplasmic contents. (2) Protoplasm consists chemically of a nitrogenous basis. (3) Protoplasm has no demonstrable structure. (4) The protoplasmic contents in one cell are not connected with the protoplasmic contents in adjoining cells. (5) The nucleus and other vitalized granules in the vegetable cell are formed by differentiation from amorphous protoplasm.

It is now our duty to see in what manner these views have been modified during the last twenty, or rather ten years.

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* From an address delivered by Professor George L. Goodale, of Harvard University, as Vice-President of the Biological Section of the A. A. A. S., at Toronto, Aug. 28, 1889; abstracted and condensed from the *Botanical Gazette* by G. M. Beringer. Reprinted from the *American Journal of Pharmacy*.

The first thesis, namely, that all of the activities of the vegetable cell are manifested in its protoplasmic contents, may be regarded as firmly established.

The second thesis, viz., protoplasm consists chemically of a nitrogenous basis, remains unchanged. But, instead of regarding the protoplasmic basis as comparatively simple, it is now known to be exceedingly complex and to contain numerous cognate proteids, some of which can be identified in the basic mass, others in the nucleus, and others still in the vitalized granules. As a result of recent studies, it becomes more and more clear that the chemical relations of the protoplasmic activities are still veiled in mystery. Botanists are now receding from the position that it is safe to use the words albuminoids and protoplasm interchangeably, the latter term is generally restricted to morphological and physiological conceptions, the former keeps its wide chemical significance. The chemical studies of protoplasm by Rodewald, Reinke, Loew, Bokorny, and microscopically by Schwarz, compel us to recognize in protoplasm a substance of bewildering complexity of composition and constitution. Moreover, you all know how wide this field of research has suddenly become by the discovery that different microbes (which are, essentially, minutest masses of protoplasm) not only give rise to such diverse products, among others the ptomaines, but present such diverse chemical reactions. Protoplasm is no longer regarded by anyone in any sense as a comparatively simple substance.

The third thesis, namely, protoplasm has no demonstrable structure, has been modified in a striking manner as a result of improved appliances for research. By better methods of staining, and by the use of homogeneous immersion objectives, the apparently structureless mass is seen to be made up of parts which are easily distinguishable. There has been, and in fact is now, a suspicion that some of these appearances, under the influence of staining agents, are postmortem changes and do not belong to protoplasm in a living state. But it seems to be beyond reasonable doubt that protoplasm is marvellously complex in its morphological and physical as well as its chemical constitution.

Fourth, we are to glance at the accepted statement that the protoplasmic body or protoplast of one cell is cut off by the cell wall from all connection with the contiguous cells. It has been shown by Gardiner and others that there are intercommunicating threads of protoplasm of extreme fineness between adjoining cells, and these living threads maintain connections, sometimes direct, sometimes indirect between one protoplasmic mass and another. This has been shown to be so widely true in the case of plants investigated that the generalization has been ventured on, that *all the protoplasm throughout the plant is continuous.*

The fifth thesis has been completely controverted. Instead of believing, as formerly, that all the granules within the cell arise *de novo* from the protoplasm in which they are imbedded, we are now forced to regard all of them as springing from pre-existent bodies of the same character. Hofmeister, in 1867, stated distinctly that the nucleus arises from homogeneous protoplasm, and that in all cell-division the nucleus must first disappear, two new ones arising in its place. The nucleus occupied a secondary place as a derivative organ, and the chlorophyll granules were believed by him and his contemporaries to be new formations from homogeneous protoplasm under certain conditions of light, temperature and food. Researches show that the nucleus in all cases hitherto examined springs from a pre-existent nucleus by a process of division.

The extraordinary manner in which the nucleus, both in common cell-division and in reproductive blending, carries ancestral characters and controls the distribution of nutritive materials is as yet the greatest mystery in vegetable life.

Formerly it was held that the granules imbedded in the protoplasmic body, known as chlorophyll granules, sprang by a process of differentiation from the shapeless mass in each exposed cell. Researches have shown beyond any reasonable doubt that these chlorophyll granules always arise by a process of division from pre-existent granules. It is known that at the growing points, where leaves are developed, the cells contain granules of about the consistence and colour of protoplasm (chromatophores), the products of whose division are three-fold, some of the resulting granules being colourless, others became true chlorophyll granules, while others still, in those leaves which become the leaves of the flower and the fruit, assume colours other than green.

Such, then, are some of the more important changes which have taken place with regard to our knowledge of the living contents of vegetable cells.

TRUE WINTER BARK.*

(*Drimys Winteri.*)

BY P. N. ARATA AND F. CANZONERI.

After an historical summary of the introduction of the bark into Europe, the author describes the genuine bark from the Straits of Magellan. This occurs in the form of deeply-furrowed, curled-up fragments with an earthy fracture, exhibiting, when in small pieces, an internal reddish-brown coloration. When fresh it has a bitter and pungent taste and an agreeable odour, recalling both turpentine and cloves. The sun-dried bark yielded: water (at 110°), 13·713 per cent.; ash, 3·338 per cent.; soluble in ether, 3·841 per cent.; in alcohol, 6·465 per cent.; in water, 13·981 per cent.; ligneous matter, 49·200 per cent. An analysis of the ash is also given. The ethereal solution contains a peculiar essence, fatty compounds, resins, and waxy matter; the alcoholic extract contains reddish uncrystallizable resins. Citric acid was carefully looked for, but not found. The essence was isolated by distilling the bark with water, exhausting the distillate with petroleum, and distilling off the solvent. The crude oil, amounting to 0·6428 per cent. of the weight of the bark employed, is a mixture of several substances.

Winterene, $C_{15}H_{24}$, is the essential oil separated from this by fractional distillation. It passes over between 260° and 255°; sp. gr. at 13° = 0·93437. Index of refraction = 1·4931; sp. rotatory power, at 16° $[\alpha]_j$ = + 11·2. It is readily oxidized on exposure to the air, becoming yellow. The formula $C_{25}H_{40}$ was calculated from the ultimate analysis and vapour density, but the authors consider that the ready oxidizability of winterene and its analogy to similar essences points rather to the formula $C_{15}H_{24}$, which would place it in the group of sesquiterpenes, such as cedrene, cubebene, etc., the boiling points of which are between 250° and 268°.

Iodine dissolves in winterene producing a greenish-yellow coloration which changes to green after a time.

On adding picric acid containing a few drops of sulphuric acid to winterene, a yellowish-red, crystalline compound is formed.

Pure winterene is coloured green by a solution of bromine in chloroform, orange-red by a solution of chloral hydrate in sulphuric acid, rose to yellow by concentrated sulphuric acid or by sulphuric acid and chloroform, dirty-yellow by Fröhde's reagent and by ferric chloride and sulphuric acid, rose to violet by nitric acid.

The reactions of the essence after oxidation are also given.

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* *Gazzetta*, xviii., 527–529. Reprinted from the *Journ. Chem. Soc.*

The Pharmaceutical Journal.

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SATURDAY, JUNE 14, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

TRADE INTERESTS.

THE greatest difficulty members of any class have to contend with in considering their joint interests lies in the persistence of the class-bias which falsifies to their mental vision the facts they have to deal with. So incapable are men generally of going beyond their professional point of view that it is the greatest rarity to find an individual whose opinions are not thus in some measure warped. Doubtless this is a natural outcome of the universal law of self-preservation, and often tends notably to advance the welfare of the class and, consequently, of the individual. It is now, however, an established fact in biology that in proportion to the advance in development of human reason, dependence upon instinct is likely to lead us astray. That is to say, that though in the lower animals, where the natural instincts predominate, conduct may safely be ordered in accordance with those instincts, in man, who is capable of logically reasoning from cause to effect, the civilizing process has blunted the natural promptings for the most part and unfitted them as guides to action. Though thus rendered capable of becoming in great measure self-dependent, it unfortunately happens often that we allow our reasoning faculties to lie dormant in dealing with the actual problems of daily life. Consequently we find many who, though weaned from the ancestral dependence on nature, yet display great weakness in their entire reliance upon those in authority to assist them in times of trouble. They take it for granted that there is "some 'thing' or 'handful of things' which can be done" by those in office to smooth all obstacles in their path. As CARLYLE puts it, they assume that there is "some Act of Parliament, 'remedial measure,' or the like, which could be passed, whereby the social malady were fairly fronted, conquered and put an end to; so that, with your remedial measure in your pocket, you could then go on triumphant, and be troubled no farther." So pharmacists who find that the goddess of fortune does not respond with alacrity to their advances, straightway look around for other shoulders than their own on which to affix the blame. As a rule the Pharmaceutical Society, of which the grumblers may or may not be members, is the favoured recipient of the burden, and its Council is called upon to "do something" and to look after "trade interests."

But what are these "trade interests" that require looking after by others than the parties interested? It is somewhat difficult to ascertain, for, as the possessors of knowledge in pre-scientific times found it to their advantage to shroud their wisdom in mystery, so the propounders of the social problems involved in these "interests" seem determined to make them equally mysterious and to prevent any possibility of their solution by simply omitting to state their terms. They continue to grumble at "things in general," but it is always easier to criticize than to work, easier to call for reforms than to effect them, and it is, above all, easy to make vague assertions about matters of the details of which one is absolutely ignorant. We must, therefore, decline to entertain the complaints seriously until they are definitely formulated. There is little reason to doubt that many honestly believe they have grievances, but this belief may usually be found to rest upon the fact that they find it increasingly difficult, as the years advance, to hold their own against all business competitors without increasing the limited stock of scientific knowledge with which they started out. If this be a fault, with whom does the blame lie, if not with themselves? May we not fairly ask such men if they have striven continually to keep themselves to the front in their own proper sphere of activity?

It is a difficult matter to define "trade interests" for pharmacists as a class, as the interests of many are not those of all. But for every one it is safe to say that his first and chief interest is to have a thorough educational equipment before fully embarking upon business life. It has in some quarters become the fashion to assert that the entailment of a systematic course of education is a hindrance in the struggle with untrained dealers in drugs. Now this is too transparent a fallacy to be for a moment entertained. This education, certified by examination, is an undoubted positive advantage to all who possess it. Many there are, we know, who are too anxious to reap that which they have not sown, but is the fact that a man has received a scientific or a classical education any reason that he should eat the bread of idleness and expect to be helped throughout life by his more fortunate brothers? Rather is it a reason why he should bear a greater share of the world's burden as being better fitted to do so. Over and above a comprehensive training the pharmacist will find his "trade interests" consist in being let alone by meddlesome legislators, and in being free to advance his scientific culture so that in all knowledge pertaining to his art he shall ever be strung to full pitch. He must also cultivate his trading instincts so that none may buy a better article than he, or obtain it at a better price; also his originative power, so that he may improve in some respect upon what everyone else has done, and have something to sell that no one else has; and finally, his artistic faculties, so that nothing may leave his hands without a perfect finish. The idea that the profession and the trade of pharmacy are distinct and incompatible is incorrect, for they are closely interwoven, and the most successful man from a professional point of view will probably draw the largest returns from his business. But he must necessarily depend upon himself. This is the key to the whole situation. Others may show him the path to success, but he himself must tread it. The whole of the pharmacist's "trade interests" are based upon self-dependence, as our own trade history teaches us. It was the union of successful self-dependent men that made the Pharmaceutical Society what it was and now is, and it will be the larger union of such in the future that will assure the position of the individual pharmacist in the eyes of the public.

A meeting of the Members and Associates of the Pharmaceutical Society of Great Britain resident in Scotland will be held in the Society's House, 36, York Place, Edinburgh, on Wednesday, June 18, at noon, when the Chairman of the Executive will deliver an address and the result of the election of the executive will be declared.

* * *

On Wednesday the House of Commons went into Committee on the Pharmacy Act (Ireland, 1875) Amendment Bill, but reported progress directly afterwards. The committee stage was set down again for Thursday.

* * *

Mr. H. Peake, the President of the Dover Chemists' Association, informs us that it is intended to hold a meeting of the chemists of Dover and the neighbourhood on Friday, the 20th inst., at 5 p.m., in the Apollonion Hall, Dover, to meet and discuss with the President of the Pharmaceutical Society any matters of trade interest that may be brought forward.

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The members of the Dover Chemists' Association have arranged to give a complimentary supper on the 20th inst., to Mr. Alexander Bottle, the Vice-President of the Pharmaceutical Society, in celebration of the fiftieth anniversary of his business life.

* * *

We are requested to make known that on Tuesday next the 17th inst. a conference of the chemists and druggists of the east and north-east of London will be held at 3 p.m. in the Board Room of the City of London Hospital for Diseases of the Chest, Victoria Park, which has been kindly lent for the occasion. This conference has been organized by Mr. W. Harvey, the Divisional Secretary for North-East Bethnal Green; and the President of the Pharmaceutical Society has promised to be present at the meeting, and make some observations upon the laws relating to pharmacy and the sale of poisons. Other matters of interest to the trade will also be considered on this occasion, and a discussion will follow, in which any of those attending the meeting are invited to take part.

* * *

The meeting of the North Kensington Chemists' Association, of which notice was given last week, will be held at the Leinster Hotel, Ossington Street, Bayswater, and Mr. H. Long, the Divisional Secretary for that district, invites all local chemists to attend this meeting, at which, as we have already stated, the President of the Pharmaceutical Society will be present.

* * *

Various inquiries have lately reached us in reference to the International Pharmaceutical Congress that was expected to have been held this year in Milan, and we regret having been unable to do more in reply to them than say that so far as we were aware the matter was as much a mystery as ever. Our readers will perhaps remember that the postponement of the Milan Congress to the present year was followed by the appointment of a committee of organization, with a president and secretaries, to carry out the requisite arrangements, but that beyond the receipt some months ago of a circular intimating that intending visitors might send in applications for registration as members of the Congress, together with their subscriptions, no further information has been received as to the progress that has been made. We understand that some who contemplated attending the Congress, and have forwarded their subscription and application for membership, are anxious to know whether there is any reason for adapting their arrangements to the contingency of the Congress taking place. We are now enabled to state that a letter has been received from Dr. Arturo Castoldi, one of the secretaries of the committee of organization, in which he announces that after consideration of the matter the Lombard Association of Chemistry and Pharmacy has come to the conclusion that it will be impossible to carry out in a suitable manner the project of holding an International Congress at Milan. The reason assigned for this is the unfavourable effect which recent legislation has exercised upon the position and prospects of pharmacists in Italy.

* * *

A recent decision by the United States Supreme Court, on a point relating to the sale of liquors in original packages, is referred to by the *Western Druggist* as having a much wider application than to the liquor laws alone and being likely to impair the efficiency of the present legislation in the different States as to the practice of pharmacy and the sale of poisons. The decision was in respect to a seizure of kegs and cases of beer that had been introduced into Iowa State, where a prohibitory liquor law is in force, and offered for sale in original packages. The seizure was objected to as being in violation of the federal statute regulating commerce between the States, and the objection was held to be good by the local court, but this decision was reversed by the Supreme Court of Iowa. The United States Supreme Court has since overruled the Iowa court's decision and decided that the transportation of liquor from one State to another is a matter of inter-state commerce which Congress alone can regulate, and that the right to transport an article of commerce from one State to another includes, by necessary implication, the right of the consignee to sell it in unbroken packages at the place where the transportation terminates. If this may be done in respect to beer or whisky, our contemporary argues it may be done in respect to any kind of medicine, proprietary or otherwise, and any person could become an agent for packeted medicines or poisons if they were only imported from another State.

Transactions of the Pharmaceutical Society.

ELECTION OF EXECUTIVE OF THE NORTH BRITISH BRANCH.

The following names of persons eligible and willing for election are included in the voting paper that has been sent out to Members and Associates resident in Scotland:—

*1. Boa, Peter, 119, George Street, Edinburgh.
2. Coats, John Thomson, 91, Broughton Street, Edinburgh.
3. Coull, George, 17, Smith's Place, Leith Walk, Edinburgh.
4. Davison, Thomas, 338, St. Vincent Street, Glasgow.
5. Ewing, James Laidlaw, 52, North Bridge, Edinburgh.
*6. Fisher, John Hutchison, 66, High Street, Dunfermline.
*7. Frazer, Daniel, 127, Buchanan Street, Glasgow.
*8. Gibson, Adam, Thistle Street Lane, East, Edinburgh.
9. Gilmour, David, 40, Bridge Street, Dunfermline.
*10. Gilmour, William, 11, Elm Row, Edinburgh.
*11. Hardie, James Millar, 68, High Street, Dundee.
12. Johnston, John, 45, Union Street, Aberdeen.
13. Kermath, William Ramsay, 1, North Bell Street, St. Andrews.
*14. Kerr, Charles, 56, Nethergate, Dundee.
*15. Kinninmont, Alexander, 69, South Portland Street, Glasgow.
*16. Lawrence, Samuel, 101, George Street, Oban.
*17. Maben, Thomas, 5, Oliver Place, Hawick.
*18. M'Adam, Robert, 34, Virginia Street, Glasgow.
*19. Mackenzie, James, 45, Forrest Road, Edinburgh.
*20. Nesbit, John, 162, High Street, Portobello.
*21. Paterson, James, 15, Regent Quay, Aberdeen.
*22. Stephenson, John Bertram, 48, Frederick Street, Edinburgh.
*23. Strachan, Alexander, 138, Rosemount Place, Aberdeen.
*24. Thompson, Thomas, 35, George Street, Edinburgh.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

On Wednesday, the 4th instant, the Council of this Society met at No. 11, Harcourt Street, Dublin, at 3 o'clock p.m.

The President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President, Mr. Wells, Professor Tichborne, Dr. Burnes, Messrs. Doran, Merrin, Beggs, Hodgson (Treasurer), Simpson and Hayes.

A report from the Law Committee was discussed and adopted and resolutions passed thereon.

On the motion of Mr. Merrin, seconded by Dr. Burnes, licences were sealed for the following gentlemen who had passed the April final examination:—

Messrs. Charles L. Crosbie, John J. Curtin, Edwin L. Gilbert, Edward James O'Donnell, Charles O'Hagan, and James Patrick Milwood.

Letters were read from Messrs. Samuel Gibson and Thomas McDowell of Belfast, requesting the Council to withdraw the prosecutions against them for illegal dispensing.

The Vice-President said that at the time when the two other cases were tried, one being for illegal compounding and the other for the illegal sale of poisons, it was agreed that if an appeal should go against them the result of it was to decide the present cases. These gentlemen now asked to have the prosecutions against them withdrawn, but they did not say anything about paying the costs.

Dr. Burnes: Let us tell them that we will not proceed further against them if they pay the fines and costs and publish statements in the newspapers that they will not infringe the law again.

Mr. Hayes: I would not ask for so heavy a punishment as that. If they pay the £5 penalty and costs we should proceed no further against them.

The Vice-President: We have still to go down and fight the other two cases.

Mr. Hodgson: Mr. Gibson is very much bound up with the gentlemen who are promoting the Amendment Bill.

The Vice-President: He is their treasurer.

On the motion of Mr. Hodgson, seconded by Dr. Burnes, the following resolution was passed:—

> "That the prosecution against Mr. Samuel Gibson, Belfast, be withdrawn upon his paying the fine and all expenses up to the present time, and writing a letter undertaking in future not to compound prescriptions, which letter is to be written in accordance with the views of our legal adviser."

On the motion of Mr. Doran, seconded by Mr. Simpson, a resolution in similar terms was passed with reference to the case of Mr. Thomas McDowell, of Belfast.

The following letter from the late Earl of Milltown was read:—

"*May* 27, 1890.

"Sir,—I have to acknowledge the receipt of your letter and enclosed Bill, which shall have my best attention on my return to town, when should you desire it I shall be happy to see a deputation from your Society.

"Your obedient servant,
"Milltown.

"The Registrar, Pharmaceutical Society of Ireland."

The President: Gentlemen, you have all heard with great regret of the death of the Earl of Milltown. We have lost a staunch friend; and the loss is a very serious one to us at the present juncture.

Dr. Burnes moved that the letter of the late Earl of Milltown be entered on the minutes.

The Vice-President seconded the motion, which was unanimously agreed to.

Letters were received from Messrs. R. W. Carter and T. M. O'Connor, enclosing letters from Mr. Webb, M.P., and Mr. Carroll, M.P., in relation to the Amendment Bill.

The President: Mr. Webb, M.P., went most fully with us into every detail connected with the Bill.

The Registrar was directed to thank Messrs. Carter and O'Connor for their communications.

A letter was read from Dr. John Muter, lecturer on Chemistry in the South London School of Pharmacy (Limited), stating that he had been instructed by the Board of Directors of that institution to apply to the Council to place it on the list of schools recognized by the Society. The writer stated that it was the oldest school in Great Britain next to that of the Pharmaceutical Society of Great Britain.

On the motion of Dr. Burnes, seconded by Mr. Merrin, the consideration of Dr. Muter's letter was deferred until the next meeting of the Council.

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* Those marked with an asterisk are members of the retiring Executive, but are eligible for re-election.

A letter was read from Mr. P. J. Devlin, licentiate, expressing his desire to become a member of the Society and enclosing the subscription of £1 1*s*. Mr. Devlin's letter stated—"I thoroughly appreciate the action of the Council and congratulate them on their successful prosecutions in Belfast. I think an appeal should be made to the licentiates and members for subscriptions of £1 each so as to enable the Council to carry on further prosecutions. I shall subscribe with pleasure if called on."

A letter from Mr. James Kiloh, licentiate, Cork, stated that he had also decided to become a member of the Society and enclosed £1 1*s*.

A letter from Mr. W. C. Carden, licentiate, announced that he had been appointed apothecary to the Waterford District Lunatic Asylum; and suggested that a list of the licentiates of the Society who held public appointments should be printed in the Calendar.

On the motion of Mr. Simpson seconded by Mr. Hayes the suggestion of Mr. Carden was adopted.

A letter, dated May 13, from Mr. Frederick B. Kilmer, New Brunswick, stated that registration would be granted to licentiates of the Society in the following states of America:—Alabama, Arkansas, North and South Dakota, Indiana, Georgia, Indian Territory, Maryland (except Baltimore), Washington, Mississippi, Nevada, Oregon, Texas, Montana, New Mexico, Tennessee, Utah, Vermont and Wyoming.

On the motion of Dr. Burnes seconded by Mr. Merrin the thanks of the Council were voted to Mr. Kilmer for his letter.

A letter was read from Mr. George Brown, M.P.S., with reference to the London City School.

The Vice-President remarked that as the letter contained charges against the examinations of the Society it might be well to refer it to the Law Committee in order that they might report upon it.

Mr. Hayes thought the letter ought to be treated with contempt.

The Vice-President said that Mr. Brown himself had to work very hard to pass the Society's examinations, and he did not find it so very easy to do so. The numbers of candidates that were rejected proved either that some of the men who came up were a very bad lot, or that the examinations were a fair test of qualifications.

The letter was ordered to be marked read.

A letter was read from Mr. William C. Harvey, asking whether the Council could accept from him a certificate of practical pharmacy from the qualified manager of a company.

The President: This manager is a pharmaceutical chemist, but the other members of the firm are not.

The Vice-President: According to our regulations we cannot receive this certificate.

The Registrar was directed to reply to Mr. Harvey stating that his application could not be entertained.

A letter was read from Mr. John Ewing, enclosing a preliminary certificate for acceptance.

On the motion of Dr. Burnes, seconded by the Vice-President, the certificate was accepted.

A letter was read from Mr. W. H. B. Creagh, asking to be granted the licence.

The Registrar was directed to write to Mr. Creagh, stating that the Council had no power to accede to his request.

The following gentlemen were put in nomination for membership of the Society:—Mr. Alexander Ferguson Allen, the Adelaide Hospital, Dublin; Mr. Peter J. Devlin, Thurles; Mr. James Kiloh, Cork; Mr. Francis Joseph Neade, Rathgar, Dublin; Mr. Patrick Scanlon Pearse, Limerick; Mr. J. W. Williams, Fermoy.

Some other business having been disposed of, the Council adjourned.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

The fourth annual dinner of the above Association took place on Friday evening, June 6, at Booth's Restaurant.

Mr. W. D. Savage, J.P. (President of the Association), occupied the chair, and was supported by the Mayor of Brighton, Dr. Newsholme, Dr. Goode and about twenty-five of the local chemists.

After dinner Mr. Marshall Leigh read a letter from Mr. Alderman Cox, J.P., regretting his inability to be present, and conveying an invitation to the members of the Association to join him in a trip up the river Arun in his yacht sometime in June. The invitation was received with acclamation. Other letters were read from Messrs. Carteighe, Aston, Gulliver and Smith.

After the loyal toasts, the Chairman expressed the pleasure he felt in once more meeting the chemists of the town. He regretted the absence of Mr. Alderman Cox, who was down on the toast list to propose "Prosperity to the town of Brighton," but they were fortunate in having with them the Honorary Secretary, Mr. Marshall Leigh, who would propose the toast.

Mr. Marshall Leigh, in proposing the toast, referred to the fact that Brighton was a very prosperous town, whilst it was the healthiest and most beautiful in England. He remarked upon the vast changes which had been wrought since 1783, when George, Prince of Wales, first visited Brighton, and said that within the last thirty years there had been spent over a million pounds in improving and beautifying the town. Amongst other things, the Town Council had perfected a system of drainage which was as good or better than that used in any other town in the country; it had also acquired the waterworks, which gave a constant supply of first rate water as well as a revenue that materially reduced the rates. Sea defences had been erected, the once royal palace had been restored to its former grotesque grandeur, and the royal stables converted into a fine assembly room; the park extending over 72 acres had also been acquired. There was also no sign that the Council was resting, for it had just decided upon the destruction of one of the remaining slums in the town, and the electric lighting scheme was also practically settled. In conclusion the speaker coupled the name of the Mayor (Mr. Alderman Manwaring) with the toast.

The Mayor, who received a cordial reception on rising to respond, remarked that he had been connected with the Town Council since 1872, and though during that time he had been well abused, he had always endeavoured to do good. He was happy to say that he had been instrumental in spending a quarter of a million in improvements, and that not a farthing had been wasted. As a consequence of the improvements the value of property had increased and the rates had been reduced. The Town Council could either make or mar the town, therefore it was advisable that they should send proper men to the Council Chamber to carry out their wishes.

Mr. E. Histed next proposed "The Medical Profession." He claimed that the profession in Brighton was second to none in the kingdom, and continuing he referred to the work done by Mr. Newsholme (Medical Officer of Health) and Dr. Goode.

Dr. Goode, in reply, stated that the healthy condition of the town did not depend so much on the medical profession as on the Town Council, and especially the Medical Officer of Health. He was pleased to see that several objectionable streets were to be swept away.

Dr. Newsholme next rose to propose "The Pharmaceutical Society." As an outsider, he noticed that there was only one gateway for a chemist to qualify himself, and that was through the Pharmaceutical Society,—whereas in the medical profession, if an aspirant was too corpulent for one gateway, there was another opened to him. The objects of the Pharmaceutical Society were threefold. Firstly it had the advancement of pharmacy and chemistry in view, secondly, the promotion of a uniform system of education for chemists, and thirdly, the protection of chemists from pirates. By the first of these objects the Pharmaceutical Society distinctly encourages original research; there are still many substances about whose composition and action little was known. New drugs come into being, and older ones were never thoroughly examined. Physicians were fond of prescribing drugs about which they knew very little, and would therefore be very grateful for any knowledge chemists could throw on drugs, new or old. The second object of the Society was a uniform system of education. The examinations were of a most stringent character, and only competent men could pass them. Thus the system was not only in the interest of chemists but in that of the public. With regard to the protection of chemists he had heard that the Society did not do enough in that direction, but it did good. The competition was very difficult to deal with. There were the dispensing doctors, who gave advice gratis and a bottle of medicine for sixpence; and then it found medical men retailing toothbrushes, etc. The remedy for all this was that they should cooperate and arrange that each should not encroach upon the other. Chemists should give up prescribing, and doctors refuse to dispense. He thought, too, that hospitals were often resorted to by patients perfectly able to pay for medical treatment, and he hoped soon to see a reform. He next mentioned the Benevolent Fund, and commended it to all those present.

Mr. Gwatkin (Local Secretary) in the course of his reply alluded to the fact that practically the whole of the old Council had been re-elected, thus showing that it still possessed the confidence of the trade, notwithstanding that there were dissenting parties. He congratulated Mr. Marshall Leigh on being re-elected and occupying a higher position on the list.

Mr. Jago, F.C.S., gave "The Brighton Association of Pharmacy." He pointed out that the work of the Association was to encourage the study of chemical substances used in pharmacy, and with regard to the trade he would like the Association to see if it could arrange that chemists' shops could be closed one evening a week.

Mr. W. D. Savage, J.P., responded, and said that the Association brought them together at least once a year, and that was a very good thing.

Other toasts followed, and during the evening several songs and recitations were rendered by members of the company.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second botanical excursion of the season took place on the evening of Wednesday, May 28, and was attended by thirty-one members. The company started from the Caledonian Station at 8.35 for Colinton, and walked back through Colinton Dell and round by Craiglockhart, reaching town again about 10.45. The pleasant ramble was thoroughly enjoyed and a good deal of practical work done; but it was found that many of the most interesting plants were not sufficiently advanced for adequate study. Another visit a fortnight later would be more profitable.

The next excursion takes place on Wednesday, June 25, to Blackford Hill. The company to meet at Blackford Hill Station at 9 p.m.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, May 15, Dr. W. J. Russell, F.R.S., President, in the Chair, when the following papers were read:—

Diethylphosphorous Acid. By T. E. Thorpe, F.R.S., and Barker North, Associate of the Normal School of Science.—The authors describe the mode of preparing this compound and its properties. It is obtained by adding alcohol, drop by drop, to phosphorous oxide contained in a vessel surrounded with ice and salt. It is a colourless, mobile liquid, possessing a peculiar penetrating alliaceous smell. Its vapour is poisonous, and even small quantities produce headache and nausea. It boils at 184°–185°, and has the relative density 1·0749 at $\frac{15{\cdot}5^\circ}{4}$. It interacts with water, forming alcohol and phosphorous acid, and is converted by bromine into ethyl bromide and metaphosphoric acid.

The Homonucleal Trichloronaphthalenes. By Henry E. Armstrong and W. P. Wynne.

The Ten Isomeric Dichloronaphthalenes and the Sulphonic Acids and Trichloronaphthalenes derived Therefrom. By Henry E. Armstrong and W. P. Wynne.

The Chlorides of Naphthalene and its Derivatives, and the Manner in which they are Decomposed by Alkalis. By Henry E. Armstrong and W. P. Wynne.

Isomeric Change in the Naphthalene Series. No. 6. The Influence of Position in Determining the Nature of the Isomeric Change in the case of the mono- and di-chloronaphthalenesulphonic Acids. By Henry E. Armstrong and W. P. Wynne.

A Third Naphthaquinone. By R. Meldola, F.R.S., and F. Hughes.

The Relative Antiseptic Powers of Isomeric Organic Compound. By Thos. Carnelley D.Sc. Aberdeen, and W. Frew, Dundee.—The authors have determined the relative antiseptic powers, in reference to ordinary aerial micro-organisms, of a number of isomeric organic compounds, more particularly di-derivatives of benzene, with the object of investigating the influence of atomic arrangement on this property. A table of results is given which indicate that, so far as the compounds which have been tried are concerned (and with the exception of the hydroxybenzoic acids), para-compounds are more antiseptic than the corresponding ortho- and meta-compounds. On the whole compounds containing the carboxyl-group are comparatively weak, while phenols and nitro-compounds are relatively strong antiseptics; paranitrophenol being, with the exception of α-naphthol, the most powerful of any of the compounds tried. These results entirely accord with those of Walcott Gibbs and Hare, who have recently investigated the poisonous action of di-derivatives of benzene on dogs.

Note on the Preparation of Pyrocatechol. By W. H. Perkin, Jun., Ph.D.—The very high price of pyrocatechol renders it desirable to discover improved methods of preparing it; the author has, therefore, studied the action of iodhydric acid on guaiacol, which is easily procured at a moderate cost. He finds that an almost theoretical yield of pyrocatechol may be obtained by boiling guaiacol with a fuming solution of hydrogen iodide; details are given in the paper.

Benedikt's Acetyl Values (Second notice). By J. Lewkowitsch, Ph.D.—The results quite recently brought forward by the author (*Pharm. Journ.*, May 31, p. 990) were so unexpected that it was determined to verify them by examining other fatty acids; capric, lauric and cerotic acids were therefore acetylated in the manner previously stated. The approximate purity of the acids used was ascertained by determining the quantity of caustic potash required for their saturation. *Capric Acid.*—The acid value was found to be 318·65, while theory requires 326·2. The acetylated product gave an acid value of 176·4, and a saponification value of 350·4; consequently an acetyl value = 174. *Lauric Acid.*—The acid value found was 273·02, the theoretical value being 280·5. The acetylated acid gave an acid value = 161·5, a saponification value = 293·99; its acetyl value, therefore, was 132·49. *Cerotic Acid.*—The acid value found was 128·4; theory indicates for $C_{26}H_{52}O_2$ 141·6 (or for $C_{27}H_{54}O_2$ 136·8). The acetylated cerotic acid gave an acid value = 73·87, a saponification value = 142·1; so that the acetyl value was 68·23. From the approximate coincidence of the acetyl value of capric acid (174) with the acid value of the acetylated acid (176·4), it might be inferred that the acetylated capric acid contains one acetyl-group, but an acid of the formula $C_{10}H_{19}O_2{\cdot}C_2H_3O$ has a theoretical acid value of 262. Similarly the value for a mono-acetyl derivative of lauric acid would be 231, and that for a mono-acetyl derivative of cerotic acid 128 (resp. 124). (The same formulæ would apply to mixed anhydrides of acetic acid and capric acid, etc.). It was easy to decide whether the action of acetic anhydride on fatty acids affected the COOH group of the latter, for in that case an alcohol of the $CnHn+_2O$ series ought not to become acetylated. The author experimented on cetyl alcohol, which was treated with acetic anhydride. The acid value of the resulting substance was—as is to be expected—*nil*; the saponification value found was 192·65. As a substance of the formula $C_{16}H_{31}O{\cdot}C_2H_3O$ has theoretically a saponification value = 198, it is evident that simply etherization of the cetyl alcohol has taken place. It was therefore to be supposed as the mixed anhydrides of the higher fatty acids and acetic acid could not have been formed, that by the interaction of acetic anhydride and the higher fatty acid the anhydrides of the latter had been produced—taking palmitic acid as an example—according to the equation:—

$$2C_{16}H_{31}O{\cdot}OH + (C_2H_3O)_2O = (C_{16}H_{31}O)_2O + 2C_2H_3O{\cdot}OH.$$

In that case the quantities of caustic potash required by the equation—

$$(C_{16}H_{31}O)_2O + 2KOH = 2C_{16}H_{31}O{\cdot}OK + H_2O$$

ought to agree with the saponification values found. The following table gives the quantities of caustic potash required by theory, in milligrams, compared with the quantities actually used in the above experiments:—

	Mol. wt.	Theory.	Expt.
Capric anhydride $(C_{10}H_{19}O)_2O$	326	344	350·4
Lauric anhydride $(C_{12}H_{23}O)_2O$	242	294	293·99
Palmitic anhydride $(C_{16}H_{31}O)_2O$	494	227	226·13
Stearic anhydride $(C_{18}H_{35}O)_2O$	550	204	221·18
Cerotic anhydride $(C_{26}H_{51}O)_2O$	774	145	142
Cerotic anhydride $(C_{27}H_{53}O)_2O$	818	137	
Oleic anhydride $(C_{18}H_{33}O)_2O$	546	205·4	242

Considering the approximate purity of the acids used, the theoretical values agree very well with the experimental values; and it may be pointed out that with pure material it would be easy by this method to determine which is the formula of cerotic acid. In the light of this explanation, the "acid values" found for the products of the interaction of acetic anhydride and fatty acids lose every quantitative meaning; these values have only been found as the "acetylated" acids were dissolved in cold absolute alcohol for titration with potash, which at once hydrolyzed the anhydrides; the hydrolysis ceasing only when a limit is reached which depends on the quantity of alcohol present, and the nature and dilution of the standard solution, in some experiments half normal soda, in others decinormal potash. Had the substances been shaken up with water (hot water does not decompose them), in the first drop of potash falling into the mixture the pink colour would have appeared at once, or very soon when the limit for the system of substances was reached. It is hardly necessary to state that experiments carried out in this direction fully bear out the correctness of the author's conclusions. Thus the interaction of KOH or NaOH and the anhydrides in aqueous solution affords an elegant illustration of that class of actions which require a measurable time for their completion. The anhydrides of the higher fatty acids are now within easy reach, as they can be prepared in a very short time by means of acetic anhydride.

ROYAL INSTITUTION.

THE SEARCH FOR COAL IN THE SOUTH OF ENGLAND.

Professor W. Boyd Dawkins gave a lecture on this subject on Friday, the 6th inst. So far back as the year 1858 Mr. Goodwin Austen had, in a lecture given before the Royal Institution, shown the probability of the existence of coal beds in the southern and south-eastern counties, a conclusion which he had also indicated in a paper read three years previously before the Geological Society. In order to understand how Mr. Goodwin Austen had arrived at this conclusion, now proved to be correct, it was necessary to consider the origin and the manner of formation of coal beds. In the first place there can be no doubt as to the formation of a seam of coal from former forests and land plants, some of which still remain in the coal in a fossil condition; of these the lepidodendron (a kind of giant club moss) and calamites (resembling giant mares'-tails) are examples. Next we find that each seam of coal is separated from others above or below it by other strata, which were originally banks of sand or mud and now form the coal measure rocks. The only explanation of this is that the plants forming the seam of coal grew on the surface of dry land, that after an accumulation of these had taken place a depression occurred and the whole surface became covered with water. Mudbanks or sandbanks must then have formed over the submerged forest, and when these had reached the surface and formed a vast delta fresh growths must have taken place and the process been repeated as many times as there are separate coal-seams. The fossils in the strata formed from these mudbanks show that some of them were deposited from salt water and some from fresh, which leads to the conclusion that the site of these deposits must at one time have formed the delta of a mighty river which drained some vast continent. Such a continent may probably have existed to the north and north-west of what are now the British Islands. The fact that the seams of coal are all parallel to each other, although not horizontal, being all regularly inclined at the same angle, leads to the inference that they originally grew on horizontal tracts near the water-line, and that they subsequently became displaced from their horizontal position. All these considerations point to the conclusion that the space now occupied by the British Islands (except the north of Scotland, North Wales and Cornwall), and the tract of country eastwards to Westphalia, once formed a huge low-lying area where the processes above described went on for a very long period, until an enormous thickness of the coal-bearing strata had accumulated (the thickness of the English coal-measures is seven or eight thousand feet). At the end of this epoch, the carboniferous age, this vast alluvial area must have been disturbed and thrown into folds like huge waves, thus causing the strata to slope at their present angle. We can then easily conceive that the anti-clines or crests of the waves would be gradually eroded by the action of water, etc., and the synclines or hollows would be filled up with the later deposits which form the newer rocks. The remainder of the alluvial would thus form isolated coal-fields, isolated both by the erosion of the upper parts, and by the covering up of the lower with newer rocks. A consideration of the isolated coalields in the southern parts of this country leads to the conclusion that the folds into which the originally flat alluvial surface was thrown run in a direction nearly east and west. There is probably a fold running from the Somersetshire coal-fields eastwards to where the coal-fields reappear in northern France and Westphalia. The Somersetshire coal-fields can be traced southwards under the newer rocks as far as the Mendip hills, which form a barrier in that direction, beyond which no coal-bearing strata have been found; the faults in this locality are of very great magnitude and point to tremendous dislocations. Eastwards they also plunge under the newer rocks and have been traced in that direction as far as Bath. On the other side the coal strata have been traced over a considerable area in Northern France in a line pointing directly towards the North Downs. A parallel fold probably runs from the Welsh coal-fields through Oxfordshire, where coal-measure sandstones and shales were found near Witney at a depth of about 1000 feet, to Harwich, where also carboniferous rocks were met with in a boring. In the area of London a good many borings have been made, and the older rocks are generally struck at depths between 800 and 1100 feet. On the north these are Silurian, and to the south the old red sandstones and Devonian, which are more recent than the Silurian, though both are older than the carboniferous. The dip of these strata is very great towards the south, and therefore we may expect that the coal-measures will come in a little further to the south. In the neighbourhood of London, therefore, the coal-measures should be looked for to the south rather than the north, although further to the north, past the ridge of the fold, they would probably re-appear. Between the years 1872 and 1876 an experimental boring was made at Battle, but unfortunately, after reaching a depth of over 1900 feet, the tube broke and the work was discontinued; they had then got through about 1700 feet of secondary rocks, and calculated that the thickness of this formation could not be much less than 2000 feet in that locality. This was an indication of the advisability of going further north, where the layer of secondary rocks would become thinner as it approached the ridge of the North Downs. The Westphalian coal-fields had been traced through Belgium and Northern France to within 30 miles of Calais, and in Calais itself coal-measure sandstones and shales had been struck at about 1100 feet. Putting together all these considerations Dover was selected as the most likely place in which to strike at a reasonable depth the coal measures supposed to run from the Somersetshire to the Westphalian coal-fields. With the help of Sir Edward Watkin and the promoters of the Channel tunnel a boring was undertaken near the Shakespeare cliff, and after piercing 500 feet of cretaceous and 660 feet of oolitic rock they came upon the water-worn surface of the coal-measures; in another twenty feet they struck a seam of coal which appeared to be 8½ feet in thickness. The depth at which this seam was found, about 1200 feet, is a very workable one; seams are worked in this country at 2900 feet, and at Charleroi in Belgium at 3400 feet. The coal measures struck at Dover may be continuous for 100 miles or more, or may be an isolated bit broken up by faults, like the Hardinghen coal-fields on the other side of the channel; this remains to be proved, but the coal obtained at Dover does not present the shattered appearance of that obtained from the Hardinghen fields, which have been broken by faults to a very great extent. The value of the discovery may be inferred from the fact that in the Somersetshire coal-fields there are 55 seams with an aggregate thickness of 98 feet, and in Northern France the annual output of coal reaches seven million tons.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual general meeting of the above Association was held at 103, Great Russell Street, on May 1, when the following report was submitted by the Council, and read by the Hon. Sec., Mr. W. Lloyd Williams.

Annual Report of the Chemists' Assistants' Association.

The Council herewith submits to the members the thirteenth annual report. The Association numbers 164 members of whom 47 have been enrolled during the session. There are 44 patrons, an increase of one. The Council regrets to have to record the death of one of the patrons of the Association, Mr. T. O. Sandell. During the past session no less than 25 notes and papers have been read at the Association's meetings, and two discussions upon questions of the day were opened and engaged in by members of the Association; one of these necessitated an extra evening meeting. Of the papers the great majority have been published *in extenso* in the *Pharmaceutical Journal*, and abstracts of all have appeared in the various trade journals. The attendance at the ordinary meetings has not been progressive in point of numbers, the prevailing epidemic in the early part of the second half of the session is accountable to a great extent for this. A distinct feature of the session has been the increasing popularity of the social meetings generally. The Conversazione at the Portman Rooms on November 14 was a conspicuous success, and the Annual Dinner at the Holborn Restaurant on March 6, under the presidency of A. P. Luff, Esq., M.D., etc., brought together far more supporters of the Association than have ever previously been attracted by even this popular meeting; whilst the musical evenings at the Rooms of the Association have been more highly appreciated than ever. An invitation by Mr. F. J. Hanbury, F.L.S., to spend a botanical and social evening at his house at Clapton on January 30, was unavoidably postponed, and a special meeting of the Association will be held on May 8, to enable the members to accept Mr. Hanbury's hospitality. The Council regrets extremely to have to report that after much careful deliberation they are unable to award the silver medals of the Association and Messrs. Burroughs and Wellcome's valuable money prizes. This is the more regrettable as this year is the first occasion upon which essays and research work were capable of being judged separately upon their merits; at the same time it is felt that the quality of the papers must be of a high character to justify awards which are no less valuable than they are honourable. The accompanying balance sheet indicates the satisfactory financial condition of the Association, and in conclusion the Council congratulates the Association upon its steady progress and another successful session.

The President moved and the Vice-President (Mr. W. J. I. Philp) seconded the adoption of the report, which was agreed to after a lengthy discussion, three members dissenting.

The Treasurer (Mr. C. J. Strother) then read the balance sheet, the adoption of which was unanimously agreed to upon the motion of the President, Mr. W. Lloyd Williams seconding the proposition.

The balance sheet showed that the receipts during the year had amounted to £137 14*s.* 3*d.*, which added to £29 3*s.* 4*d.* balance in hand at the commencement of the year, made a total of £166 17*s.* 10*d.* The receipts included £23 2*s.* 0*d.* subscriptions from patrons, £41 subscriptions from members, and £30 3*s.* 6*d.* donations. On the other side the expenditure had been £135 14*s.* 6*d.*, leaving a balance in hand of £31 3*s.* 1*d.*

The Scrutineers, Messrs. W. Chattaway and A. L. Anderson, reported that 89 voting papers had been received, of which two were informal. The voting was as follows:—Ellwood, T. A., 78; Richards, E., 78; Williams, W. Lloyd, 76; Millard, E. J., 72; Strother, C. J., 72; Philp, W. J. I., 71; Rogers, F. Ashley, 71; Rogers, Frank A., 64; Stark, A. C., 59; Umney, J. C., 55; Layman, E., 52; Taylor, A. S., 48; Fell, J. C., 46; Davis, F., 43.

The above form the Council.

Goodman, F. W., 40; Burnett, E. E., 37; Pickering, C. E., 34; Whitfield, Geo., 33; Secoombe, C. W., 29; Morris, W. A., 24; Gaskin, J. H., 23.

A vote of thanks was proposed to the Scrutineers by Mr. Strother and seconded by Mr. W. Lloyd Williams, and the President then read his Valedictory Address.

VALEDICTORY ADDRESS.

Gentlemen,—The work that devolved upon me when your Council thought well to choose me as President of this Association, must now come to an end. The duties I have had to perform have been rendered light and pleasant by the readiness with which every officer of the Association afforded me his help and advice, and the hearty sympathy I have at all times received from yourselves.

The session has again proved a successful one, as the report and balance sheet presented this evening show. Though the Association has passed through difficulties and drawbacks, which probably accounts for the slightly diminished numerical strength, yet it proves its tenacity when it comes through the ordeal, scarcely affected and as vigorous as ever. The first half session witnessed great inconvenience in regard to the room we were compelled to occupy during the renovation of the ordinary place of meeting, a room far too small and not very comfortable. The second half session was robbed of its promising success by the influenza epidemic, which, if it laid not prostrate the members of the Association, attacked outsiders with such pertinacity that the chemist's aid was called into requisition; thus, more work devolving upon the chemists' assistants, our attendance had to slightly suffer numerically.

A special feature in connection with the papers read before the Association this year has been those of an educational nature, which are exceedingly valuable in being concise and simple epigraphs of large and difficult subjects; for instance, we have had lucidly brought before us photomicrography, blow-pipe analysis, crystallography and the polariscope.

The discussions on the papers have been well entered into by our members.

Joining in discussion or reading a short paper may be useful to yourselves and also to the Association, but even that is insufficient to be considered a manifestation of careful study of scientific subjects, or even an application towards the advancement of pharmacy generally. What would be a far greater benefit to yourselves and to the Association would be the persistent following out of some special line of work, in form of research or investigation, allowing diversion to other subjects to form a mental recreation, whereby thoughts may be recouped, returning with increased energy to the subject occupying attention. Johnson says "Those who attain any excellence commonly spend life in the common pursuit, for excellence is not often gained on easier terms." Another method of acquiring useful knowledge and making yourselves conversant with the progress of pharmacy is to keep a special note-book, in which to enter an account of any new preparation, reserving the page to add anything that may further appear in literature respecting it, or to write down aught you may yourselves observe or discover as to its merits, composition or special features. This method of obtaining knowledge is, I know, adopted by some of our members.

If these suggestions are only followed out by our members generally we shall not at the end of future sessions have to deplore that competitions for prizes are of so low merit that the Council cannot award the medals and prizes.

I would now ask, what proportion do our numbers bear to the number of chemists' assistants engaged in London and suburbs, and who are thus eligible to membership? I am convinced it is a very small fraction. Why should we hold such an isolated position? I would suggest for the consideration of a future Council the advisability of sending to every chemist in business in London a circular drawing attention to the Association, its objects and uses, asking them to lay it before their assistants and apprentices, using their efforts to get them to join. Some of you may say, "But surely every chemist knows of the existence of the Association." Yes, perhaps they may, although I doubt it myself; but every assistant does not know of its objects, or the advantages it offers him, or how to set about to become a member. This fact has come prominently before me frequently during the past year. Some members may object to the method I suggest, considering it a form of canvassing that should not be undertaken, being beneath the dignity of the Association. My reply is, if we have anything worth possessing, or know of anything worth knowing, the best form of benevolence is to share it with others.

Another method of increasing the number of members, devolves not upon the Council only, but upon each of us individually, that is by taking a personal interest in the welfare of the Association, and in each other, by attending the meetings as frequently as possible, and by using our own endeavours to get others to join. "It is plurality that constitutes association, and it is individuality that builds it." On the enthusiasm exerted by ourselves the success of future years depends. An Executive is chosen, but for the administration of the laws, and for the general business of a Society, and not as a scapegoat for each member.

Secure to the Association a firm and definite policy, then maintain and uphold it. I do not refer to a political policy. I would repeat what your President of two years ago said: "Do not allow the Association to become a political organization, but a policy we must have, and then zealously defend it. It may be the perfecting of ourselves and the happiness of others," the aiming at which is a duty incumbent upon each.

Gentlemen, in conclusion I must thank you for the help rendered me and my *confrères* on the Council during the past session, and further impress upon you the necessity of continued support to the Council you have newly elected. If you wish the Association to continue its progress of usefulness, it will require your vigorous work on its behalf, and you will in future years be able to look with pride upon a thriving institution that you helped to build. "Nature knows no pause in progress and development, and attaches her curse on all inaction."

At the conclusion of the President's address a vote of thanks was proposed to him by Mr. E. J. Millard, and seconded by Mr. T. S. Dymond, for the able manner in which he had filled the presidential chair during his year of office.

Mr. Ellwood suitably acknowledged the compliment, and the proceedings then terminated.

At the first Council meeting the following officers were elected for the session 1890-1891:—

President, Mr. A. C. Stark; Vice-Presidents, Messrs. W. J. I. Philp and W. Lloyd Williams; Honorary Secretaries, Messrs. E. Richards and C. W. Secoombe; Treasurer, Mr. C. J. Strother.

Parliamentary and Law Proceedings.

Illegal Sale of Laudanum.

At the Bradford West Riding Court, on Monday, before Colonel Hirst, C.B., Mr. George Hodgson and Mr. E. P. Arnold-Forster, Joseph Holroyd, of Cleckheaton, was charged under the Pharmacy Act with not having complied with the provisions of the Act in respect to the sale of a poisonous drug on May 28 last.

Superintendent Symonds said the defendant was the proprietor of an establishment in Westgate, Cleckheaton, which he called the "Medical Hall," and on the day named he sold to a woman who called at his shop a small quantity of laudanum in a bottle supplied by him, upon which there was neither his own name nor address, but simply the word "Poison" on a red label. The defendant was without any qualification to sell such drugs, and probably subsequent proceedings would be taken against him for so doing.

Emily Rukin, the wife of John Rukin, miner, of Hartshead Moor, Cleckheaton, said she went to the shop of the defendant, Holroyd, on the forenoon of May 28 last, and asked to purchase sixpennyworth of laudanum. The defendant supplied her with the drug in a bottle provided by him, for which she paid 1*d.*, and 6*d.* for the laudanum. There was nothing upon the bottle except a red label containing the word "Poison." She went home and took all the sixpennyworth at one dose.

Mr. Hines, for the defendant, in cross-examination, endeavoured to elicit from Mrs. Rukin that she had been in the habit of taking laudanum, but she denied that she had ever taken any before. She had asked for the drug for another woman, but that was a falsehood. She also denied that Holroyd refused to sell her the drug.

John Rukin deposed that he found his wife in a semi-unconscious state, and in consequence of what she said, he searched the house and found the bottle bearing the red label. The police were informed, and a doctor was called in, who used the stomach-pump.

Sergeant Lawson, who was called in, said he took possession of the empty bottle, and next morning visited the shop of the defendant and asked him whether he sold laudanum, and how much he had sold to a woman on the previous day. At first defendant said he did not sell laudanum, and then denied having sold any to any woman on the previous day, saying that he was not certified to sell such drugs. The bottle was sent to Mr. Allen, Sheffield, West Riding analyst, who gave evidence to the effect that it had contained laudanum.

Mr. Hines, for the defendant, denied the sale, and called a witness named John Ogden, cabinetmaker, Cleckheaton, to prove that Mrs. Rukin called at the defendant's shop on the morning of May 28, and in his presence asked for a shillingsworth of laudanum, which defendant refused to sell her.

The Bench considered the offence to have been proved, and imposed a fine of 40*s.*, with costs, or one month's imprisonment.—*Bradford Observer.*

Poisoning by Chlorodyne.

An inquest was held at Portsmouth on Monday respecting the death of Sarah Williams, who according to the evidence of her husband, an engine-room artificer, had for two years been in the habit of taking chlorodyne, laudanum, chloral and chloroform, but chlorydyne principally.

Rose Hinks, a young girl, said she was in the habit of doing house work for the deceased. She had been sent to Mr. Timothy White's, Lake-road, and Mr. Brewis, Lake-road, for chlorodyne and laudanum. Deceased always took the drugs secretly. When she went to the house on Friday morning she thought Mrs. Williams was asleep, but she looked unusually pale, and witness tried to wake her; but as she could not succeed she called assistance. Witness had not obtained chlorodyne for more than a week, but she frequently fetched ale, gin, brandy and whiskey. At the least she would usually get three bottles of chlorodyne a week, the price varying from 9½*d.* to 2*s.* a bottle.

After some other evidence had been given as to the means adopted by the deceased to obtain supplies of chlorodyne,

P. C. Hearl said he searched the deceased's bedroom and found a number of chlorodyne bottles, which were concealed in different parts of the room.

Mr. J. Green, surgeon, said Williams wrote asking him to attend his wife while he was at sea. He knew at that time—two or three years ago—that she was taking chlorodyne, and he advised her against it. He saw her again two or three times before her confinement. He reasoned with her, but she seemed to despair, and the last time he saw her he went away with the impression that she would give up trying to abandon the habit. He was called early on Friday morning, and finding her dead, fetched a policeman. Death had taken place a few hours. He and Dr. Weston assisted in the search of the room, and found a gin bottle, with two ounces of spirit in it, under the bed, and a bottle nearly full of chlorodyne was found under the pillow. He also found a purse containing 1*s.* 6*d.* and a large number of pawn-tickets. One ticket was dated the very day prior to the confinement. He also produced an unopened bottle of chlorodyne that had been found since the death. The witness gave minute details of the results of the post-mortem examination, and said that from the bottle he found under the pillow there had been taken 80 to 90 drops of chlorodyne, which would be sufficient to cause death, especially in a person suffering from albuminuria, whereas the proper dose was from 10 to 30 drops.

The jury found a verdict of "Death from an overdose of chlorodyne."

Correspondence.

⁂ No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

The Future of Pharmacy.

Sir,—Mr. Swinn's admirable letter in the Journal of 7th inst. opens up several extremely important if not vital points, and with him I trust that other and abler men will take up this question of the "future of pharmacy," and not leave it until some effort has been made to solve the difficulty; I would also ask those of my brethren who belong to the rank and file to keep "pegging away" at our leaders until we have at all events aroused them to a knowledge of the actual state of affairs. I hope Mr. Swinn's remarks as to the futility of attempting to confine the sale of all drugs pure and simple to the trade will be well studied by those who have an inherent belief in the eternal fitness of legislation for the removing or the remedying of all the ills that flesh is heir to.

Mr. Swinn has, however, in my opinion, laid bare the weak spot in the constitution of the Society, vis., inadequate representation in the country by local or other secretaries. In this respect the Society occupies a very anomalous position. It would scarcely be correct to apply the terms deaf and blind to the condition that exists, for these terms imply (at all events in the majority of cases) the presence of external sense organs, whereas in the case of the Society these organs are wanting. True, the nerve fibres and the nerve cells are there sound and healthy; but without the external organs no irritation of the fibres, and consequently no impressions of sound or light, can be received by the brain (Council). If the Pharmaceutical Society is to retain its hold, to say nothing of extending its influence, it must have more eyes and more ears; it must, through these organs, be brought more into touch with the whole trade; and not only this, the trade itself must be made to feel that the Society is a real living organism of which it ("the trade") forms part. Whether the plan recommended by Mr. Swinn be adopted or no, all I, as one who has taken some interest in the matter in the past can say is, the principle must be adopted, and that at no very distant date; the change already made in the method of election of local secretaries, shows that at all events the Council have not lost sight of this important feature in its constitution, and I earnestly hope that our excellent and energetic President will, amidst the thousand and one other claims upon him, find time to well consider this vital question.

The admission of "Minor men" to membership at once, or after a term of years, as suggested by Mr. Swinn, is a matter of detail, though I for one should say, "Seize them at once; make them members immediately upon qualification, if possible, compulsorily." My idea may be, possibly is, utopian; nevertheless, I still cherish the hope that the time is not far distant when the Major shall be the qualifying examination; before, however, this can be done the whole trade must be united, and the first and the most important step towards this is the appointment by the Society of more "external sense organs" for the Council.

131, *Embden Street, Manchester.* J. Hart.

Sir,—So many letters have appeared in the Journal about Trade Interests, etc., and that the Pharmaceutical Society by no means represents the chemists of Great Britain as a body, that one feels very reluctant to write more upon the subject, but feeling as chemists we have wrongs to be righted, I venture to add my humble opinions, trusting that our new Council may so benefit us as to make the present year memorable in the annals of pharmacy.

Is it altogether to be wondered at that so few in comparison belong to the Society, especially assistants, when we see from the advertisement columns the salaries offered to them; notably one in last week's issue, where a duly qualified man, not under thirty years of age, is offered the magnificent sum of £80 per annum for his services as dispenser?

Why is it that we who require a special education for our business, and who must pass increasingly severe examinations to qualify us for our calling, are not better paid? that a man at the mature age of thirty years and who has such grave responsibility resting upon him should be expected to be satisfied with £80 a year?

A shop walker in a drapery establishment, requiring no scientific knowledge, commands a better salary, and according to the papers a coal porter at the gas works, before the late strike, was earning £3 a week, which sum would be positive affluence to our poor dispenser. Very great advantages must accrue to such a man to compensate him for sparing half a guinea out of his already small income.

A chemist should be a gentleman, and surely it is not too much to expect that his salary should be in accordance.

The different trade unions have opened our eyes to what can be done by them in securing to their members increased salaries by arbitration, and, failing that, by strikes.

Some principals will says we cannot afford to pay high salaries, on account of the stores and large companies cutting prices so low that it is very difficult to make both ends meet; but if our new Council, with our esteemed President at its head, can bring forward a Bill whereby we shall receive better protective measures, restricting the sale of all drugs and poisons, and giving us the power of returning a member to Parliament, then we shall no longer hear of such paltry salaries to assistants, nor that the Society is weak either in members or funds.

Waterloo Ville, Hants. W. R. Wheeler.

The Nottingham and Notts Association.

Sir,—I notice with pride the official recognition of the work done at Nottingham on behalf of the future pharmacists. Such sentences as the President uttered at the Council meeting to the effect that "Nottingham was doing about the best work of any of the centres of education in the country," and that "he could say from his experience in the examination room that many men from that district had displayed very sound knowledge," is indeed very gratifying to them who have the work in hand. But I think the President must have been misinformed when he says this success was very largely due to the activity of the authorities of the University College rather than that of the local representatives of the Society and the trade.

As an old student, and once librarian of the Nottingham Association, I can say that it is due to the efforts of this Society that I was fortunate enough to pass all three of the examinations as soon as the law allowed me, and at my first attempts.

Perhaps if we look at the working of the Association (which may possibly be a guidance to other towns), we shall see that a little more credit should be given to its members. The latter subscribe 7*s*. 6*d*. per annum, and the associates 2*s*. 6*d*. The members, in return, have a dinner in the winter and an outing in the summer both of which they have to pay extra for, so that they ge no advantage, whilst they provide a room, of which the President speaks, a museum and two or three classes a week for the use of the associates. In this room a class is held every Friday evening, under the superintendence of one of the local chemists, on pharmacy and sometimes materia medica: this class is free. Then the members make arrangements with the University College authorities for classes in chemistry under Professor Clowes, and botany under Mr. Carr, alternate sessions, and I learned that the College authorities charged the Association one guinea for each student in chemistry, while the Association only charged the associates half that amount, thus giving the other half out of its funds. It is the Association that has to send out circulars and notices to students and to make it a success; it was the Association that gave a soirée at the commencement of the session when I was there; it is the Association which provides free classes in half the subjects, and pays half the expenses of the other classes; it is this Association which is arranging a dispensing class for its students; and it is this Association which our much-valued and esteemed President asserts is not so active as it might be. Why, sir, in the interests of students there is not another in the kingdom to beat it in its exertions, and I ask you to answer the question, what could the University College do for the pharmaceutical student if the Association ceased to exist? I do not see on what grounds Mr. Richardson backs up Mr. Carteighe's assertions, but I admire the remarks made by Mr. Schacht.

We old students are proud of Professor Clowes as a tutor, but prouder still of our Association, which we consider is A1 in the kingdom, both in its facilities and its high percentage in passing candidates through the examinations, and are not willing to see it lowered in any way, but where a Society does three-fourths of the work it ought to receive the same proportion of praise.

1, *Preston Road, Brighton.* Lawrence Priestley.

Erratum.—In the 9th line of the 3rd paragraph of Mr. Swinn's letter on p. 1016, *for* "unqualified" *read* "qualified."

D. M. is recommended to communicate with the Secretary respecting any breaches of the Pharmacy Act that may come under his notice.

B. Havard.—Probably *Stachys palustris*; send it when in flower, in July or August.

C. H. Turver.—We do not think there is a Society that specially seeks the object mentioned.

F. Gale.—(1) *Carex sylvatica.* (2) *Carex glauca.* (3) Probably *Carex riparia*; material insufficient for identification.

NOTICE.

Chemical Society.—A meeting will be held on Thursday, June 19, at 8 p.m., when papers will be read on "Invertase, a Contribution to the History of an Unorganized Ferment," by Messrs. C. O'Sullivan and F. W. Tompson. "The Action of Carbonic Oxide on Nickel," by Messrs. Mond, Langer and Quincke; "The Interaction of Iodine, Water and Potassium Chlorate," by Mr. H. Bassett; and on "The Milk of the Gamoose," by Messrs. Pappel and Richmond.

Communications, Letters, etc., have been received from Messrs. Jones, Rix, Tubby, Groves.

LESSONS FROM FIELDS AND LANES.

JUNE.

Yellow and white have been for nearly a month the predominating colours in the meadows. The crowfoots, to which the former colour is due, are typical representatives of their order (*Ranunculaceæ*), and as such should be used for the purpose of studying its features. Reference is made to them in the article of last June (*Pharm. Journ.*, xix., p. 1009). The white is due to the flowers of the common-beaked parsley (*Anthriscus sylvestris*), a member of an order (*Umbelliferæ*) of especial interest to pharmacists from the number of medicinal plants which belong to it. The salient features of the order will be found referred to in the article of last August (*Pharm. Journ.*, xx., p. 101).

The order *Caryophyllaceæ*, in addition to the chickweeds, stitchworts and sandworts mentioned in the article of last June (*Pharm. Journ.*, xix., p. 1010), furnishes a number of plants of great interest. Conspicuous among these is the red campion or catch-fly (*Lychnis diurna*), easily distinguished by its soft ovate lanceolate leaves and red notched petals; the flowers are *diœcious*, the male being provided with ten stamens and the female with five styles. The number of styles is a vestige of the time when the ovary was composed of five cells; these have now disappeared, leaving a one-celled ovary with *free central* placentation. There are several species of *Lychnis* now to be met with in the course of an afternoon ramble. Marshes are brightened here and there by a patch of the "ragged robin" (*L. Flos-cuculi*), so-called from its four-cleft petals, whose tattered appearance give the plant quite an air of disrepute. *L. vespertina*, the white campion, may be met with here and there on the borders of fields; its specific name is derived from the fact that the flowers only fully expand in the evening, at which time also it emits its characteristic fragrance. It thus forms an attraction for night flying moths, which plunder its honey and at the same time effect cross-fertilization.

The pinkish-purple corollas of the corncockle (*L. Githago*), nestling within the long sepals, are well known in many districts. Its long, straight stems give it an appearance of dignity, not associated with any other member of the order, and are a remarkable example of the influence of environment in moulding the habit of a plant; its stems have a striking resemblance to the corn by which they are surrounded, and are the result of the struggle to reach the light, rendered necessary by the quick growth of the corn. The German catch-fly (*L. viscaria*) will be met with only by the fortunate few, and is therefore so much more worth looking for. The only station we know for it is a cliff near Edinburgh, known as "Samson's Ribs," and even there it can only be reached by an experienced climber, at considerable risk to both life and limb. The whole plant is sticky and thus easily recognized. The remarkable persistence of rare plants in certain stations is well shown by the fact that the writer examined the other day a herbarium specimen of *L. viscaria*, collected on "Samson's Ribs," about the year 1796. The genus *Silene* is sometimes apt to be confused with *Lychnis*; it may be readily distinguished, however, by the smaller number of styles (three). It should be noted that the scale which is to be found at the base of the petals of many of the campions is a variety of the *corona*, which exists in a state of much greater perfection in the daffodil. *Silene inflata* and *S. maritima* are both remarkable for their inflated calyx. The former is to be found in the same situations as *L. vespertina*, which it closely resembles, and the latter on banks by the seaside. There are several interesting species of *Silene*, but as they are mostly rare, the student who is fortunate enough to find them must refer for their description to a standard "flora." Other members of the Clove order now to be found in flower are the corn-spurrey (*Spergula arvensis*), with linear fleshy whorled leaves and small white flowers; which, as in many other members of the order, require a considerable amount of light before they fully expand; the Sandwort-spurrey (*Spergularia rubra*), much resembling the corn spurrey, but with pink petals and spreading prostrate branches; and the procumbent pearlwort (*Sagina procumbens*), easily recognized by waysides and on walls by its spreading tufted stem, awl-shaped (*subulate*) leaves and minute flowers, only showing their tiny white entire petals in the brightest of weather.

The pea order is well represented in the flora of the month. The name of the order (*Leguminosæ*), it will be rememberod, is derived from the fruit characteristic of it (*legume*). All the indigenous species belong to the sub-order *Papilionaceæ*, so called from the butterfly shape of their corollas (*papilionaceous*). Before going further it will be well to recall the parts composing this characteristic form of corolla, which may be well seen in any of the members of the order now in flower. The boat-shaped petal at the base of the flower and in which the stamens are enclosed is known as the *carina* or keel, the two lateral petals are the *alae* or wings, while the large petal which always forms the most conspicuous feature of the flowers is known as the *vexillum* or standard. The keel is composed of two petals adhering by their lower edges in some of the species while in others they are free. The stamens of the *Leguminosæ* are ten in number and *perigynous*. They are generally united by the filaments to form one bundle (*monadelphous*) although they are sometimes in two bundles (*diadelphous*), in which case there are generally nine in one bundle and one in the other. This difference in cohesion of the stamens is, along with the form of the leaves, used in the division of the order into groups. Most interesting of all the order to pharmacists is the common broom (*Cytisus Scoparius*), whose long tough branches and bright yellow flowers are well known to almost everyone; the leaves are very variable—the normal shape being *ternate*—and are sometimes quite absent. Closely related to the Broom are the "dyer's greenweed," *Genista tinctoria*, and the needle furze (*G. anglica*). In both the yellow flowers are in *racemes*. The former is common in meadows on the English side of the border, but is far from common in Scotland; its leaves are lanceolate and smooth. The latter is much more speading in habit, and furnished with spines; it should be looked for in moorland districts. The trefoils or clovers, the vetches or tares, and the vetchlings or everlasting peas are fast forcing themselves on our attention and will soon be the most common genera of the pea order to be found in flower in the fields and lanes. *Trifolium repens*, the white Dutch clover, and *Trifolium pratense*, the common purple clover, will be found in almost any meadow. The yellow trefoils (*T. procumbens* and *minus*) are readily recognized by their heads of small yellow flowers and are common in pastures everywhere; the leaves of the trefoils are good examples of the ternate type. The vetches are easily distinguished from the trefoils by their flowers being either solitary and axillary or in racemes and by their pinnate leaves terminated by a *tendril*. Among the early flowering species of vetch the commonest are the "common vetch" (*Vicia sativa*) and the bush vetch (*V. sepium*). Both have pale purple flowers and are in habit trailing, although when opportunity offers they sometimes take to climbing. In the former the flowers are single or in pairs and almost sessile in the axils of the leaves, while in the latter they are in almost sessile racemes. In both species the stipules are a characteristic feature and their *half-hastate*, sometimes *half-sagittate* shape, should be noted. The tufted vetch (*V. Cracca*) is just beginning to show its long racemes of bright blue flowers among the hedges. This plant is an inveterate climber, and in the course of another month will be flaunting its inflorescence above the tops of the highest hedges. It is readily distinguished from all the other vetches by its long dense racemes, large branched tendrils, and generally robust habit. Much resembling in habit the vetches are the everlasting peas; they are distinguished, however, by their fewer leaflets and flattened style—that of the vetches being generally cylindrical. *Lathyrus pratensis* is perhaps the commonest species, and its bright yellow flowers will soon be the most conspicuous feature of railway embankments, where it seldom fails to catch the eye of travellers by rail. It has only one pair of leaflets and a pair of long tendrils, but is provided with very large *sagittate stipules*. The tuberous bitter-vetch (*L. macrorrhizus*) is becoming common in thickets, and will go on flowering till August. Its flowers are of a peculiar crimson tint, changing to green or blue; it has a creeping rhizome bearing *tubers* (from which has been derived the specific name *large-rooted*). A plant much resembling in habit the trefoils is beginning to light up dry places with its bright green ternate leaves and brilliant yellow—often tinged with crimson—flowers. The bird's-foot trefoil (*Lotus corniculatus*) always seems peculiarly in harmony with its surroundings. It is decumbent in habit, and the flowers are in long-stalked umbels. A closely-allied species (*L. major*) is easily recognized by its climbing habit, larger leaves, and altogether clumsier appearance.

To the student of development the *Papilionaceæ* is a particularly interesting group of plants, so perfect and so varied are the adaptations of its members for the securing of cross-fertilization. In the broom, when a bee alights on the flower it holds on with its legs to the "wings," and in doing so exerts so much pressure on the keel, with which they are connected by means of a fold, that it splits along the upper margins of the petals, which until now have remained joined; this splitting of the keel suddenly releases five short stamens which have already dehisced before the expansion of the flower, and their pollen is scattered on the bee's under surface. As the bee goes on with its work the slit in the keel goes on extending until the style which has hitherto lain along the bottom of the keel is released with explosive force and sweeps out with it the pollen from the longer stamens, which on their dehiscence has been gradually collecting around the flattened stigma; the pollen from this second explosion is forced against the bee's back. It is a remarkable fact that although the *vexillum* of broom is provided with the lines known as honey guides, yet the flower is destitute of honey. It is probable that these lines are a relic of a once existent state of things and have been retained by the flower because of the advantage conferred on it by the attraction they have for honey-seeking insects and the chances of cross-fertilization thus secured. In the bird's-foot trefoil the treatment which the bee receives when getting its pollen burden is somewhat gentler than it experiences in the case of the broom. When the flower is still in the bud the anthers dehisce and the pollen collects in the apex of the keel; by the growth of some of the stamens it is securely wedged there until the pressure exerted by a bee alighting on the wings causes the stamens lying behind the pollen to act like a piston and force it up through a small orifice in the apex of the keel and so dust the lower surface of the bee. In the vetches and peas the leverage exerted by the insect visitor on the *alae* and through them on the *carina* is still the factor which determines the transference of the pollen, but the mechanism is much simpler than in the cases just instanced; the style is provided with a brush, such as we have seen in some of the *Compositæ*, and each depression of the keel effects a sweeping motion, by which the pollen which has collected in the keel as before is swept out and dusted on the insect.

The *Rosaceæ* will soon have attained their maximum annual profusion, but the consideration of the numerous members of the order fast coming into flower must be reserved for next month, when the number of species in flower will be greater, and the chances of comparison thus increased. Strange as it may seem, the rose order is very closely related to the *Leguminosæ*. In both the stamens are situated on the calyx tube or on a disc surrounding the ovary, the leaves are generally compound, with a preponderance of pinnate forms and are provided with well-marked stipules, while the number of parts forming the floral envelopes is generally the same. They differ in the structure of their fruit and of their corolla, which is markedly *irregular* in the peas and as markedly *regular* in the roses; the stamens in the pea order are ten, and more or less united by their filaments, while in the roses they are *indefinite* and free.

Most of the species of the order *Caprifoliaceæ* are now to be found in flower, and some of them are no less well known than they are interesting. The order belongs to the *gamopetalous* (petals united) division of dicotyledons, and has an inferior ovary and *epipetalous* stamens (on the corolla). Foremost among its members in point of pharmaceutical importance is the common elder (*Sambucus nigra*); its inflorescence is a good example of the *compound dichasium*, a form of cyme in which the primary axis ends in a single flower, and a number of secondary axes spring from beneath this terminal flower. The guelder-rose (*Viburnum opulus*) is remarkable from the fact that the corolla of the outer florets of the inflorescence have become very much enlarged, the extra showiness thus obtained being at the expense of the essential organs of the flowers. The woodbine or honeysuckle (*Lonicera Periclymenum*) is too well known to require description; its corolla is *infundibuliform* (funnel-shaped). It is interesting to note the stage of development arrived at by the plants just mentioned, as instanced by the position of their honey. The elder is quite destitute of honey; the guelder-rose possesses a plentiful supply, but owing to the shortness of the corolla tube it is exposed to the ravages of all kinds of insects; while the honey-suckle, the most specialized of all, has it hidden in a long tube and only accessible to long-tongued bees, although at times the tube becomes so well filled that it is quite readily accessible. The honeysuckle is visited by a great number of night moths, probably attracted by its fragrance, which is especially marked at night.

Dwellers in mountainous and especially in limestone districts should find several interesting members of the saxifrage order, one genus of which, the golden saxifrage, has already been referred to in our April "lesson." The rue-leaved saxifrage (*Saxifraga tridactylites*) is to be found on walls, and is readily recognized by its tiny white flowers and glossy *cuneate* (wedge-shaped) *trifid* or *quinquefid* leaves. The meadow saxifrage (*S. granulata*) frequents moist meadows, and is the best fed looking member of its family, a characteristic evidently due to its richer surroundings; it has white petals and long stalked *reniform* (kidney-shaped) leaves. The mossy saxifrage (*S. hypnoides*) has flowers much resembling those of the last mentioned species, but smaller; its leaves are narrow and tufted and in appearance are not unlike those of the procumbent pearlwort. The mossy saxifrage loves limestone rocks, and in many of the Derbyshire dales it is almost as common as grass. The yellow mountain saxifrage (*S. aizoides*) must be looked for on the hills; its rich yellow red-spotted petals can never be mistaken. On the Kirkstone pass in Westmoreland it lines the sides of the road in many places, and when in full bloom is a sight once seen not readily forgotten.

A June ramble would scarce be botanically complete if we did not light on a few clumps of "forget-me-nots." The forget-me-nots, or scorpion-grasses, belong to an order (*Boraginaceæ*) which resembles in many of its features the foxglove and labiate orders; it is readily distinguished from either, however, by its five stamens. The pretty little early field scorpion grass (*Myosotis collina*) is now past its best. *M. versicolor*, with its yellow and blue corollas, may yet be found in the meadows, and dry places should now yield an abundance of *M. arvensis*, notable for its very small flowers. But the queen of all the forget-me-nots is the water one (*M. palustris*), whose large bright blue corollas are beginning to lend such a charm to the borders of ponds and streams. The inflorescence of the forget-me-nots is to the student their most noteworthy feature; it is a well-marked example of the "scorpioid cyme," an inflorescence in which the axis elongates by means of secondary axes, the first of which always springs from beneath the terminal flower of the primary axis, each following one springing from *beneath* the terminal flower of the one immediately preceding it. The flowers always being produced on one side of the axis gives rise to a twisted or scorpion-like appearance, from which originates the name "scorpion-grass," and from which is also derived the term descriptive of the inflorescence.

There are two interesting and striking composites just coming into flower, and as they are both plentiful everywhere the student should not lose the opportunity they offer of comparing the two groups of the order represented by them. The "marguerite" or "moonpenny" is fast developing its heads of yellow and white florets in the fields, while roadsides, lanes and embankments are brightened with the nodding yellow heads of the "cat's ear." These will be found referred to in the article of last July.

SOZOIODOL SALTS.

As the potassium, sodium, lithium, zinc and mercury compounds with diiodparaphenolsulphonic acid have been now adopted to some extent in medical practice under the name "sozoiodol salts," the following information as to their physical and chemical properties, published by H. Trommsdorff, of Erfurt, may be of some use.

General Reactions.

1. *Potassium Chlorate and Hydrochloric Acid.*—It is characteristic of all the sozoidol salts that upon warming them in aqueous solution with potassium chlorate and hydrochloric acid chloranil (tetrachlorquinone) is formed, which separates in shining gold plates. As the odour of chloranil is very intense and definite this reaction allows of the detection of sozoiodol, even when very much diluted. But since phenol and phenolsulphonic acid behave similarly, it is necessary also to test for iodine, which can be done by the following reaction:—

2. *Nitric Acid* (1 : 4).—All sozoiodol salts, upon being warmed with nitric acid, give picric acid, which separates in yellow scales, and at the same time iodine vapour is evolved. The nitric acid should be in considerable excess and the heating continued until all the iodine is driven off.

3. *Sulphuric Acid.*—Upon heating the dry salt with concentrated sulphuric acid iodine is immediately volatilized and there is at the same time a formation of iodphenol, recognizable at once by its extremely disagreeable odour.

4. *Ferric Chloride Solution.*—All soluble sozoiodol salts give with a few drops of this solution an intense blue violet colour, which after a time passes to red violet.

5. *Bromine Water.*—When bromine water is added to a soluble sozoiodol salt iodine is set free and can be shaken out of the solution by means of carbon bisulphide.

6. *Barium Chloride Solution* (1 : 20).—All soluble sozoiodol salts give with this solution a strong white precipitate, which after a time changes into needles and consists of barium sozoiodolicum. It dissolves upon addition of ammonia even in the cold, and also in much hot water.

7. *Silver Nitrate Solution* (1 : 20) gives with the water-soluble sozoiodol salts a white microcrystalline precipitate of silver sozoiodol, which is also easily soluble in excess of ammonia.

8. All sozoiodol salts upon being heated give off the red violet vapour of iodine, sometimes with and sometimes without puffing up.

Testing of Sozoiodol Salts as to their Purity.

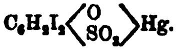
The *Potassium Sozoiodolicum* occurs in commerce as a fine white crystalline powder, which upon being heated on platinum foil puffs up in an extraordinary manner (resembling almost the so-called Pharaoh's serpents); at the same time the very disagreeable odour of iodphenol is given off. If a portion be completely incinerated, the ash dissolved in water, and first hydrochloric acid and afterwards platinic chloride added, the well-known yellow precipitate of potassium platinochloride is formed. Potassium-sozoiodol is insoluble in alcohol, but 0·5 gram finely powdered dissolves in 50 c.c. of water at 15° C. by simply shaking it round. Twenty c.c. of this solution treated with two drops of silver solution gives a white precipitate which should dissolve in dilute nitric acid (concentrated acid liberates some iodine). At most, immediately, not more than a quite faint opalescence should remain (traces of chlorine). If there should be a yellowish white turbidity it would indicate that the preparation contained free iodine. This may be the case when the contents of a bottle through frequent opening have been allowed to get damp, to which special attention is called. If a few drops of barium chloride solution (1 : 20) be added to the above mentioned potassium-sozoiodol solution the resulting white precipitate should dissolve completely without turbidity upon warming in water. A few drops of dilute sulphuric acid added to 10 c.c. of the above solution should give no turbidity (barium). Ammonium sulphide solution and sulphuretted hydrogen water should not render turbid a solution of 0·5 gram of the salt in 50 c.c. of water. Bromine water shaken with a solution of 0·5 gram of the salt in 50 c.c. of water should not cause turbidity, but only colour it yellow (a milky turbidity would indicate potassiumphenol, as tribromphenol).

The *Sodium Sozoiodolicum* comes into commerce in white prismatic needles, with a taste at first astringent and afterwards sweetish. One gram dissolves easily in twenty c.c. of cold water, but even in lukewarm water the solubility is essentially increased. In warm glycerine the solubility is almost the same. In hot alcohol, especially aqueous alcohol (80 per cent.), it is soluble up to 5 per cent. When heated upon platinum foil it does not puff up; and the residual white fused mass gives a yellow flame when heated on a loop of platinum wire. Towards silver solution, barium chloride, dilute sulphuric acid, sulphuretted hydrogen, ammonium sulphide and bromine water it behaves exactly like the potassium compound.

The *Lithium Sozoiodolicum* appears in glancing white plates, which sometimes assume a faint yellowish tinge without affecting its purity. It dissolves easily in water and aqueous alcohol. The incinerated salt heated on platinum wire gives a carmine red flame. Towards silver solution, barium chloride and dilute sulphuric acid it behaves like the potassium salt.

Zincum Sozoiodolicum crystallizes exactly like the sodium salt, in long white needles, which sometimes when kept for a long time assume a very faint reddish tinge. It does not puff up when heated and leaves a yellow powder. It dissolves in alcohol much more easily than in water. The solubility of the finely powdered salt in cold water is 1 : 50; warm water dissolves it abundantly, about 5 : 100 remaining in solution after cooling. One gram of the salt dissolves easily in 10 grams of alcohol at the ordinary temperature. Towards silver solution barium chloride, dilute sulphuric acid and bromine water it behaves like the potassium salt. With ammonium sulphide it gives a yellowish white precipitate.

The *Hydrargyrum Sozoiodolicum* appears in commerce as a deep citron-yellow extremely fine and light powder. It is said to be sent out containing a constant proportion of 32 per cent. of mercury, corresponding to the formula—



$$C_6H_2I_2\left\langle\begin{matrix}O\\SO_3\end{matrix}\right\rangle Hg.$$

Upon being heated it puffs up like the potassium salt and volatilizes rapidly without leaving any residue. In water and in alcohol it is practically insoluble. On the other hand, 0·5 gram of the salt should dissolve easily when shaken in 30 c.c. of a 5 per cent. solution of sodium chloride; the solution should contain no white or yellowish-white suspended precipitate, or at most there should be a faint milky turbidity. If 0·5 gram of the salt be dissolved in 50 c.c. of water with the aid of a little nitric acid, two drops of silver solution added to 10 c.c. of this solution should show at most a trace of opalescence (chlorine). The solution should not be rendered turbid by two or three drops of barium chloride solution or by dilute sulphuric acid; at most there should at first be only a turbidity, disappearing on the addition of the sulphuric acid. With ammonia a solution of the salt in sodium chloride gives a yellowish-white precipitate passing into grey, and with sulphuretted hydrogen a black precipitate. The quantitative determination of the mercury may be effected by dissolving 2 grams of the compound in 5 per cent. sodium chloride solution, adding one or two drops of hydrochloric acid and precipitating with sulphuretted hydrogen; the sulphide is then dried at 100° C. upon a tared filter.

THE VINEYARDS OF BRONTE.

The following account of a visit to the estate of the Duchy of Bronte, given to Nelson by Ferdinand IV., of Naples, in 1799, and which has descended through the female line to General Viscount Bridport, K.C.B., Duke of Bronte, is taken from an official Report on the Sicilian Vintage by Mr. Consul Stigand.

This estate possesses one of the most important "Stabilimenti Enologici," or wine factories of Sicily. It is situated near the Castello di Maniace, the seat of the family in Sicily, in a district remote from the ordinary track of travellers, at the extreme limits of the province of Catania. The Castello di Maniace, the seat of the family, and of the administration of the duchy, is about thirty miles distant from the eastern and at much the same distance from the northern coast, at about six hours' drive from the nearest railway station at Piedimonte, on the line from Catania to Messina, at ten miles distance from Bronte, itself a town of 16,000 inhabitants, and at four miles distance from the nearest village, that of Maletto, which gives the title of prince to a Sicilian family.

When the estate was erected into a duchy and handed over to Nelson, it was in a bare and wretched plight. It was forty miles distant from any carriageable road, and no proprietor had lived on it for 200 years. After the flight of the last monastic proprietors, from 1693 to 1799, the property was in the hands of caretakers. Reforms and improvements were commenced on the estate soon after Nelson received it, but little was done on a grand scale until the succession of the present duke in 1868. No members of the family had then visited the place for 40 years. Roads were immediately commenced, and the mileage of roads on the property has now been increased to twelve miles. Farmhouses have been repaired and built, several bridges over torrents at times unpassable erected, and the "castello" itself restored and enlarged not only to make a suitable dwelling-house, according to English notions, but also to allow for storage of grain and wine, and for stabling, while the ravages of the Simeto had to be restrained with solid bastions and embankments. Indeed, when the castle was delivered over to Nelson it was quite a ruin, threatening entire disappearance, without a scrap of furniture on the premises.

The estate itself comprises vineyards and arable lands growing magnificent crops of wheat, and lava lands furnishing the valuable pistachio nut (a yearly offering of which is graciously accepted by Her Majesty the Queen), while almond and orange groves flourish in the more sheltered parts of the estate. The forests of oak and beech form a considerable proportion of the value of the estate.

The vineyards of the estate are situated at the distance of about a mile from the castle, descending the Simeto; to arrive there one passes through a grove of fine oaks. The vineyards themselves extend over about 240 acres of ground as level as a chess board, and their aspect, when viewed from an elevation, is most refreshing in the regularity of the rows of the planted vines, and in the brilliancy of their verdure. Elevated lookout houses are erected at different points for watchmen employed during the season of ripening, as a protection against pilferers. The soil is very deep and uniform, and consists of a friable alluvial deposit of argillaceous loam spread over a spacious plain. This alluvial deposit has evidently been washed down from the detritus of the surrounding mountains, which, with the great mass of Etna, overlook and screen the vineyards on all sides except the south. The elevation, like Maniace itself, is about 2000 feet above the level of the sea. The depth of the permeable soil is evidently one of the chief causes of its efficiency.

Experiments were made in nurseries for many years on the kinds of vines suited to the soil, and from the beginning of the vineyard Mr. Alexander Nelson Hood, as director-in-chief, has been aided in the management by a French gentleman, M. Fabre, with an assistant, M. Ricard. Vines were procured from Madeira, from Bordeaux, from Rousillon: the Palomino vine and the Hermitage vine were also tried, as likewise were some samples of the Pedro Ximenes of Spain, transplanted from the estates of the Duke of Wellington at Grenada; but the vine which has been selected as suited best to the soil and climate is the "Grenache noir" of Rousillon. The youngest vines utilized are now seven or eight years old; the oldest have fifteen years of growth. Each vine stands in a square of ground somewhat larger than a square metre, and great care is taken to keep the soil free from weeds by frequent horse-hoeing. The vines are pruned three times over every year, and in the summer the exuberant shoots are removed by hand in order that the vigour of the vine may be concentrated on the fruit: great attention is paid to select the moment of proper maturity for gathering the grape, and only the best bunches are selected for wines for export, the inferior grapes being left for inferior wines, which are consumed in the country. The time of vintage is, as in other places, quite a festal period. From 120 to 150 men, women and children come from all sides to assist in the vintage, and they live wholly on the premises until all is concluded, taking their meals in a somewhat primitive fashion in open air, out of long wooden troughs, and ignoring, in Oriental fashion, knives and forks, and a fair proportion of grapes are left hanging on the vines for gleaners after the harvest, in patriarchal fashion.

The time of the vintage being carefully chosen, as above-mentioned, the grape-plucking is carried on in groups of twenty pickers, women and boys, each group being marched in Indian file from the "stabilimenti" to their allotted vine rows by two overseers. The pickers carry their baskets on their heads, set them down, and then cut off the branches with knives, under the supervision of the overseers, who see that no inferior grapes are selected. When each group has filled their baskets, they are marched in the same manner back to the "stabilimento" to the "palmento" or pressing-house. All work with alacrity and joyousness, as though animated by the spirit of the youthful Bacchus himself. The boys especially laugh and grin like young satyrs and fauns, and the oldest and plainest women seem to look younger and more pleasant. The boys, not content with carrying their heavy baskets straight to the pressing-house, prolong their route by executing a sort of rude "fantasia," marching in a circle around the central fountain of the interior quadrangle, and chanting songs in chorus, which may be a distant echo of the "Evöe Bacche" of classic times, after which tribute to Liber and the Graces, they deliver in their burdens one after another at the windows of the pressing-house. The "stabilimento" itself is one of the finest in the island, and, as mentioned, Mr. Hood was his own architect. The interior quadrangle is about 120 feet long by 100 broad. On the shortest sides are gates for entering the premises, while one of the largest sides is formed by the pressing-house, and the other chiefly by the "cantine" or "dispense," the wine magazine. In this magazine the tuns or casks are stored in imposing array; the largest tun has the majestic name of "La Madre," and bears it on her face in the largest of capitals; it contains 152 hectolitres (3,344 gallons), or 18,200 bottles, and a good-sized dinner party might be accommodated in its interior, when empty, if a floor were put to it. There are, besides, two enormous vats closed at the top, which are, in fact, also casks, but of a different shape, and these are about double the size of "La Madre," and capable of containing together 60,000 bottles, besides which there are twenty casks of 75 hectolitres, and 120 of smaller dimensions.

The grapes having been delivered in, as above described, at the windows of the pressing-house, are passed on at once to the men who do the work of wine pressing. The bunches are first placed pell mell on a series of dressers, such as are used in the Gironde, fitted with sieves, whose meshes are large enough to let the berries of the grape fall through, but to retain the stalk, when the grape bunches are rolled upon them, and these munipulators exercise a second supervision as to damaged berries. The berries of the grapes, leaving the stalks behind them, fall through on the floor, and are then raked along to the pressing-room, where the wine pressers are engaged in going round, like mill horses in an endless circle, trampling in turn over each supply of berries as provided for them; they, too, are under the direction of a superintendent. No use of a machine as a wine presser is made at Maniace, as the action of the feet is considered here, as at Montemaggiore, preferable; but the feet are not shod, as in other places, with hobnailed boots, but with light mocassins of gutta percha, which, with the feet of the presser, are carefully washed every morning and evening. The men are clothed simply in drawers and shirts, and as the trampled berries spurt freely round their legs, these have a sufficiently blood-stained appearance. After this trampling has gone on for a due time, the grapes are heaped up in the centre, and an instrument called the "donkey," a large, round platform of wickerwork—is put on the heap, upon which the wine pressers all jump together, and then that batch is considered finished, and the husks are raked away, and a fresh batch from the triers raked in. From the floor of the pressing house the juice runs in continuous streams through tubes of caoutchouc into square reservoirs in an adjacent compartment on a lower level, and in these reservoirs the first fermentation is allowed to proceed; the length of time allotted for which fermentation depends on the season and the quality of the must. It need not be said that the whole premises of the "palmento" not only have a Bacchanalian reek of the juice of the grape, but become extremely purple-stained, from the spurting of juice over the walls, so that a thorough process of white-washing has to go on as soon as the vintage is over to prepare the building for the next year.

After the first fermentation, the juice is carried across the quadrangle in skins of goats or pigs (reminding one of the nocturnal onslaught of Don Quixote, who slashed and pierced a number of similar skins hanging in the garret of his venta where he slept, under the idea that they were Saracenic invaders) to the "cantina" on the other side of the yard, and there transferred to the larger tuns and vats above described.

The quality of the must is, during each vintage, the subject of careful analysis. There is a special room, something like a chemist's laboratory, and provided plentifully with instruments for experimenting on the quality of the must—syphons, pumps, saccharometers, salleron—and other alcoholmeters, œnoterms, graduated testing and tasting glasses, etc.; but the chief reliance is placed upon the unassisted palate itself for determining what should be the duration of the initiatory stages of fermentation.

When the must, after its first fermentation, has been transported into the big casks and vats in the great "cantina," as above mentioned, it is then allowed to clear, and subjected carefully to the ordinary process of raking and fining for three or four times a year for about seven years.

It need not be said that the casks, for the final lodgment of the wine, are prepared with all possible care, and each one is subjected to severe scrutiny before the wine is sent forth for exportation. These casks are prepared on the "stabilimento" itself, and from wood coming from the estate.

When the vineyard is in good working condition, it is calculated it can render 180,000 bottles a year.

The wine thus prepared is of a light amber colour, dry, of pleasant bouquet, of a good aroma, with full natural body ("corsé" is the French term), esteemed beneficial for invalids; lighter than Marsala, with something of a flavour between Madeira and Sauterne. It has a clear, *primesautier* taste, and it is said to keep any length of time and improve in bottle.

No attempt, notwithstanding the immense care which has been expended on the production of this wine for many years, has been made to place it in any market. It has, however, been highly appreciated in private by connoisseurs, and it is confidently believed that wine prepared with such patience, tact and liberal treatment will find a permanent and favourable acceptance on English tables, especially as the price is modest compared with those of notorious compounds styled sherries and Madeiras, costing no more than 30*s*. a dozen.

CLOVE CULTURE IN ZANZIBAR.*

REPORT OF CONSUL PRATT.

Zanzibar is noted for being the principal source of the world's supply of cloves, and a report on the cultivation of this article of domestic economy may prove of interest.

When speaking of Zanzibar, we include the islands of Zanzibar and Pemba, three-fourths of the entire crop of cloves being produced in Pemba. Those grown on the island of Zanzibar are reckoned of superior quality and command the better price, but this is probably due to the fact that the owners reside here, and can thus give their affairs the benefit of direct supervision.

Certainly the conditions for their successful cultivation are most favourable at Pemba, where the rainfall exceeds that of Zanzibar, but the management being left to careless overseers, the result is the cloves are imperfectly cured and (but little care being observed in handling) are frequently marketed in an inferior condition.

The clove tree was first introduced into this country by the then Sultan, Seyed Said bin Sultan, about the year 1830, since which time its cultivation has gradually extended, until it is now the chief industry of the islands.

The industry received a check in 1872, the date of the great hurricane. At least nine-tenths of the trees were destroyed at that time, so the larger part of those now standing are of new growth.

A peculiarity of the clove tree is that every part is aromatic, but the greatest strength is found in the bud, which is the "clove" of commerce. The finest quality of cloves are dark brown in colour, with full, perfect heads, free from moisture.

In the cultivation of the clove, the first thing to be done is the starting of the shoot. The seeds are planted in long trenches and are kept well watered until after sprouting. In the course of forty days the shoots appear above ground. They are carefully watered and looked after for the space of two years, when they should be about 3 feet in height. They are then transplanted, being set about 30 feet apart, and are kept watered till they become well rooted. From this time on the young trees require only ordinary care, though the best results are obtained when the ground about the trees is well worked over and kept free from weeds.

The growth of the tree is very slow, and five or six years are required for it to come into bearing, at which time it is about the size of an ordinary pear tree and is usually very shapely. It is a pretty sight to see a young plantation just coming into bearing. The leaves, of various shades of green tinged with red, serve to set off the clusters of dull red clove buds.

As soon as the buds are fully formed and assume this reddish colour the harvesting commences, and is prosecuted for fully six months at intervals, since the buds do not form simultaneously, but at odd times throughout the whole period. The limbs of the tree being very brittle, a peculiar four-sided ladder is brought into requisition, and the harvesting proceeds apace.

As fast as collected, the buds are spread out in the sun, until they assume a brownish colour, when they are put in the storehouse and are ready for market.

A ten-year-old plantation should produce an average of 20 pounds of cloves to a tree. Trees of twenty years frequently produce upwards of 100 pounds each.

The present season, commencing with July, 1889, is very favourable, and the crop will exceed that of any previous season. It will, in all probability, amount to 13,000,000 pounds, averaging a local value of 10 cents per pound.

The Sultan derives no inconsiderable portion of his revenue from this source, since the duty is levied at 30 per cent. *ad valorem*, thus placing to the Sultan's credit for the present year nearly, if not quite, $400,000.

Besides the clove buds, the stems are also gathered, and form an article of commerce, commanding about one-fifth of the price of cloves and having about the same percentage of strength. To this circumstance is due the fact that ground clove can frequently be purchased in the market at a lower price than whole cloves.

For the past fifteen years the cultivation of cloves has been the chief occupation of the Arab planters and has always netted good returns. It seems probable that it will continue to be a profitable crop, since the consumption of the article appears to keep pace with the inevitable increase of production.

Up to the present time the plantations have been worked with slave labour at comparatively small expense; but with stoppage of slave supplies from the mainland, great difficulty will be experienced by the planters during harvest time. One result will be an increase in expenses; but what the planters have most to fear is that the curtailment of the labour supply will entail a direct loss by rendering it impossible to harvest the crop until after it has blossomed, when it would be unfit for the uses of commerce.

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* From the *Oil, Paint and Drug Reporter*, May.

The Pharmaceutical Journal.

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SATURDAY, JUNE 21, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

LOCAL CONFERENCES OF CHEMISTS AND DRUGGISTS.

In pursuance of the notices which appeared in last week's Journal, two meetings of this nature have taken place during the past week, and reports of the proceedings will be found at pp. 1048 and 1052. In both instances the attendance was tolerably good, though it could not be described as so numerous as might have been expected from the circumstance that it had been announced that the President of the Society would address the meetings. However, the divisional secretaries who had organized these meetings for the purpose of promoting the consideration of pharmaceutical affairs may be congratulated that their efforts have met with such a measure of success, and that they have been instrumental in commencing a good work that may be expected to result eventually in considerable benefit to the craft generally and to the extension of the representative position of the Pharmaceutical Society. Apart from the addresses of the President and the useful exposition he gave of the circumstances under which past legislation in regard to pharmacy has been effected, there is not much to be said of the proceedings at either of the meetings. There was the same expression of a sense of need for union and co-operation amongst chemists and druggists that has so often been heard, and that furnishes so much ground for surprise that those very necessary, and, as it would seem, generally appreciated wants, have not long since been provided for. It may be hoped that the contemplated series of local and provincial meetings, of a similar nature to those now referred to, will be instrumental in putting an end to much of the misapprehension that now prevails as to the position of the Pharmaceutical Society and general pharmaceutical affairs. We venture to think that many who attended these meetings will have gained from the President's addresses a clearer perception of the fact that most of the evils under which chemists and druggists now suffer are but the natural outcome of opposition that has unwisely been offered to the endeavours of the Society's Executive to carry out a policy calculated to be beneficial to the entire body of chemists and druggists. If this influence is extended, as it is to be hoped will be the case by such meetings held throughout the country, a very wholesome effect will be produced, and instead of hearing so often the question, "What has the Pharmaceutical Society done for the trade?" we may find individuals asking themselves what they have done towards fulfilling their obligation to make the Society truly representative of the body and sufficiently strong to enable its Executive to command greater success in the endeavours to promote the general interests and advancement of British pharmacists.

PROSECUTIONS UNDER THE APOTHECARIES ACT.

Several cases of prosecution under the Apothecaries Act, 1815, which have recently been before the Courts are deserving of notice, partly because the infringements of the Act complained of were analogous to the circumstances which chemists and druggists regard as undue interference with their business, and partly, also, because the persons proceeded against were themselves chemists and druggists. In one of these cases it was proved that the defendant, who had been an assistant to medical men, had without any qualification practised on his own account as an apothecary by interviewing patients, supplying them with medicine, acting as medical officer to several sick clubs, and giving medical certificates. The judge declined to accept the defence offered that the defendant was qualified to act as a chemist and druggist, and inflicted the maximum penalty of twenty pounds. In three other cases the proceedings were taken against the assistant of a chemist, on the ground that he had acted as an apothecary without qualification. No defence was offered in these cases, and as the full penalties with costs, altogether amounting to £65 5*s.* 6*d.*, were paid before the day fixed for the hearing, it may be inferred that there was no question of the prosecution being well founded. It is distinctly detrimental to the interests of pharmacy that such infringements of the province of medical men should take place, and it would appear to be desirable in the interest of the pharmaceutical body that there should be a power of removing from the Register of Chemists and Druggists persons who offend in this way against the law, the interest of the public, and the credit of their own calling. A special point of interest presented by the last mentioned cases is the fact that the proceedings were directed against a person who had infringed the Apothecaries Act in the capacity of an assistant, and not against the proprietor of the business, who no doubt derived a profit from the acts complained of. It will be seen, therefore, that the principle of personal responsibility for infringement of the law which has recently been applied in relation to the Pharmacy Act is by no means one confined to cases occurring under this Act, but that, as a general rule, it is only by the recognition of that principle breaches of the law can be adequately reached. At the present moment respect for qualification is one of the objects most necessary to secure in the interests of registered members of the Pharmaceutical body, and as it is only by observing the law in our own action that we can expect the same to be done by others, it is to be regretted that sometimes chemists and druggists fail, as in the cases above mentioned, to comply with this primary necessity.

THE NEW GERMAN PHARMACOPŒIA.

The German Pharmaceutical journals report that at a sitting of the Bundesrat, on the 12th of this month, it was decided to adopt, with some slight alterations, the proposed draft of a Pharmacopœia which has been prepared by the Standing Committee appointed for that purpose in 1887. The new Pharmacopœia will come into force on the 1st of January, 1891. It will be published in the German language, instead of Latin, which has hitherto been adopted, but the Latin names of the several articles will still be retained with the corresponding German names as synonyms, and consistently with that alteration the work will be entitled "Arzneibuch." Among the articles newly introduced into this Pharmacopœia are acetanilid, trichloracetic acid, antipyrin, cocaine hydrochloride, codeine phosphate, the hydrochlorides of homatropine and hyoscine, keratin, menthol, naphthalin, naphthol, paraldehyde, phenacetin, physostigmine sulphate, resorcin, salol, sulfonal and thalline sulphate, fluid extracts of condurango, hydrastis and *Rhamnus Frangula* and tincture of strophanthus. A considerable number of the drugs and preparations comprised in the present Pharmacopœa Germanica are excluded; among these are codeine, quinine bisulphate, quinoidine, morphine sulphate and sodium benzoate. The additions to the poison schedule are the hydrochlorides of homatropine and hyoscine and physostigmine sulphate. The list of reagents has been considerably altered and prominence is given to the solutions for volumetric analysis. The table of synonyms has also been much extended. In the formulæ the term "part" is intended to indicate part by weight in all cases where the contrary is not especially stated. A table of maximum doses is given adapted for adults, and pharmacists will be held responsible for not exceeding these doses in any case in dispensing medicine, unless the physician's prescription ordering a larger dose bears the mark (!) as a specific indication that such is his intention.

The Committee on the Pharmacy Act (Ireland) Amendment Bill has been postponed until Thursday the 19th, but being the twenty-third order of the day, and opposed business, it will probably be again deferred. Since last week several amendments that had for a time been allowed to drop out have been restored to the notice paper. These amendments have for their principal object to make the title of the class proposed to be created by the Bill "druggists" instead of "chemists and druggists," and to limit the right to registration without examination to chemists and druggists practising as such in Ireland as principals, and styling themselves as such, at the time of the passing of the principal Act, who would also retain the right to use the title "chemist and druggist." But persons who have gone into business as chemists and druggists as principals, and styling themselves as such, after the passing of the principal Act and before the 1st of January, 1888, or who shall have completed a term of service as apprentice or assistants of not less than four years at the latter date, would be entitled to registration upon passing an examination in English orthography and composition, arithmetic, weights and measures of the British Pharmacopœia, the appearance of the various drugs and chemicals, and the usual tests for poisons in common use and their antidotes. Another amendment would strike out the clause in which it is proposed to repeal the section in the original Act giving to the Council of the Pharmaceutical Society of Ireland power to create a class of chemists and druggists.

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It is now announced that the arrangements for the fifty-eighth annual meeting of the British Medical Association, which is to be held in Birmingham from Tuesday, July 29 until August 1 next, are nearly complete. The retiring President is G. G. Wheelhouse, F.R.C.S., and the President-elect is Willoughby Francis Wade, B.A., M.B., F.R.C.P., Senior Physician to the Birmingham General Hospital. The Address in Medicine will be delivered by Sir Walter Foster, M.D., M.P.; in Surgery by Lawson Tait, F.R.C.S.; and in Therapeutics by Dr. William Henry Broadbent. The scientific business of the meeting will be transacted in twelve sections. The Annual Museum will be held in the Queen's College, one of the sections being devoted to food and drugs, including antiseptic dressings and other chemical and pharmaceutical preparations, and another to sanitary appliances.

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On Wednesday morning, the 9th of July, the Society of Chemical Industry will hold its annual general meeting in University College, Nottingham, under the presidency of Sir Lowthian Bell, Bart, F.R.S. In the afternoon and on the two following days visits will be made to various works and places of interest, and there will be a Conversazione at the Castle and a Dinner in the Exchange Hall. Mr. Rider Cook has been nominated as the next President.

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The Programme of the forthcoming meeting of the British Association at Leeds has also been issued. The first general meeting will be held on Wednesday evening, September 3, when the President-elect, Sir Frederick Abel, will deliver an address. The evening discourses will be on "Mimicry," by Mr. E. B. Poulton, F.R.S., and on "Quartz Fibres and their Application," by Professor C. V. Boys. Professor T. E. Thorpe, F.R.S., will preside over the Section of Chemical Science, and Professor A. M. Marshall, F.R.S., over the section of Biology.

* * *

A notice has reached us from Mr. J. Holding, the Divisional Secretary for West Islington, that a Conference of the chemists and druggists of Islington, St. Pancras, Marylebone and Hampstead will be held in the Music Room of the Midland Hotel, Euston Road, on Thursday, the 26th inst., at 3 p.m., to discuss subjects of interest to the trade. The President of the Pharmaceutical Society has promised to be at this meeting and to make some observations on various important matters.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 18 *and* 19, 1890.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Davies, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was present on the 18th on behalf of the Privy Council.

MAJOR EXAMINATION.

18*th.*—*Four* candidates were examined. *One* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Cox, Frederick Hudson	Southampton.
Farnworth, Walter	Blackburn.
Hulme, Harold Edwin	Pendleton.

19*th.*—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Johnstone, Edward Straus	Whaley Bridge.
Lovibond, James Joseph	Plymouth.
Marsden, Frederick Steele	Snaith.
Wilkinson, William	Bradford.

MINOR EXAMINATION.

18*th.*—*Twenty-four* candidates were examined. *Fourteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Blayney, William Cowan	London.
Clarkson, Richard Bell	Newark.
Coleman, John David	Cardiff.
Curtis, Michael	Malvern Link.
Dalby, William James	Hastings.
George, David	Cardigan.
Goddard, Henry Edward	Great Yarmouth.
Hocking, Francis Almond	London.
Hodson, Ernest Albert	Bromsgrove.
Holt, James Hartley	Ormskirk.

19*th*—*Twenty-one* candidates were examined. *Thirteen* failed. The undermentioned *eight* passed and were declared qualified to be registered as Chemists and Druggists:—

Leighton, Thomas Taylor	West Hartlepool.
Mountain, John Thomas	Woodbridge.
Pattison, Thomas Dowson	West Hartlepool.
Payne, Joseph Hind	Wainfleet.
Pears, Harry William Kilby	Brighton.
Shaw, Tom	Rochdale.
Simpson, James William	Maidstone.
Tompsett, Walter Hartnup	Maidstone.

MODIFIED EXAMINATION.

19*th.*—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Chemist and Druggist:—

Walters, John	Penarth.

PRELIMINARY EXAMINATION.

19*th.*—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Anderson, David	London.
Brown, Richard Moss	Nottingham.
Christopher, Robert George	London.
Drust, John Hubert	North Ormesby.
Fletcher, Fred Taylor	London.
Furness, Thomas Edwin	Oldham.
Fyson, Rupert Arthur	Dorking.
Gardiner, Percy	Oxford.
Lloyd, Hugh William	Bala.
McKenzie, Alexander Thomas	London.
Palk, Harold William	Totnes.
Sayers, Edgar Brooks	Canterbury.
Swann, Albert Ernest	Bath.
Thomas, William John	Beaumaris.
Whitworth, John Handley	Southport.

MEETING IN EDINBURGH.

ELECTION OF EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the members and associates in business of the Society residing in Scotland was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, June 19, at 12 noon. The chair was taken by Mr. William Gilmour, F.R.S.E.

The Chairman said according to the agenda paper he was apparently expected to make some remarks. By this he supposed he was required to say something on behalf of the retiring Executive by way of giving an account of its stewardship. He had no special point to bring before the meeting. The last session had been a quiet, though not unimportant one. Several important matters had been brought forward, and he thought good would result from the discussions that had arisen regarding them. The annual report of the Executive, which was sent to the Council at the end of April, contained all the information it had to give regarding the active work in which it had been engaged during the year. He might perhaps call attention to one or two points in that report. The examinations had been conducted on the old lines. The alteration in the dispensing department, by which two hours were now devoted by each candidate to that subject, had given every satisfaction. He thought it was not only fair to the examiner that a candidate should have a greater selection of prescriptions, but it was doubly fair to the candidate. The setting aside of two hours to dispensing had worked smoothly with the arrangements as to other subjects under the able direction of their chairman, Mr. Stephenson. They would have seen the report of Sir Douglas Maclagan, the Government Visitor to the Scotch examinations, which was published recently in the Journal. It was on the whole a favourable report, but he had again and again pressed upon the Board the necessity of a definite curriculum of study. He (Mr. Gilmour) thought that would not entail any great hardship on young men. It would let them know more precisely what they were to be examined upon, and would thus prevent them frittering away their time to a great extent. It was very desirable, also, that there should be a proper schedule or syllabus of the Examinations, so as to guide them in their studies. The failures in the examinations still continued, he was sorry to say, to be heavy; although rather fewer than last year. The evening meetings had been very interesting. They opened with a most interesting paper by Professor Fraser, and they had also had an excellent address from the Vice-Chairman, and valuable papers by several other gentlemen. They were indebted greatly to members who contributed papers from year to year; and who often came forward to fill the places of those who promised, but failed to fulfil their engagements. He had prepared to give a paper himself, but unfortunately he was prevented through illness. There was a growing difficulty in connection with these evening meetings. Manufacturing chemists who were in the way of having material for papers, and who formerly used to contribute many, did not now so readily come forward. Their trade secrets were now more carefully kept to themselves, and he could not blame them, for competition was now so keen. With regard to the library, one of the first things that would engage the attention of the new Executive would be the providing of additional shelving. There were a number of books for which there was not adequate accommodation, and this was a disadvantage. It would be seen that there was an increased circulation of books to the extent of 240 volumes, and the total number circulated during the year had been 1114. This indicated that there was a growing inclination among the members of the craft to keep their education up to date. And this was not all, for the Library was largely used for purposes of reference. The attendance at the rooms, numbering upwards of 3000, was slightly less than last year, but still very satisfactory, and the decrease was easily accounted for by satisfactory reasons. With regard to what might be called pharmaceutical politics he did not feel disposed to say much. They had had before them the question of the sale of methylated spirit on Sundays, and he was sure they all agreed with the propriety of the recent law prohibiting such sale. He thought the statements made as to the quantity sold by certain chemists were grossly exaggerated; still, no doubt the evil did exist, and it was well that it should be stopped. They had also considered the question of the sale of medicated wines, and had secured a clear definition of the revenue authorities' regulations. The question of the sale of methylated spirit in quantities not less than one quart, as recently proposed in Parliament, had also been also satisfactorily settled by the prompt action of the Society. He would merely refer to a question that had recently occupied a good deal of attention. He meant the Wheeldon case. He knew he was touching on debatable matter, and that he differed from many whom he highly respected, but he was clearly of opinion that the decision in that case was a right one. He had observed that at the present time the question of unqualified assistants to medical men was occupying the attention of the medical profession, and they seemed to be moving in the same direction as the Wheeldon decision pointed. It was not right, he held, to leave a shop in unqualified hands. He would not go further on that subject. With regard to the recent Pharmacy Bill, he thought no one would regret very much that it had been withdrawn. He hoped the new Bill would be more comprehensive and receive full consideration. In conclusion he had to congratulate them on the election of Mr. Storrar as a member of Council. The feeling that had been evoked in connection with his election had been one of the most cheering things he had ever had to do with, and he had received many communications which he had very highly appreciated. It had done this good, that it had given them a common interest in one of themselves, and that notwithstanding the fact of his being a country chemist. He did not by any means intend the reference to country chemists in any derogatory sense, but he thought they had sometimes been too much inclined to look to city men.

The Assistant Secretary then read the report of the Scrutineers as follows :—

“ *Report of Scrutineers.*

“ At a meeting held on April 16, the Executive appointed June 18 as the date of the election for the ensuing year. Two hundred and ninety-nine nomination papers were issued by the Assistant-Secretary on May 21.

“ The nomination papers returned showed that forty-three members and associates in business had been nominated, of whom the following twenty-four signified their willingness to act if elected :—

BOA, PETER, 119, George Street, Edinburgh.
COATS, JOHN THOMSON, 91, Broughton St., Edinburgh.
COULL, G., 17, Smith's Pl., Leith Walk, Edinburgh.
DAVISON, THOMAS, 338, St. Vincent Street, Glasgow.
EWING, J. L., 52, North Bridge, Edinburgh.
FISHER, JOHN HUTCHISON, 66, High Street, Dunfermline.
FRAZER, DANIEL, 127, Buchanan Street, Glasgow.
GIBSON, ADAM, Thistle Street Lane, East, Edinburgh.
GILMOUR, DAVID, 40, Bridge Street, Dunfermline.
GILMOUR, WILLIAM, 11, Elm Row, Edinburgh.
HARDIE, JAMES MILLAR, 68, High Street, Dundee.
JOHNSTON, JOHN, 45, Union Street, Aberdeen.
KERMATH, WILLIAM RAMSAY, 1, North Bell Street, St. Andrews.
KERR, CHARLES, 56, Nethergate, Dundee.
KINNINMONT, ALEXANDER, 69, South Portland Street, Glasgow.
LAWRENCE, SAMUEL, 101, George Street, Oban.
MABEN, THOMAS, 5, Oliver Place, Hawick.
M'ADAM, ROBERT, 34, Virginia Street, Glasgow.
MACKENZIE, JAMES, 45, Forrest Road, Edinburgh.
NESBIT, JOHN, 162, High Street, Portobello.
PATERSON, JAMES, 15, Regent Quay, Aberdeen.
STEPHENSON, JOHN BERTRAM, 48, Frederick Street, Edinburgh.
STRACHAN, ALEXANDER, 138, Rosemount Place, Aberdeen.
THOMPSON, THOMAS, 35, George Street, Edinburgh.

“ A voting list was accordingly drawn up, and on June 7 three hundred voting papers were issued.

“ The Scrutineers met last night at 8.30, and proceeded to examine the voting papers. The result was found to be as follows :—

Voting papers issued . . 300
„ returned . . 150

“ There were thus 150 votes to be recorded.

“ The following gentlemen have a majority of votes:

BOA, PETER, 119, George Street, Edinburgh.
FISHER, JOHN HUTCHISON, 66, High Street, Dunfermline.
FRAZER, DANIEL, 127, Buchanan Street, Glasgow.
GIBSON, ADAM, Thistle Street Lane, East, Edinburgh.
GILMOUR, WILLIAM, 11, Elm Row, Edinburgh.
HARDIE, JAMES MILLAR, 68, High Street, Dundee.
KERMATH, WILLIAM RAMSAY, 1, North Bell Street, St. Andrews.
KERR, CHARLES, 56, Nethergate, Dundee.
KINNINMONT, ALEXANDER, 69, South Portland Street, Glasgow.
LAWRENCE, SAMUEL, 101, George Street, Oban.
MABEN, THOMAS, 5, Oliver Place, Hawick.
M'ADAM, ROBERT, 34, Virginia Street, Glasgow.
MACKENZIE, JAMES, 45, Forrest Road, Edinburgh.
NESBIT, JOHN, 162, High Street, Portobello.
PATERSON, JAMES, 15, Regent Quay, Aberdeen.
STEPHENSON, JOHN BERTRAM, 48, Frederick Street, Edinburgh.
STRACHAN, ALEXANDER, 138, Rosemount Place, Aberdeen.
THOMPSON, THOMAS, 35, George Street, Edinburgh.

“ Eighteen names are reported, two being equal.

“ The voting papers and all other documents are submitted herewith.

W. GILMOUR, *Chairman.*

“ ROBERT AITKEN. CLAUDE F. HENRY.
“ WILLIAM BURLEY. JOHN ROBERTSON.”

The actual result of the poll was as follows :—

Gilmour	127	Mackenzie	101
Kinninmont	127	McAdam	99
Maben	127	Gibson	96
Boa	126	Kermath	93
Nesbit	121	Lawrence	83
Stephenson	121	Thompson	83
Frazer	117	Ewing	73
Hardie	117	Johnson	60
Kerr	117	Gilmour	58
Strachan	116	Coats	46
Paterson	107	Davison	41
Fisher	101	Coull	37

The Chairman said there were no informal papers. One paper had been received by post that morning and was therefore too late to be included in the enumeration.

Mr. David Maclaren, Edinburgh, moved the adoption of the report. He would like a word to express the pleasure they one and all had at the position taken by Mr. Storrar at the last election and they could congratulate themselves that the kingdom of Fife was now represented by one who, though he had been late in coming prominently forward as an active working member of the Society, had already made his mark. As to the report he regretted that one half of the members in Scotland had failed to take the part they should have done in this election. He was perhaps treading on delicate ground, but he would like to ask how it was that in Scotland members of the Board of Examiners were allowed to become members of the Executive, while they could not become members of the Council of the Society. It seemed to him that if they were allowed to do the one they might also be allowed to do the other. However that might be, he would say they had in the Executive now elected a body of men who had the interests of pharmacy at heart. As to the compulsory curriculum, he thought it would be a very wise step indeed to lay down a definite course of study for candidates. At present candidates had a very vague idea as to the knowledge required, and questions appeared to be sometimes asked over a very wide field and on a very broad basis. He had much pleasure in moving the adoption of the report.

Mr. Lindsay, Peebles, seconded the motion. He said that with regard to the sale of methylated spirit on Sundays, he could testify as a country chemist that in the country districts some action was necessary, and he entirely approved of the recent restriction. There was another question which he hoped the Council of the Society would keep in view. He referred to the increase in the spirit duty, which would bear heavily on chemists, and he trusted they would keep a vigilant watch on the interests of the trade in regard to it.

The report was unanimously adopted.

Mr. Watt, Haddington, said from the report just adopted, it appeared that Mr. Lawrence, Oban, and Mr. Thompson, Edinburgh, had obtained an equal number of votes, and as there was only one vacancy to fill, it would be for the meeting to determine which of the two should be elected. He understood that there was no precedent to guide them as to how the difficulty was to be got over, but it seemed obvious that they should follow the rule stated in line 113 of the Charter; by which, in the case of an equality of votes, the person presiding at any general meeting shall have a second or casting vote. He would suggest that the most impartial way in which to do this would be to place the two names in a hat and allow the Chairman to draw the lot.

This having been done, the Chairman stated that Mr. Lawrence, Oban, had the vote, and he was therefore elected.

The Chairman then declared that the first seventeen names on the list given by the scrutineers, together with the President of the Society (Mr. Michael Carteighe), the Vice-President of the Society (Mr. Alexander Bottle), David Storrar, Kirkcaldy, and James Watt, sen., Haddington, as ex-officio members, would form the Executive for 1890–91.

On the motion of the Chairman a vote of thanks was awarded to the scrutineers.

Mr. Storrar said he would like to take this opportunity of expressing his thanks for the support that had been given him in his election to the Council. He might say that he had now been put in a position of less freedom and greater responsibility and therefore must be careful in what he said. He could not go far wrong however, in saying that he appreciated very highly the compliment paid to him. He believed it was not a personal honour but a graceful recognition by their English friends of the Scottish claim for more representation. He was sure all would agree that it had been courteously and pleasantly done. For himself he appreciated very highly the recognition of that claim which they had given. With regard to the work of the Council, his experience was really so little that he must refer them to his friend and colleague Mr. Watt. But he had found already that there was a very great deal of hard and interesting work going on in the Council of the Society, and that this work received on the part of members of Council a great deal of attention and care. He must say that with regard to much of the work done by the Council he had already had his eyes opened. While on his feet he might say that they all united in congratulating their Chairman on his recovery from the severe illness under which he had been labouring for some time and they would congratulate themselves also that he would be able once more to preside at their meetings. They had always been fortunate in their Chairman in Scotland, and while they might have had as good a one, he was sure they had never had a better than Mr. Gilmour, or one who more deserved their confidence and respect. The Chairman had already gone very fully over the ground covered by the annual report but there was one point on which he might be allowed to say a word, and that was with reference to the Evening Meetings. They could not help having noticed that their energetic secretary, Mr. Hill, had had considerable difficulty in securing papers for these meetings and when these papers were secured there was not always so good an attendance as might reasonably be expected. He really thought some effort should be made to improve this state of matters during the coming session. It was a great pity that on the occasion say of such a paper as that of Professor Fraser at the beginning of the session there should not be a fair turn out to join in the discussion. He would further remark that it was a pity the Executive should have so little to do. They were told by a very distinguished person, not very remotely connected with Kirkcaldy, that:—

> "Satan finds some mischief still,
> For idle hands to do."

There was no reason why the Executive should do so little, but it had got into the position of being looked upon with some suspicion by the Council. He was not much of a Home Ruler, but he did think there should be some decentralization. Something in that direction might be done in connection with the new Pharmacy Bill, and the new Executive might turn attention to it so as to assist the Council in framing and carrying it into effect. The Executive might also very profitably employ its time in seeking to increase the membership of the Society in Scotland. Instead of 300 members as at present, they might very easily have double that number; indeed, Mr. Carteighe, as they would have seen, had indicated that there was something like a distinct promise to that effect when these premises were secured. It was the greatest possible mistake for those who did not approve of all that was done to retire from the Society, for they thereby deprived themselves of any power to influence the policy of the Council. So long as they failed to secure a larger membership they would be in the undesirable position of having legislation which was applicable to only a small portion of the trade. He would conclude by proposing that they give to Mr. Gilmour a hearty vote of thanks for his past services.

Mr. Watt, Haddington, said he desired to endorse what had been so well said by Mr. Storrar. The fate and fortune of the drug trade in Scotland were bound up with the Pharmaceutical Society. Some, he believed, thought otherwise, but he had no doubt it was so. The President made almost a passionate appeal to them after the last meeting to endeavour to raise the membership of the Society in Scotland, and he (Mr. Watt) should like to see that accomplished during the ensuing year. There were, no doubt, many obstacles in the way, but he thought matters looked more hopeful for the future. They were aware there was a new Pharmacy Bill to be introduced, and the President had indicated a mode of opening the door wider so as to increase the membership of the Society by an alteration of the bye-laws. That was hopeful, and the state of the Council now was, he thought, more favourable to what might be called trade interests. The new Bill would be placed before them, and he hoped the members generally would take it into their consideration and give the Council the benefit of their opinion and advice. He rather regretted that there was such a small meeting that day, for if they were to do anything there must be some bond of union among them, either by meeting together, dining together, holding a conversazione or something of that sort in order to bring them into harmony. At present they were something like a rope of sand. He would like to see them facing the enemy with a united and determined front, and he had good hopes that they would yet see a better and brighter prospect for the future of pharmacy. With regard to Mr. Maclaren's question about putting examiners upon the Executive, he would remind them that in Scotland they had a very limited area to draw from. In England there were about 2500 members eligible, while in Scotland there were only 300. For that reason they could not afford to dispense with such talent as was secured by having examiners upon the Executive.

Mr. Mackenzie said the President seemed to think Scotland was a cultivable field, and they should boldly suggest that it would help matters if they would give attention to some improvements in the organization at Bloomsbury Square. He thought if those in London would ask suggestions with regard to the proposed Bill or other matters, they would find the Scottish Executive very willing to give them; and they might also make raids into various districts with a view to induce members to join the Society. He hoped the promised Bill would be on a wider basis than the last one, and not be dominated exclusively by Bond Street notions.

Mr. Nesbit, Portobello, said it did seem a little incongruous that examiners should be on the Executive but he entirely agreed with what had been said by Mr. Watt. So few took an active interest that they could not do otherwise, but for himself he would be very willing to retire if such was the desire of the members. If the new Pharmacy Bill was on the same lines as the last it would have his support. He thought it should be sent down to local secretaries, so that it might be discussed in the several localities.

Mr. Watt, Haddington, moved a vote of thanks to the Chairman, which was passed with acclamation.

The meeting then closed.

Proceedings of Societies in London.

MEETING OF CHEMISTS AND DRUGGISTS AT VICTORIA PARK.

A Conference of the chemists and druggists of the north and north-east of London was held at 3 p.m. on Tuesday, the 17th instant, in the Board Room of the City of London Hospital for Diseases of the Chest, Victoria Park.

Mr. W. Harvey, Divisional Secretary of the Pharmaceutical Society for North-East Bethnal Green, who had organized the meeting, said he wished at the commencement of the proceedings to correct a misapprehension as to the origin of that conference. It had been suggested in one of the papers that the idea of holding the meeting had originated at Bloomsbury Square, but he wished most emphatically to deny that. Neither the Pharmaceutical Society nor his esteemed friend the President had had anything to do with the starting of that meeting. Most of those present were aware that last year the Pharmaceutical Society had appointed Secretaries for the various Parliamentary Divisions, who were requested to visit the chemists and druggists carrying on business in the respective districts, and thus form a means of communication between them and the Pharmaceutical Society. In the course of his visits in the district of North-East Bethnal Green, he had had many questions put to him which he had really found himself unable to answer satisfactorily, and he thought therefore that it would be a good plan to get two or three divisions amalgamated, and to arrange a joint meeting for the interchange of views upon matters connected with the trade. He consulted his friends, Mr. Barnard and Mr. Fitch, and subsequently it was decided to try and get one of the officers from headquarters to attend the meeting, and he was very pleased to say that their esteemed President had at once consented to be present. He was also much gratified to find such a good gathering, and he hoped that a great deal of good would result from it. Of course there was bound to be some diversity of opinion, but they must not forget that whatever the Council of the Pharmaceutical Society did was done for the benefit of the whole trade. He begged to move that Mr. R. O. Fitch be elected Chairman of that meeting.

The motion was seconded and carried unanimously.

The Chairman said that such meetings as that were greatly needed. Chemists and druggists, as a rule, stayed at home and minded their own business, but unfortunately they minded nothing else. Bloomsbury Square was to many of them a *terra incognita*, and whatever the Council did they thought must be wrong. He used to think so once, but when he went there he found that the Council did exactly what he should have done if he had been in the same place. He was convinced that the Council had done everything which it was possible for it to do within the lines of the law, and certain things which had been strongly advocated outside it did not do, because the law would not permit. He had great pleasure in calling upon the President of the Pharmaceutical Society to address them on the laws relating to pharmacy and the sale of poisons.

Mr. M. Carteighe said he believed the object of that meeting was a serious and earnest one. He was afraid that much of what he would have to say would appear to many of them to be more or less unsatisfactory. Probably some of those present, owing to the pressure of business and other causes, were not able to follow the work of the Pharmaceutical Society, and were under the impression that it possessed powers which it really did not possess, and he would therefore like to make a few observations as to the condition of the law as it affected their trade interests. Up to 1852 any person could practice pharmacy under any title he pleased, but in that year, thanks to the active labours and self sacrifice of Jacob Bell, an attempt was made to place pharmacy upon a proper footing. Notwithstanding his great exertions, all that Mr. Bell could induce Parliament to do was to enact that no person should assume the title of pharmaceutical chemist unless he had gone through some examination, but practically there was nothing in the shape of real restriction. When he was a boy it was a usual thing for a man who failed altogether as a schoolmaster to start as a chemist and druggist. The Bill of 1852, it was true, did not have a very great effect in the way of direct pecuniary benefit, but its indirect effect was of great importance. Although that Act did not interfere in any way with anybody's right to follow the calling of a chemist and druggist, it gave a stimulus to general education and helped to produce a larger number of efficient men, and, above all, it led to a very considerable number of men becoming enrolled in one great body. Mr. Jacob Bell proposed, but unsuccessfully, that no one should be allowed to dispense prescriptions and compound medicines unless he was a qualified chemist and druggist. The question of poisons did not arise in those days. For some time after the passing of the 1852 Act it was open to every person then in business as a chemist and druggist to join the Pharmaceutical Society without entrance fee, to become a Pharmaceutical chemist, and to take part in all the proceedings of the Society. Although a certain number of men came in, Mr. Bell's hope that the whole of the trade would come in and make the body strong enough for another attack on Parliament was not realized. In 1866 a Bill was drafted on the lines of the original Pharmacy Bill, by which it was proposed that all persons who were then on the register as pharmaceutical chemists should remain where they were; that all persons engaged in business who had not registered as pharmaceutical chemists should become chemists and druggists and have a register prepared for them free of expense; and that those two classes of persons should between them do all the compounding of medicines—do, in fact, the pharmacy of Great Britain. Again, there was no mention of poisons. That Bill, which was probably the best that could possibly have been drafted in the interests of the chemists and druggists, was presented to the then Home Secretary, Mr. Sidney Walpole, by a deputation of the Council, and he agreed to introduce it into Parliament. There were, however, certain things in it which were objected to by the then chemists and druggists. They said that a chemist and druggist of that time was as good as the pharmaceutical chemist, and by the Bill he ought to be made one straight away, and to become a member of the Society. But the Council had to consider those who were within the fold, as well as those who were outside, and on the other side, it was argued that it would be unjust to allow the existing chemists and druggists to come in on the same terms as those who had joined years before, and as those who had passed their examinations and paid the fees in the interval between 1853 and 1866. In that state of things a society was formed, called the United Society of Chemists and Druggists, by a number of energetic and active men of considerable experience (many of whom became officers of the Pharmaceutical Society), who organized an opposition to the proposed Bill. As a result of this unfortunate division of opinion between the chemists and druggists within the Society (who were then called pharmaceutical chemists) and those who were outside, the Home Secretary declined to introduce the Bill. Then in 1867 the Society went to Parliament again on the same Bill, and the United Society of Chemists and Druggists introduced a Poisons Bill—not a Pharmacy Bill. Both were referred to a Select Committee, which took evidence on the subject, but did not consider at all as to what titles people should have, or whether there was a substantial grievance or not. It simply reported that in its opinion it was necessary that there should be legislation in regard to the sale of poisons, and so the attempt to obtain more satisfactory pharmaceutical legislation was frustrated, and the end was further off than before. As a pharmaceutical body the Society had always objected to a Poisons Bill, although it held that a true Pharmacy Bill dealing with every man in the business would be a great boon to all. The Council of that day was compelled to take that Poisons Bill and make it as much of a Pharmacy Bill as it was possible to do under the circumstances. The Bill of 1868 did not deal with the compounding of prescriptions in the ordinary sense of the term. It said that a poison or a preparation of a poison should be a substance which had been put into the schedule by a process apparently under the control of the Council of the Pharmaceutical Society; but that was not quite the case, because although it provided that any substance might be added to the schedule on the passing of a resolution to that effect by the Council of the Pharmaceutical Society, there was a further important proviso that before the resolution could be carried into effect the approval of the Privy Council must be given to it. For instance, the Council of the Pharmaceutical Society had passed a resolution on two occasions in favour of including carbolic acid in the schedule, and had used the strongest possible pressure in that direction, but to no avail, as the Privy Council refused to sanction it. The former Medical Officer of the Privy Council, with whom they had much to do (Sir John Simon), the first Medical Officer of Health for the City of London, a man of considerable will and force of character, was of opinion that the schedule should be very much extended, but, unfortunately, he was not in office now. Others amongst their own body might not look very favourably on the extension of the schedule, but consider that, on the whole, unless there was something like a prescribed right to compound medicines and prescriptions, it was not an unmixed boon. The Pharmaceutical Society was a voluntary Society which had worked for the trade for very nearly fifty years to do it service, and it was a disadvantage to the trade that it had not been better supported by the trade generally. It was impossible for the Council to get measures passed through Parliament in these days unless it was supported by the whole of the trade. The difficulty was that those outside not only did not join them but actually tried to make out that everything the Council did was to their disadvantage. He was sorry that that was the position of things, but it arose largely from ignorance of the actual state of affairs; and there were certain people interested to some extent in keeping up the division. When he was a young man there was a feeling of immense strength that it was all moonshine to educate men for their business. Wholesale men used to complain that their business was being ruined—that they could not get men who had passed an examination to come and serve at their counters for a guinea a week. His answer was that he was very glad of it; they did not intend that qualified men should be got to work for porter's wages. They wanted a class of men who would stand up in the battle of life and persuade the public that they existed for its benefit, and from it get a decent reward for their services. Many thought it would be a great advantage if any person could prosecute an unregistered man for selling poisons without coming to the Council of the Pharmaceutical Society. That duty had been imposed on the Council by the Legislature, partly because it was supposed that its members knew more about cases of that kind than any outside body, and partly because being elected by the members of such a Society the Council might be relied upon to bring general common sense to bear on each case brought before it, and not become persecutor instead of prosecutor. Again, prosecutions cost money, and the Legislature thought that as the Pharmaceutical Society was the body to examine, it should also be its duty to carry out prosecutions. That duty the Council carried out to the best of its ability, and in carrying it out had had several important legal cases to consider and fight. Shortly after the passing of the Act there were complaints that certain associations carried on under the guise of co-operation, and other companies which were merely trading bodies, having been once established had begun to dispense and sell poisons, and in some cases had actually assumed the title of chemists and druggists. In the early days they did not assume that title, but they began to sell poisons, and they claimed that they did so lawfully if the person who actually dispensed the poison was himself a qualified man. They would remember the case which the Council dealt with of the man who was a grocer in the Tottenham Court Road and practically became a chemist and druggist. He took the chemist's shop next door, and kept the former proprietor as an assistant and began to carry on a kind of stores. He was sued in the county court and paid the penalty. Process was then served upon him for another penalty, when he immediately associated himself with six other persons, formed a company, and told the Council it might do its worst. When he was sued the second time the Council was told he did not exist, but had become part of a company. It was thought if there was anything in the principle of the person keeping an open shop being a qualified man, that this was a clear case of attempting to evade it, because this was an open shop conducted in the most open way. But the result of a series of proceedings in different courts of law was, with many ups and downs and various dicta from the judges, that at last it was settled that as a corporation could not be examined it could not be registered, and that, as there was no particular clause in the 1868 Act referring to such bodies, they were outside the Act. That was the technical finding, but in the course of the discussion there were many dicta, and the most important ones were given by Lord Selborne, who was justly regarded with the greatest possible respect, for the soundness of his law and the consideration he had for all interests. He said he should have had some doubt in arriving at the conclusion he did if the poison which had been sold had not been handed over to the person who bought it by a qualified chemist and druggist. It was argued that inasmuch as by the Act an executor, administrator or assign of a deceased chemist and druggist could, through the medium of a registered person, carry on business, there seemed to be no danger to the public in a Corporation doing the same thing, provided the person handing over the poison was properly qualified. In the Council of the Pharmaceutical Society, before that Bill went to Parliament, there were a few men (he was one of them) who objected to that clause altogether. They held that when a chemist and druggist died his qualifications could not be transferred to his executor, and it was not done in any other profession. On the other side it was contended that the trade was a curiously mixed one, and considering how livings were made in remote country districts, it would be a great hardship unless some provision of the sort were made. He and one or two of the younger men, who were opposed to the clause, were taunted with the fact that not being married men they could not understand the question. Since that decision of the Law Courts the Council had proposed several drafts of Bills for presentation to Parliament, and had actually considered that very clause, which was dangerous to their interests on account of the loopholes it left open. It had been proposed first of all to abolish the clause altogether, and secondly, to restrict the operation of it to three years, but both those propositions met with such an amount of opposition throughout the country that the Council had been obliged to give way. He was not finding fault, but he wanted to point out that if chemists and druggists insisted upon the right to leave their businesses to be conducted by their executors they could not logically object to corporations doing the same thing. The condition of the pharmacy law was this, that any seven persons could form themselves into a company and carry on business as chemists and druggists by means of a qualified assistant, and they could not be prevented. It followed also from what had taken place that in order to keep open shop a person must be registered, and if he did not himself sell or compound poisons, he must take care that the person to whom he deputes that duty is qualified. Baron Pollock and Mr. Justice Hawkins had laid down very clearly the amount of supervision necessary. This might at first sight appear a very bad thing for them, but they must remember that they carried on their business and asked for their prices on the basis of being qualified men, and if they were to say that any one of them should be at liberty to have any number of shops, with unqualified assistants to supply the public, they would be practically destroying their *raison d'être*. They were chemists and druggists because they were registered with special privileges, and they must not delegate those privileges to unqualified persons. Such persons might assist them in the conduct of their business in a proper way, but the moment that an unqualified assistant or apprentice was put into the position of a responsible qualified man the law intervened, and there was something to be said in favour of that from the trade point of view. Half-a-dozen capitalists, such as were now finding the sinews of war for certain enormous retail businesses dealing in almost everything, a syndicate of such persons who were on the register, might open a chemist and druggist's shop in every town and village in Great Britain and carry them on by means of irresponsible apprentices and assistants if owners were at liberty to delegate their authority to unqualified persons. That was the alternative which they had to face. Those who framed the Act of 1868 had no notion that there would be such an enormous development of company trading as there had been during the last twenty years. What was to prevent a Universal Chemist and Druggists' Syndicate from carrying on the whole business of the country, unless the law required that the person having charge of a shop and handing over the poisons must be a qualified chemist and druggist? From that point of view the recent judgment might be regarded as not being adverse to their interests. Of course there would be the difficulty of obtaining qualified men, and many might say the expense would be too great, but he believed there was no greater mistake than to look for the cheapest form of assistance in their business. He would like to see the expense of obtaining poisons made as great as possible. He wished chemists and druggists would remind those who might complain of prices what their qualifications were, and value them at a proper rate. The Council could do little or nothing for them in the way of promoting legislation in their interests unless those who were outside joined the Society and gave it their support; so long as they persisted in the view that everything done by the Council was adverse to their interests, the hands of the Council were tied and its power for good diminished.

The Chairman said he was sure they had all listened with pleasure to the eloquent address which Mr. Carteighe had delivered. If any one present wished for further information on any point he would now have the opportunity of putting questions.

Mr. Dwyer (Mile End) wished to know if any steps were to be taken to prevent grocers and oilmen from selling chlorodyne and similar preparations containing poison.

Mr. Carteighe said the sale of poisonous patent medicines by unqualified persons would probably be dealt with shortly outside the Pharmaceutical Society to commence with. If they, who were engaged in the business, were to move in the matter, it would be said they were merely looking for a little extra profit, but if the question were raised by someone outside who believed that it was a dangerous thing that preparations of poisons should be sold in that way, they, as a body, would come into Court with greater chance of obtaining a satisfactory judgment.

Mr. Dwyer asked whether such articles came under the provisions of the Pharmacy Act as to the selling of poisons.

Mr. Carteighe said the Act had not yet been so read, and they could only be brought in lawfully by going before a superior Court and contesting a case.

Mr. Barnard thought chemists, as traders, ought now to consider whether the time had not arrived when the Pharmacy Act should be repealed and a new Act passed to meet the present requirements. This was a time of progress, and since 1868 many great and important changes had taken place which called for an alteration of the law. He had great hopes, if they went to Parliament for a great extension of their privileges, that they would get them, because they had the Law Courts behind them to a certain extent. With regard to the question of extending the poisons schedule, it was evident that if such things as spirits of salt, oil of vitriol, and the like, were included it would be almost impossible to carry on many manufacturing businesses, and they would never get such an extension as that if they were to ask for it. They could, however, reasonably hope to obtain an Act which would schedule all kinds of poisons used for human consumption and the cure of diseases.

Mr. Holmes (Upton Park) asked if any legislation had been proposed or considered by the Council, dealing with the employment of unqualified men in open surgeries.

Mr. Carteighe said that no action had been taken. He did not himself think any legislation was needed on the point, because he believed that the unqualified servant of a surgeon would be held by the Courts to be on the same footing as the unqualified assistant of a chemist and druggist.

Mr. Kirk mentioned a case in which his assistant offended a customer by declining to let her have a packet of Battle's vermin powder. In London chemists did not know the great majority of their customers. A customer might obtain a packet of vermin killer and sign the book as "Mary Jones," and afterwards commit suicide, and then it would turn out she was "Jane Smith." The seller might not know her although she was a good customer. Would he be liable to a penalty of £5 in such a case?

Mr. Carteighe said he did not think so. In his opinion no magistrate would convict in such a case if ordinary care had been exercised. The word "knowledge" was a wide one, and the mere fact of not knowing a customer's name would not bring a seller under the Act.

Mr. W. G. Hattersley (Poplar) said that as nearly all present were in business in the East end of London, he would like to take that opportunity of pointing out the great advantage they would all derive if they agreed to close at, say, 9 o'clock, instead of keeping open till 2 or 3 o'clock in the morning. Some of his neighbours he believed kept open all night.

Mr. Hatfield (Limehouse) said that chemists were unfortunately as a trade at sixes and sevens, and suspicious of each other. If they were to unite together, instead of remaining isolated as they were, it would be a great benefit to them all.

The Chairman said he would like to refer to the recent increase of the duty on spirit, which affected chemists to a slight extent. If they used half an ounce of spirit of wine in preparing a tincture, the extra cost was too small to enable them to charge anything more for it, but as great many grains made a mountain so a great many fractions of a penny made a considerable difference to them, and he did not think it right that it should fall upon them. He had taken upon himself to write to the Chancellor of the Exchequer on the subject, and if they had all done the same he believed that 13,000 letters from the chemists and druggists of the United Kingdom would have had the desired effect. He had also written to his member, Sir Charles Russell, who in reply wrote: "The case certainly seems a very hard one, but I do not see why you should not endeavour to recoup yourselves by enhanced prices." From that it would seem that they were not charging enough, and he was inclined to agree with that opinion.

Mr. Beaton said that if he supplied a small quantity of methylated spirit on a Sunday he would be doing an illegal act, though persons might buy as much whiskey as they liked, and the sale of that would be legal. He thought that was anomalous and unfair.

Mr. Carteighe said that it was a fact that many persons in certain parts of Edinburgh and Glasgow bought methylated spirit on Sunday for the purpose of drinking in lieu of ordinary spirit. It was a most dangerous practice and he did not think they could reasonably object to that limitation on the Sunday. If a medical man wanted methylated spirit and he wrote it down in the form of a prescription, he did not think the authorities would prosecute if it were supplied.

Mr. Kirk asked whether chemists were allowed to sell, say, 2 ozs. of spirit of wine for ordinary purposes.

Mr. Carteighe said he did not think any proceedings would be taken against a chemist for selling a small quantity of spirit of wine, if he acted in good faith.

Mr. Bell said he had listened with great pleasure to Mr. Carteighe's address. He had been the local secretary in Hastings for many years, and had always found that when he took an interest in pharmaceutical affairs the Pharmaceutical Society took an interest in him. If chemists and druggists supported the Council it would be able to do much for them, but if they did not intend to support it that meeting would be comparatively of little use.

Mr. Hatfield said it would be an excellent thing for Mr. Carteighe to go back to his colleagues with an expression of opinion from that meeting that it was their intention to support the Council in its efforts. He would therefore move—

> "That this meeting of East end chemists, assembled at a conference held at the Victoria Park Hospital, considers that the Pharmaceutical Society deserves the support of the trade, and will use its best endeavours to support the Council in any efforts it may make for obtaining amended legislation in the interests of chemists and druggists."

The motion was seconded by Mr. Kirk, supported by Mr. Hattersley, and carried unanimously.

Mr. John Holding said Mr. Harvey must be congratulated on the success of that meeting. He would like to mention that another meeting would take place on Thursday, the 26th inst., at the St. Pancras Grand Hotel, for the divisions of Islington, St. Pancras, Hampstead and Marylebone, at which Mr. M. Carteighe had consented to be present.

The Chairman moved a most cordial vote of thanks to Mr. Carteighe for his kindness in coming to explain the position of the law relating to pharmacy, which was seconded and carried unanimously.

Votes of thanks were also passed to Mr. Harvey for his services in arranging the meeting; to the Governors of the Hospital for their kindness in granting the use of the room, and also to the Chairman.

MEETING OF CHEMISTS AND DRUGGISTS AT BAYSWATER.

A meeting of the North Kensington Chemists' Association was held at the Leinster Hotel, Ossington Street, Bayswater, on Tuesday evening last at 9 o'clock. Mr. H. Long, Divisional Secretary, presided.

The Chairman said some people wanted to know what the Pharmaceutical Society had done for the trade interests. In the first place it had a splendid building equipped with every requisite for the study and advancement of pharmacy; and in the next place it was an organization which would be able, if they all joined it and supported it, to afford almost every facility connected with pharmacy they might desire. Most of them considered pharmacy from the bread and cheese side of the question, and they feared that although pharmacy was advancing the trade interests were retiring. In many instances the cheese had gone and the bread was fast vanishing, which showed the necessity for association. He did not think there would have been a Pharmaceutical Society if it had not been for external aggression. In 1841 a Mr. Hawes brought in a Bill very inimical to the interests of chemists, which caused the leaders of pharmacy to join together for the purpose of founding the Society, which obtained its charter on February 18, 1843. In 1852 they obtained the first Pharmacy Act, and in 1868 the Sale of Poisons and Amended Pharmacy Act. He was of opinion that what they wanted was a proper interpretation of that Act. If Parliament said no one person should do a certain thing, he did not think the judges had a right to say that seven persons might do it. He was happy to say they had Mr. Carteighe present, and he would therefore call upon him to address the meeting.

Mr. Carteighe said that the chemists and druggists in London knew very little of each other. Jacob Bell used to say that it almost required a big fire to get a chemist and druggist to leave his shop, and his experience during the last twenty-five years in connection with the Pharmaceutical Society was that it was exceedingly difficult to get them to attend meetings, however important they might be. If they would not combine together, not only in connection with the Pharmaceutical Society but in the District Associations for mutual good will and protection, they would run the risk of being pressed out completely. When they looked at the way in which miners, brickmakers, policemen and postmen were combining together it seemed very remarkable that druggists should go further away from each other and allow somebody else to take their place. The first difficulty that existed in regard to the formation of the Pharmaceutical Society was that of getting the men together, and he agreed with the Chairman, that if there had not been a clear aggression from the outside the Pharmaceutical Society would never have been founded. It was not to be wondered at that so many of the public should look upon them as persons who might be pressed out, considering the low value which some of them placed upon their own services. One of the worst things that could happen to the public would be that the great corporations which were affecting retail interests so much should wedge out the small chemists and druggists in the suburban districts and out of the way places. If they did not tell their customers exactly the position of affairs they must not blame the public for not understanding them. With reference to the decision of the judges as to the position of the corporations, it was no use kicking against the pricks. They might think the decision very wrong, but they had to submit to it. The wisest thing that the executive of the Pharmaceutical Society could do was to try to make the best of an imperfect Act of Parliament. He had received many letters from members of the public calling attention to the fact that they had been to this and that place and bought poisons from a boy or girl in the shop, which showed that the public was beginning to have its attention to these things aroused. If chemists and druggists chose to take the trouble to sell a poison, to register it, and carefully comply with all the conditions required by law for the amount of money given generally to a crossing sweeper, they had themselves to thank for being underrated and their services undervalued. He was glad to notice that in quarters where for some years there were complaints about high prices, there had been recently a reaction in favour of the pharmacist. They had learnt his value, but it was a process of education. Mr. Justice Hawkins and Mr. Baron Pollock both stated that you must lock up your poisons when you go away. If they had to exercise that amount of care it meant that they must make the public pay for that care.

Mr. Marsh said with reference to the late decision, he should like to know, if it was necessary that they should employ qualified assistants, how these were to be obtained; because it would be impossible to find a sufficient number. Could the Council institute a qualifying examination at an earlier age than 21?

Mr. Carteighe said at present there was no such power.

Mr. Andrews said that 5000 or 6000 people either kept no assistant at all or worked with an apprentice or unqualified assistants. There was a very serious outlook before them, and it might be considered advisable by some that the less important things in the schedule might be sold by assistants or apprentices of a certain standing, but not qualified.

Mr. Carteighe said that would require a fresh Act of Parliament, and he did not think it would be at all advisable.

Mr. Watson said it would be creating another modified class of assistants to come forward, and would be repeating what took place in 1868.

Mr. Parker said they were now beginning to feel the trouble following from want of foresight. They were crying out now because their assistants could not sell these poisons or take their place when they wanted to leave the shop; but if the Bill had passed as originally proposed their assistants would have passed the Minor and could have been accepted to do what they wanted them to do. Further, there were many complaints that chemists and druggists were not exempted from jury service; if the Act of 1868 had not been opposed by themselves every chemist in business would have been exempt. Recent decisions had placed them in a most awkward position, and it would be almost impossible to meet them legally. They must do the best they could, and wait a little time until the demand for qualified assistants had been met by the supply. No doubt there would be in those decisions an enormous stimulus for young men to get through the examination, and in a few years' time no young man will have reached twenty-one without having passed the Minor examination. They might have to pay a little higher price for them, but they would have to get a little better price from the public. With regard to poisons, he did not know whether they were prepared to put a patent medicine stamp on a couple of ounces of chlorodyne. If a doctor prescribed two ounces of Fellows's syrup it should bear an *ad valorem* patent medicine stamp. He maintained that they could not at present strictly obey the law, but they must do the best they could, in the hope that in a few years' time the conditions would be altered.

Mr. Carteighe said there was a letter from Mr. Horsley which raised the question of the amount of subscriptions to the Pharmaceutical Society. It suggested that if the subscription were reduced to half a guinea it would tempt many people to join the

Society. He did not concur with that view at all; but thought it might be advisable to allow a man to compound his subscriptions for a comparatively small sum.

Mr. Pickard thought it would do no good to reduce the subscriptions to one-half. If they were remitted altogether, and the amount made up by an increased examination fee and a charge for the Journal, he believed the Society would be quite as strong financially as now.

The Chairman proposed a hearty vote of thanks to Mr. Carteighe for coming to give them such good counsel, which was seconded and carried unanimously.

An informal conversation on organization and other questions affecting the interests of the trade then ensued.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, June 12, Mr. E. White, Vice-President, in the chair.

The first paper read was on "The Iron Scale Preparations," by Mr. H. Fairburn. The preparations considered were citrate of iron and quinine, ammonio-citrate of iron, and potassio-tartrate of iron. The methods of making these preparations, which are official in the British, American, French and German Pharmacopœias, were contrasted and compared with each other. Of citrate of iron and quinine, B.P., six ordinary trade samples were analysed, with the following results:—

	Percentage of quinine.	Percentage of Fe_2O_3.
1	13·5	21·54
2	13·72	19·88
3	13·07	18·08
4	13·00	19·7
5	13·58	18·14
6	14·04	18·29

Of these all contained traces of sulphates, and in No. 5 the quantity was considerable, being equivalent to 3 per cent. of H_2SO_4, or rather more than enough to form neutral sulphate with the quinine, which was probably introduced in that state instead of being first precipitated as the Pharmacopœia directs. The quinine was estimated by shaking the solution with ammonia and two or three successive quantities of ether, evaporating the separated ethereal solutions, and weighing; the ferric oxide was estimated by direct ignition.

Six specimens of ammonio-citrate of iron yielded the following percentages of ferric oxide, 32·3, 32·0, 32·9, 32·7, 33·2 and 30; all contained traces of sulphate, and No. 5 a large quantity.

Four specimens of ferrum tartaratum gave these results:—

	Fe_2O_3 per cent.	K as K_2CO_3 per cent.
1	30	11·1
2	37·5	16·9
3	37·0	19·4
4	30·0	7·2

The precipitate obtained on the addition of a little acid to a solution of ferrum tartaratum was also analysed and found to correspond with the formula $Fe_2O_2C_4H_4O_6$.

The paper gave rise to a discussion in which the Chairman, Messrs. Ough, Hayton, Browne, Fuge and the Secretary took part.

The next paper read was a—

NOTE ON THE ESTIMATION OF REDUCED IRON.

BY H. D. FUGE.

Reduced iron is prepared by passing a current of dried hydrogen gas over heated ferric oxyhydrate, deoxidation being effected in accordance with the equation $Fe_2O_2(OH)_2 + 3\,H_2 = 2Fe + 4\,H_2O$, but as this reaction is not completely realized in practice and oxygen is absorbed on exposure, the resultant product is a mixture of metallic iron with a variable amount of oxides. As the medicinal effects are supposed to be dependent on the amount of metal present, the Pharmacopœia very rightly fixes a limit (50 per cent.) to the amount of oxides which may exist in samples intended for medicinal use. The official test is based upon the fact that metallic iron forms soluble ferrous iodide when digested at a gentle heat with an aqueous solution of iodine and iodide of potassium, whilst the accompanying oxides are not affected. This test is of course of value, but results are largely influenced by the conditions under which the experiment is performed. Mr. E. Johnstone has made a number of experiments according to the iodine method, *e.g.*, digesting for various periods at a gentle heat, macerating in the cold for two hours, and again for forty-eight hours, rapid boiling, etc., but fails to obtain constant results. Digestion with bromine he finds to yield higher results than any modification of the iodine method.

A solution of neutral ferric chloride, sp. gr. 1·5, has also been suggested for the estimation of reduced iron, and is found to give results more nearly approaching those which I have obtained by the process I am about to bring before you.

This method depends on the facility with which iron displaces copper from solutions of its salts, a reaction familiar in the old experiment of placing a steel knife into a solution of copper sulphate, when the knife immediately becomes coated with copper, a corresponding amount of iron passing into solution ($CuSO_4 + Fe = Cu + FeSO_4$).

If reduced iron be placed in solution of copper sulphate the minute state of sub-division of the metal ensures that the whole of it passes into solution as ferrous sulphate; the latter may be estimated by a variety of methods; most conveniently by standard solution of potassium bichromate or potassium permanganate.*

The details of the method which I have found most convenient are as follows:—

A hot aqueous solution of 1 gram of crystallized copper sulphate in about 25 c.c. of water is poured upon ·3 to ·4 of reduced iron; the containing flask is immediately corked and agitated occasionally during ten minutes.

The liquid is then filtered, the residue washed with distilled water; the filtrate acidified with sulphuric acid, diluted with distilled water and titrated with either of the above-mentioned standard solutions.

The following results, which have been obtained by this process, suffice to show that it is capable of yielding constant results:—

		Percentage of metallic iron.
Sample A.	I.	52·8
	II.	52·5
	III.	52·9
B.	I.	46·7
	II.	46·6
C.	I.	39·6
	II.	40·5

The purity of the copper sulphate, so far as the above estimations are concerned, may be tested by adding a few drops of potassium permanganate solution to a weak acidified solution of the salt; an immediate change of colour should ensue.

Mr. W. F. J. Shepheard informs me that the facility with which a sample of reduced iron continues to burn after contact with a lighted match, roughly indicates whether it is fit for medicinal use or not.

In conclusion, I would suggest that the B.P. requirements would be met by a sample answering the following test.

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* The end reaction is in neither case obscured by the presence of a small amount of copper sulphate.

If 10 grains be added to a hot solution of 40 grains of copper sulphate in one and a half fluid ounces of distilled water, and shaken occasionally during 10 minutes; the liquid after being filtered and acidified should continue to give a blue precipitate with ferricyanide of potassium, until at least 297 grain measures of volumetric solution of potassium bichromate have been added.

A discussion followed, in which the Chairman, Secretary, Messrs. Browne, Shepheard and Sherlock took part.

The meeting then adjourned.

Provincial Transactions.

MEETING OF NOTTINGHAM CHEMISTS.

A meeting of the chemists of Nottingham was held at the Masonic Hall on Wednesday, June 11, to consider the Thursday half-holiday question, and decide upon some course with regard to it. Mr. Councillor Fitz Hugh, J.P., occupied the chair, and there was a very good attendance.

The Chairman, in opening the proceedings, remarked that a vote of the trade had recently been taken, and the results were so satisfactory as to lead him to hope for some uniform action.

Mr. Gill read the report of the vote, which was as follows:—78 papers issued, 65 returned; 32 in favour of closing from 1 to 6 p.m., 16 in favour of closing from 1 p.m. for remainder of day, 4 in favour of closing from 5 p.m. for remainder of day, 7 unable to close, being postmasters, 4 unwilling to close, 2 would do as the majority did.

After a short discussion Mr. Bolton proposed "That this meeting of chemists having received a good return of men willing to close their establishments on a portion of Thursday, and seeing that the requirements of the public are different in the suburbs to those in the centre of the town, it is decided to ask chemists to close in the outlying districts from 1 to 6 p.m., and in the centre of the town at 5 p.m., to commence on July 1."

This was seconded by Mr. Parker, and supported by Mr. Middleton. When putting it to the meeting the Chairman remarked that those who wished could close at 1 for the rest of the day, and hoped that as the public became accustomed to the movement it would be possible for all members of the trade to participate in the entire half-holiday.

This was carried unanimously, as was also a suggestion that the movement be judiciously advertised.

Mr. Bolton then called attention to the increased duty on spirit of wine, which would have to be paid by retail chemists, and would be equivalent to a second income tax upon them. He proposed that the Secretary of the Nottingham and Notts Chemists' Association be instructed to write to the local members of Parliament, calling their attention to the injustice, and asking them to endeavour to obtain exemption for chemists and druggists.

Mr. Wilford seconded, and it was carried *nem. con.*

Mr. Squires suggested that the secretaries of kindred societies should be asked to do the same, so that all the members of Parliament might be informed upon the matter.

This suggestion was considered, but found to be impossible, although it would no doubt have beneficial results if carried out.

At this point Mr. Fitz Hugh had to leave the meeting, and Mr. W. H. Parker was called to the chair.

Arrangements were made for holding a picnic next month at Hasleford, and several other matters of interest were discussed.

Mr. Parker wished to inform the meeting that a new Pharmacy Bill was being drafted, and it would be advisable for them to consider what things they thought ought to be included in it, so that when the draft was published they might criticize it in a reasonable manner. If they would join the Pharmaceutical Society, it would have greater influence in bringing to pass those measures which were desirable for the trade.

A vote of thanks to the Chairman brought a very pleasant and successful meeting to a close.

Parliamentary and Law Proceedings.

POISONING BY ARSENIC.

Mr. Harrison, Coroner for East Essex, held an inquiry at Terling on Wednesday, June 18, concerning the death of Mary Moss, wife of Charles Moss, coachman to Lord Rayleigh. The evidence showed that the deceased had died from irritant poisoning caused by taking arsenic mixed with barley meal in mistake for oatmeal which she was in the habit of using in the form of gruel. The oatmeal and the poisoned meal were kept on the same shelf. A verdict of "Death from misadventure" was returned.

Obituary.

Notice has been received of the death of the following:—

On the 21st of May, Mr. Henry Kellett, Pharmaceutical Chemist, Chapel Street, Salford. Aged 59 years. Mr. Kellett had been a member of the Pharmaceutical Society since 1853.

On the 25th of May, Mr. Thomas Greensmith, Chemist and Druggist, Market Square, Rugeley. Aged 73 years.

On the 28th of May, Mr. William Howell, Chemist and Druggist, Kenton, Devon. Aged 87 years.

On the 30th of May, Mr. Charles Wilkinson, Chemist and Druggist, Watergate Street, Chester. Aged 44 years.

On the 30th of May, Mr. John Phillips, Chemist and Druggist, of Cowbridge Road, Cardiff. Aged 60 years.

On the 4th of June, Mr. David Rees, Pharmaceutical Chemist, Newcastle Emlyn. Aged 28 years. Mr. Rees had been a member of the Pharmaceutical Society since 1883.

On the 4th of June, Mr. Noah Macallan, Chemist and Druggist, Ellon, Aberdeenshire. Aged 46 years.

On the 5th of June, Mr. James Edward Lynn, Chemist and Druggist, Wellington Street, Woolwich. Aged 75 years.

On the 9th of June, Mr. Charles Bostock, Chemist and Druggist, Rochdale Road, Manchester. Aged 42 years.

On the 11th of June, Mr. John Reid, Pharmaceutical Chemist, High Street, Montrose. Aged 69 years. Mr. Reid was apprenticed in Perth, and afterwards entered the service of Messrs. Duncan and Flockhart, Edinburgh. Subsequently, about forty years ago, he commenced business on his own account in Montrose. In 1863 Mr. Reid was elected on the Town Council and after filling sundry other municipal offices, he became Provost of Montrose in 1884. He was a Justice of the Peace for the county of Forfar, and a Fellow of the Society of Antiquaries, Scotland. Mr. Reid became a member of the Pharmaceutical Society in 1853, and at the time of his death was Local Secretary for Montrose.

On the 16th of June, Mr. William Scarlett, Chemist and Druggist, Brunswick Street, Hanley, Staffordshire. Aged 72 years.

Review.

CHRONIC BRONCHITIS AND ITS TREATMENT; A Clinical Study. By WILLIAM MURRELL, M.D., F.R.C.P., Lecturer in Pharmacology and Therapeutics at the Westminster Hospital, etc.*

All the writings of Dr. Murrell are well worthy of the perusal of pharmacologists and physicians. In the preface the author claims this *brochure* to be a simple record of clinical work extending over a period of ten years, and remarks, "I am satisfied if I have done anything to improve the methods of treating chronic bronchitis and winter cough;" and we, too, are satisfied that by the therapeutical soundness of his methods he has effected a great change in all respects for the better in the treatment of this most troublesome complaint. Those who have been accustomed to ring the changes on ammonia, senega, squill and ipecacuanha, according to the ancient and orthodox methods of prescribing will in the midst of repeated disappointment hail this work as a harbinger of success.

After a brief description of the nature of the complaint, the class of patients in whom it is met is graphically spoken of as "fishmongers who have to get up early in the morning, and transact their business in open shops; bargees and lightermen who periodically fall into the Thames and have to be revived with gallons of beer; unattached clergymen who hold forth in streets; and women whose periodical attempts to improve the census lower their power of resistance to atmospheric changes." Dr. Murrell then passes on in chapter II. to record his success in the application of ipecacuanha and other drugs by means of a spray.

For this purpose an ordinary hand worked ether-spray, or better, one of Siegel's steam sprays, is well adapted. The preparation of ipecacuanha employed is the wine, about two drachms being used at each sitting. At first it was given pure, but subsequently diluted with twice its bulk of water. The inhalation should last about ten minutes once, or better, twice a day, if asthma be associated with the cough. Ipecacuanha, as is well-known, belongs to that class of expectorants which depress the heart's action, lessen blood-pressure and increase secretion; but it is stated that when used as a spray it has little or no depressant effect, provided that the fluid which accumulates in the mouth is not swallowed. Hoarseness due to ulceration of the vocal cords was much mitigated by a course of ipecacuanha spraying.

Tartar emetic spray, gr. j–ʒj of water is efficacious when the sputa are thick and stringy, and better still vinum antimoniale and water in equal parts. But we venture to think that anything like repeated or prolonged use of the latter drug would rapidly induce a decidedly depressant effect. Tinct. of lobelia, the simple, not ethereal tincture, one drachm at a sitting is indicated in cases of bronchial asthma. Tincture of cantharides ♏v.–ʒj. of water and jaborandi spray in ʒij. doses of the tincture are said to be of value, and do not produce any marked constitutional effect, the only drawback to the latter being its liability to colour the skin and hair, a case in point being that of an old gentleman who came with a long snowy-white beard and went away with one of a green colour; "he did not notice it, but his friends did." Potassium iodide and ammonium chloride sprays have met with success.

The third chapter contains a good account of the administration of tar and its preparations, not pitch, but wood-tar prepared from *Pinus sylvestris* and *palustris*. It was generally given in the form of pills. Each pill contained two grains of tar, and after several trials it was found that the best basis was about one grain of lycopodium, the sporules of *Lycopodium clavatum*. The pill is given every three or four hours, and the catarrhal attacks were found to rapidly become less severe and frequent. A preparation of tar well adapted for children is the syrupus picis liquidæ, the formula for the preparation of which is given on page 67; but the precaution of washing the tar first in cold water must be rigidly adhered to, in order to get rid of certain acid properties which otherwise prove irritating. The preparation contains 4 per cent. of tar, but by adding a few drops of some alkali, such as ammonia, it can be made of any desired strength. It probably contains xylol, cresol, methyl cresol, pseudocumol, etc., and other substances "the names of which cannot be pronounced without danger to the health." The dose is ʒij. in water four times daily. The mixture of two parts of syrup of tar and one part of syrup of Virginian prune is an ideal one, and the expectorant action is much increased by the addition of 2-6 minims of a 2 per cent. solution of apomorphia. An excellent preparation known in America is wine of tar, composed of tar, rum and treacle.

Creasote, prescribed as follows:—Creasote ♏j., tinct. opii ♏ij., ætheris chlor. ♏xx., glycerine ʒj., aq. ad ℥j., and benzol according to this prescription, viz., benzol pur. ʒiss., ol. menth. pip. ʒss., ol. olivae ℥ij., in doses of ♏ij.–xxx. in sugar, are much recommended. Terebene is now of proven efficacy in winter cough and fetid bronchitis. A good combination is pure terebene, oil of cubebs and oil of sandalwood, diluted with liquid vaseline and administered by means of an atomizing apparatus. Pinol alone or pinol and terebene find much favour with Dr. Murrell.

A comparatively unknown drug, cheken, of the genus Myrtaceæ is much vaunted, both in chronic bronchitis and pulmonary hæmorrhage. The liquid extract in ʒij. doses in water is prescribed every four hours. Ammonium chloride vapour is well established now to be of considerable value in chronic catarrhal affections of the mucous membranes, and the author finds that the Vereken inhaler is the best. Its disagreeable saline properties may be well disguised by the addition of a little liquid extract of liquorice to the fluid in the inhaler, or better still, in a mixture of pure terebene, oils of cubebs and oil of sandalwood. *Grindelia robusta*, given as liquid extract, is mentioned on page 166 as serviceable in asthma, but much care must be taken that the drug is of good quality.

The book is written in a terse, racy style, much to the point, and interspersed with some quiet humour, which beguiles the reader from page to page. But its great value lies in the fact that every statement is supported by an array of successful cases. The indication for the use of each particular drug and its method of application are clearly and concisely put, and we earnestly recommend it to those who are constantly having cases of winter cough under treatment. The thanks of all are due to the author for his courage in venturing into so apparently unprofitable a field of pharmacological research, and we congratulate him upon the decided success he has attained.

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* London: H. K. Lewis, 136, Gower St., W.C. 1889. 8vo. Pp. 171.

BOOKS RECEIVED.

A TREATISE ON PRACTICAL CHEMISTRY AND QUALITATIVE ANALYSIS. By FRANK CLOWES, D.Sc. Lond., etc. Fifth Edition. London: J. and A. Churchill. 1890. From the Publishers.

A MANUAL OF PHARMACEUTICAL TESTING FOR THE MAN OF BUSINESS AND HIS ASSISTANTS. By BARNARD S. PROCTOR, F.I.C., London: Offices of "Chemist and Druggist," 1890. From the Publishers.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE FUTURE OF PHARMACY.

Sir,—I have read with pleasure the recent correspondence in the Journal on the above subject, and hope that this correspondence will still continue; at any rate, until it has been the means of arousing the chemists of the country to action, *i.e.*, by showing them the necessity of joining the Society, as by that means only can anything be done to alleviate the present grievances of the trade.

Without the unanimous support of the members and associates of the Society, the Council is powerless to do anything, as was recently shown in its having to withdraw the recent Pharmacy Bill, a Bill which was undoubtedly a step in the right direction, as anyone would acknowledge who had taken the trouble to peruse it.

The fact is, the Bill did not receive the support of the trade, simply because the majority of the trade positively knew nothing of its provisions.

There is, however, some excuse for the majority knowing nothing of the Bill; as undoubtedly in the greater number of cases it was owing to the members not having the time at their disposal to peruse it, on account of the unreasonably long hours through which they work. This brings up another question; viz., Cannot something be done to reduce these long hours of business?

They certainly are not necessary, and if there were but a little more *unity* amongst chemists, these long hours would very soon be reduced.

I, too, with Mr. Hart (whose letter appeared in last week's Journal), hope the time is not far distant when the Major shall be the qualifying examination. The question is often asked, What is the use of the Major examination under present circumstances from a business point of view? Practically it is no use; that is, as far as the public are concerned, as the public does not know the difference between a Minor and a Major man.

But by all means let us still have the Major, the passing of which only should entitle a man to the right of being the proprietor of a pharmacy, and let the Minor be the qualifying examination for the assistant which should give him the right to manage a business for a Major man.

Under such circumstances I think there would be no difficulty in introducing to the next Pharmacy Bill a clause having for its object the necessity of at least one member of a limited company being a qualified (Major) man before such company should be at liberty to set up in business for the dispensing of prescriptions, etc., and making it imperative also that such company should employ a qualified assistant to take charge in the absence of the qualified member of the company.

It is high time that something be done in the interests of pharmacy, for that reason, therefore, I make these suggestions, with the hope that they may be followed by others coming from abler and better sources than those of

Saffron Walden. W. N. S. RICHARDSON.

EARLY CLOSING IN LIVERPOOL.

Sir,—Will you kindly allow me to make an appeal to those of our fellow chemists in this city and neighbourhood who have not already joined in the early closing movement. It is a lamentable fact that in every fold there is a proverbial black sheep, and although we cannot get rid of him, we can generally afford to ignore him. But in Liverpool and district there are a few—and, I am happy to say, only a very few—chemists who appear to be very reluctant to close their pharmacies at the very moderate hour of nine p.m., and to these, not being black sheep, but highly respectable business men, I wish to point out that through their present attitude, all the labour of those who have tried to improve matters may be in vain. Surely it is not much to ask for ourselves and assistants, that they close their establishments one hour earlier than has been their custom, and yet this one hour makes all the difference between getting out for a walk in gas-lit street after dark, and having an opportunity of enjoying a stroll the sunset and twilight in the parks and lanes of t suburbs.

Another point I wish to mention is that the meeting Liverpool chemists, held at the Royal Institution on M 29, unanimously resolved to close every night excepting Saturday. I observe an indication of the thin en the wedge of dissent by some keeping open later on Fri "because the grocers do so." The publicans keep op till eleven every week night. Why not we also?

Let us all unite as men, throw aside all feelings jealousy or envy, snatch any opportunity, no matter h slight, of improving our position as a class, and let each stick to our guns. The public will respect us n the less that we are gradually throwing off the bonds drudgery in which we have been so long enslaved, a showing that we have a spirit above that of the sordid though still lean and starving apothecary.

JOHN BAIN.

Hon. Sec., Liverpool Chemists' Association.

122, Robson Street, Liverpool.

B.P.C. BLUE LIST, QUESTION NO. 8, CASCARA SAGRADA.

Sir,—I have a number of data and of results of observations bearing upon the answers to this interesting and important question, and propose in due time laying them before the Conference.

The question is very comprehensive, and seeks to include information of a therapeutic character which can only be authoritatively furnished by a qualified medical man. I shall be obliged to any of your readers who will furnish me with me with the names of gentlemen both able and willing to make the necessary observations, to whom I shall be most happy to furnish the necessary preparations of old (1888), and new (1889, and in a short time 1889 spring collected bark and of bark collected in winter.

JOHN MOSS.

PHARMACY IN COLOMBO.

Sir,—Referring to the extract from Mr. A. Tschirch's article upon "Pharmacy in Singapore and Ceylon," which appeared in your issue of May 31, may I be permitted to state for the information of your readers that the Pharmacy of Neil S. Campbell and Co., in the Cinnamon Gardens, Colombo, is appointed and conducted in a manner equal to first class pharmacies in Great Britain. The dispensers hold either Major or Minor qualifications of the Pharmaceutical Society.

NEIL S. CAMPBELL.

Clifford.—(1) *Anchusa sempervirens.* (2) *Holcus mollis.* (3) *Glyceria aquatica.*

Correction.—Mr. Hart asks that in the last paragraph of his letter that appeared in the Journal for the 14th inst., the words "make them members immediately upon qualification" may be read "immediately upon commencing business," etc.

J. H. R.—Both the time required and the effect produced have to be taken into account in making the comparison.

W. J. T.—The use of rain water, with a little ferric carbonate or a few rusty nails added, a glass vessel, plenty of light and as much freedom as possible from disturbance, have been recommended as favouring the keeping of leeches in a healthy condition.

T. C. Jones.—Possibly the coloration is due to a defect in the ammonia solution.

NOTICES.

School of Pharmacy Students' Association.—The last meeting to receive the report of the Executive Committee on the past session will take place on Thursday, June 2 the President, Dr. Attfield, F.R.S., in the chair.

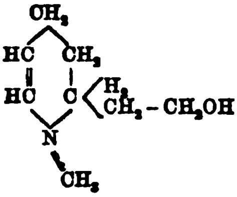
Chemical Society.—A meeting will be held on Thursday, July 3.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Draper, Stephenson, Bottle.

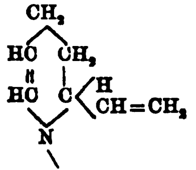
"THE MONTH."

Cocaine and Atropine.

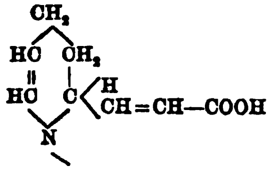
The most recent researches upon the chemical constitution of cocaine and atropine have not only demonstrated a most interesting relationship between the two alkaloids, but have made it probable that before long the synthesis of both these alkaloids will be effected. Atropine or hyoscyamine, as is known, can be saponified under the influence of alkalies, with the formation of tropic acid and tropine, and these can be recombined with elimination of the elements of water to form atropine. The constitution of tropic acid has been worked out, and it has been ascertained to be α-phenyl-β-propionic acid, but until very recently the constitution of tropine had not been determined. Professor Ladenburg suggested that it was a tetrahydropyridine with a methyl group attached to the nitrogen and an atom of hydrogen in the α-position replaced by an oxyethyl group. Buchka has suggested that its constitution might be represented by the following formula:—



Assuming this latter formula to be correct it became evident that tropine must stand in close relation to ecgonine, the basic decomposition product of cocaine, and this was still more apparent upon comparing the formula that might represent tropidine (the anhydride of tropine) with that attributed to anhydroecgonine, from which it would seem that the latter is a carboxylic acid of tropidine:—



Tropidine.



Anhydroecgonine.

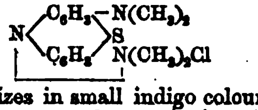
Again assuming the correctness of these representations, it should be possible to convert one of these bases into the other. This has been successfully effected by Dr. Einhorn, who by splitting off the carboxyl group from anhydroecgonine has converted it into tropidine, and has thus established the close relation of the cocaine and atropine series of compounds (*Berichte*, xxiii., 1338). As the same chemist a short time since (*Berichte*, xxiii., 219), by the condensation of α-picoline with chloral and elimination of chlorine and the elements of water from the product by treatment with alcoholic potash, obtained pyridylacrylic acid, and by the intervention of a bromine compound converted this into pyridyl-β-lactic acid, which he considers to be the mother-substance of ecgonine, it would appear that only a few links in the chain of synthesis of the two alkaloids are now wanting.

Japaconitine.

Some years since Messrs. Paul and Kingzett reported that they had separated from Japanese aconite a crystallizable alkaloid, differing in its characters from those attributed to any base previously obtained from aconite, which they represented by the formula $C_{29}H_{43}NO_9$ (*Pharm. Journ.*, [3], viii., 172). This statement was at first challenged by Dr. Wright, who alleged that the supposed new substance was simply a mixture of pseudaconitine and its decomposition products; but afterwards he reported that, in conjunction with Mr. Luff, he had isolated from Japanese root a peculiar crystallizable alkaloid, which was named "japaconitine" and represented by the formula $C_{66}H_{88}N_2O_{21}$ (*Pharm. Journ.*, [3], ix., 986). In a thesis recently presented at Dorpat, Dr. Lubbe has reported that in working upon material imported direct from Japan under the name of "kusa-usu," and believed to be identical in origin with that used by the chemists previously named, he had obtained still a different result, the crystallized alkaloid separated by him being, in his opinion, identical with crystalline aconitine from *Aconitum Napellus* roots (*Apot.-Zeit.*, June 14, p. 321). It was obtained in rhombic prisms, containing no water of crystallization, and melting at 183°-184° C., being the same figure as given by Dr. Wright. It may be remarked, however, that the formula attributed by Dr. Lubbe to this base ($C_{33}H_{44}NO_{12}$) does not quite agree with that given to aconitine by Messrs. Wright and Luff ($C_{33}H_{43}NO_{12}$), or by Herr Jurgens ($C_{33}H_{47}NO_{12}$), and in fact is not in accord with an accepted rule as to the construction of formulæ. Whichever may prove eventually to be correct among these conflicting statements, it will be seen that, without going outside the work of the chemists mentioned in this note, the characteristic alkaloid of *Aconitum Napellus* and that of Japanese aconite root alike enjoy the questionable advantage of having three different formulæ attributed to them. Pseudaconitine was not detected in Japanese roots by Dr. Lubbe. It is also incidentally mentioned in the thesis that notwithstanding aconitine is so powerful a poison it undergoes no chemical change in producing its effect, which is described as being "solely due to contact action."

Methylene Blue as an Anodyne

The fact that "methylene blue," a diphenylamine compound, when used in staining histological specimens, manifests a remarkable affinity for nerve tissue, and especially for the axis cylinders of the sensible and sensor nerves, suggested to Messrs. Ehrlich and Leppmann that it might prove to possess anodyne properties when introduced into the system (*Deut. med. Woch.*, June 5, p. 493). This idea has received therapeutic confirmation in experiments made in the Moabite Hospital, Berlin. These were carried out first with injections of a solution of a zinc-free compound, but a concentrated solution failed to yield a sufficient dose in the quantity thought desirable to be injected at one place (about 4 c.c. of a 2 per cent. solution) and similar negative results attended the use of a preparation of the acetate. It was therefore administered as a fine powder enclosed in gelatin capsules, containing each from 0·1 to 0·5 gram, the highest daily dose being 1 gram. The rapid passage of the methylene blue into the blood, even after the smallest doses, was clearly evident, since a quarter of an hour after its internal administration or injection the urine became pale green, in two hours blue-green, and in four hours dark blue, but no pathological constituents were found in the urine. A bluish coloration was also observed in the saliva and fæces; but no bluish tinge of the skin, mucous membrane or of the sclera was ever observed. It was found that in all definite forms of painful local affections, as, for instance, in all neuritic processes, and in rheumatic affections of the muscles, joints and tendon sheaths, it acts as an anodyne. The action is, however, somewhat peculiar, in that its effect is only manifested some time after administration, usually about two hours, but when suitable internal doses of 0·1 to 0·25 gram are administered, it goes on increasing gradually, until after a considerable interval the stage of painlessness is attained. The explanation of this slow action suggested is based upon observation of what takes place when methylene blue is injected into living nerve tissue. The coloration of the nerves that takes place immediately undergoes alteration; in the course of an hour the diffuse blue staining disappears and instead irregular intensely blue granules make their appearance in the axis cylinders of the nerve origins, the granules being eventually eliminated, probably mechanically, from the nerves. It is suggested, therefore, that there is a formation of an insoluble compound from the colouring substances and certain constituents of the nerve substance, which alters the chemical condition of the nerves and produces temporarily an anodyne effect. In agreement with this the action appears to be purely anodyne, and the compound produces no direct influence upon inflammatory swellings or effusions into the joints or tendons. No ill effects were observed to follow its long-continued use, and the injections are described as being almost painless. The substance used by Messrs. Ehrlich and Leppmann, and described by them as chemically pure methylene blue, free from zinc chloride and beautifully crystalline, was probably the tetramethylthionine chloride—



which crystallizes in small indigo coloured scales, with a tinge of copper or bronze on the principal surface and of cantharis green on the transverse fracture, and readily gives a 2 per cent. solution (*Annalen*, cxxx., 143). Formerly commercial "methylene blue" consisted of a double chloride of zinc and tetramethylthionine, which accounts for a material free from zinc being specified. The free "methylene blue" base, tetramethylthionine hydroxide, when dried over sulphuric acid, forms a dark amorphous mass, showing a green metallic lustre when triturated; it dissolves readily with a small quantity of water to form a syrup, and is also very freely soluble in alcohol. Solutions of the chloride give with sulphuric acid a grass-green coloration and with strong solution of caustic potash a violet-black precipitate.

Antipyrin and Sodium Salicylate.

Rather more than a year ago attention was called in the Paris Society to the fact that antipyrin and sodium salicylate, when dispensed together in the powder form, may form a pasty mass (*Pharm. Journ.*, [3], xix., 862). According to M. Vigier this alteration appeared to be accompanied by decomposition, the pasty product giving an alkaline reaction, although the salicylate is faintly acid. It was afterwards pointed out by a correspondent in this Journal (vol. xix., p. 920) that a mixture of the two powders can be kept in a bottle without change for several months. This apparent incompatibility has been exhaustively investigated by Professor Spica, of Florence, who reports (*L'Orosi*, May, p. 145) that the phenomenon of the passage into the liquid state of a mixture of antipyrin and sodium salicylate does not depend upon the formation of a salicylate of antipyrin, or the production of free alkali, but simply upon the absorption of moisture from the surrounding atmosphere. The oily liquid formed was ascertained to be perfectly neutral. It was found that antipyrin or sodium salicylate would remain unaffected when exposed separately under conditions in which a mixture of the two would deliquesce and increase in weight. When exposed in an atmosphere saturated with moisture the salicylate would deliquesce, but not the antipyrin; nevertheless, when deliquescence of a mixture of the two was in progress there was a stage at which any portion that remained solid consisted of sodium salicylate only, and was free from antipyrin. It therefore appeared that whilst the sodium salicylate acted as a carrier of moisture the antipyrin went most readily into solution. When the two compounds were mixed intimately in molecular proportions the deliquescence was not complete even after several days.

Antipyrin Salicylate.

Professor Spica also reports that he has succeeded in preparing a well-crystallized compound, which he considers to be a salicylate of antipyrin, and thinks may turn out to possess therapeutic value. It is said to be obtained by adding to a boiling very dilute aqueous solution of antipyrin, in small portions at a time, a molecular proportion of salicylic acid (100 of antipyrin to 73·4 of salicylic acid). If the quantity of water be sufficient, the liquid when boiling is clear, but if not a portion of the new salt is thrown out as a yellowish oil. In either case, upon slow cooling of the liquid, there is first an appearance in it of a certain milkiness and then of the well-crystallized salt. When, through deficiency of the solvent, the oily separation takes place, this forms upon cooling a yellow crystalline mass, which should be crystallized from a larger quantity of water. The salt occurs in fine crystalline scales, or in flocks formed of very small elongated crystals, the scales tending to group round a centre. Separately, the crystals are colourless and transparent, but in the mass they are white. They are very slightly soluble in cold water (1 in 250), more soluble in hot water, and freely soluble in alcohol, ether, chloroform, ether and carbon bisulphide. The solutions manifest a faintly acid reaction, and have a taste sweet at first and then bitter. The crystals melt at 89°-90° C., above which temperature they decompose. Left at ordinary temperatures in a vacuous space they do not sensibly diminish in weight, and on analysis give results corresponding with the formula $C_{11}H_{12}N_2O{\cdot}C_7H_6O_3$. In an atmosphere where antipyrin mixed with sodium salicylate will deliquesce, the antipyrin salicylate, mixed intimately with an equal weight of sodium salicylate, will not undergo change. The salicylate of antipyrin gives with ferric chloride the violet coloration characteristic of salicylic acid, and h nitrous acid the green coloration of antipyrin. ice the appearance of Professor Spica's paper tatement has been published by Dr. Scholvien the effect, that some time last year, a considerable ntity of antipyrin salicylate was sent to the rlin hospital, under the name "Salipyrin del," with a view to its being tested as to its rapeutic value. The therapeutic results so far obned are said to have been favourable and will be blished shortly. Dr. Scholvien states that a simr way of preparing the compound than that given Professor Spica is to heat together antipyrin and icylic acid in molecular proportions, with or hout a little water, on a vapour bath. The mixe melts to an oil, which upon cooling solidifies, crystalline cake being afterwards recrystallized m alcohol. Another method is to shake gorously together an aqueous solution of antipyrin d an ether solution of salicylic acid, when the mpound, which is almost insoluble in water and th difficulty in ether, separates slowly in handme crystals.

Poisoning by Antipyrin.

Dr. Schwabe reports a case where violent toxic mptoms were observed in a young woman who had been ordered antipyrin in one gram doses for severe neuralgic pains (*Apot.-Zeit.*, June 14, p. 322). Three minutes subsequently to taking a dose noon, after a meal, she complained of peculiar pressive pain in the back of the head. This s followed quickly by singing in the ears, giddiss and a feeling of anxiety; then by tumultuous art beat, difficulty of breathing, cold sweat, a rong feeling of heat on the right side of the body d of cold and numbness on the left. In twenty inutes the sight was affected followed by complete maurosis, lasting half an hour, when it gradually isappeared. The heart disturbance was excessive, he beats numbering two hundred to the minute uring the first hour; the speech also was affected. he symptoms perceptibly decreased during the fternoon and evening, but the patient felt very ill uring the next two days, though she eventually covered without any permanent injury.

Poisoning by Acetanilid.

Two cases of poisoning by acetanilid have also en reported recently, in both of which however excessive doses were taken (*Pharm. Zeit.*, June 21, p. 386). The first of these was in Dorpat, where a student took 29 grams. The dose was followed y the characteristic symptoms of aniline poisong; there was loss of consciousness and the skin er the entire body acquired a dark blue colour. nder medical treatment the skin was restored to s normal colour in three days. In the other case German woman swallowed 30 grams of acetanilid, ith the intent to commit suicide. Five hours fterwards she was found senseless, showing exeme cyanosis of the face, conjunctiva and extreities, which were quite cold; the skin was dry, ol, and bluish; temperature in the axilla 36°; ulse scarcely perceptible; breathing superficial and ardly to be heard. After washing out the stomach, he deep collapse was treated with injections of mphor emulsion, mustard poultices, brandy nd other agents, consciousness returning after welve hours. Blood taken from the finger-tips uring the cyanosis was dark red, slow to coagute, and gave a spectrum showing the lines characristic of methhæmoglobin. In addition, strongly pigmented particles were seen, which were considered to represent decomposition products of the red blood corpuscles. Aniline was detected in the urine and it has been assumed that the effects of acetanilid is due to aniline liberated by the decomposition of the compound in the system. But the editor of the *Pharmaceutische Zeitung* points out that most of the acetanilid of commerce is contaminated by impurities and suggests that experiments should be made with acetanilid that has been purified by treatment with potassium permanganate.

Test for Albumen in Urine.

According to Herr Zouchlos a mixture of potassium sulphocyanide and acetic acid is a more delicate test for albumen in urine than the potassium ferrocyanide and acetic acid solution, over which it also has the possible advantage of being colourless (*Pharm. Centralh.*, June 12, p. 353). It is prepared by mixing 10 c.c. of a 10 per cent. solution of potassium sulphocyanide with 2 c.c. of acetic acid. A few drops of this liquid, which can be kept unaltered for a considerable time, added to an albuminous urine, produces a turbidity or a precipitate according to the quantity of albumen present. Potassium sulphocyanide and succinic acid are said to act in a similar manner, and as these can be carried about separately in the dry state Zouchlos suggests that they would be convenient for clinical use; a mixture of the two is apt to deliquesce, but this could be avoided by enclosing it in gelatine capsules.

Sodium Alum.

In a recent communication to the Academy of Sciences (*Compt. Rend.*, June 2, p. 1139) M. Augé calls attention to erroneous statements made in standard works as to the physical properties of sodium alum. According to all authors sodium alum is exceedingly efflorescent and falls into a powder after some days; but M. Augé states that it is very slightly efflorescent and can be preserved unaltered several months. Wurtz gives its solubility as 110 parts in 100 parts of water at 16° C.; but M. Augé finds only 51 parts of the crystallized alum to dissolve in 100 parts of water at that temperature. Muspratt, Wagner and others state that sodium alum in solution, after having been heated to boiling temperature, loses its property of crystallization; but M. Augé states that such a solution may be boiled indefinitely without affecting the power of the alum to crystallize. M. Augé gives reasons for supposing that the first and third of these misconceptions may have had their origin in the occurrence of uncombined sodium sulphate in sodium alum as generally met with.

Constituents of Myrrh.

In a lengthy paper Dr. Oscar Köhler publishes the results of a chemical examination of a sample of "myrrha electa," supplied by Gehe and Co., of Dresden, and represented as coming from Sumali (*Archiv*, June 2, p. 291). The myrrh is described as being in irregular dark to light brown semi-transparent pieces, of different sizes up to the thickness of a walnut. It had an agreeable balsamic odour, and an aromatic bitter taste, felt greasy and left upon paper oily spots that after a time disappeared. When burnt it gave off white vapour and left 2·79 per cent. of ash, containing phosphoric acid, chlorine, iron, and especially calcium and magnesium. The myrrh having been powdered was submitted to steam distillation, the residue, after being freed from water, was extracted with absolute alcohol, and the distillate, soluble and insoluble portions were separately examined. Dr. Köhler reports that the crude myrrh consisted of gum, resin and essential oil. The portion soluble in water, but insoluble in alcohol, which amounted to from 57 to 59 per cent., was recognized as a gum having the formula of a carbohydrate, $C_6H_{10}O_5$. The portion of the myrrh soluble in alcohol was a mixture of resins, the greater part consisting of an indifferent soft resin (C), soluble in alcohol and in ether, represented by the formula $C_{26}H_{32}O_9$, in which three replaceable hydroxyl groups are present. Besides this there were two bibasic acid resins, one (A), represented by the formula $C_{13}H_{16}O_8$, and the other (B), by $C_{26}H_{32}O_9$. The essential oil obtained amounted to from 7 to 8 per cent., a quantity far in excess of that mentioned by Ruickholt (2·18 per cent.); the principal constituent corresponded to the formula $C_{10}H_{14}O$. The formulæ arrived at for the several constituents of the resin exhibit a certain correspondence, in that if the formula given for the (A) acid resin ($C_{13}H_{16}O_8$) be doubled all three formulæ will contain twenty-six atoms of carbon:—

$$\begin{aligned}&\text{Indifferent resin (C)} = C_{26}H_{31}O_2(OH)_3\\&\text{Resin acid (B)} \quad\;\; = C_{26}H_{32}O_9\\&\text{Resin acid (A)} \quad\;\; = C_{26}H_{32}O_{16}\end{aligned}$$

The differences between the resins therefore consisted essentially in the different amounts of oxygen they contained, and Dr. Köhler thinks this may find an explanation in different stages of oxidation, which would take place principally in the outer parts of the crude resin.

Croton Oil.

The varying statements that have been made with regard to the solubility and activity of croton oil (see before, p. 978) have induced Herr Reuter to experiment with a series of oils prepared in different ways (*Apot.-Zeit.*, June 14, p. 320). (1) Croton oil extracted direct from the seeds by means of alcohol, which was a very thick brownish-yellow liquid, soluble in light petroleum spirit and very freely in ether and in alcohol; it had a very acrid taste and consisted principally of free crotonoleic acid. (2) Oil removed by light petroleum spirit from seeds already extracted by alcohol, which was less acrid, contained only a trace of free crotonoleic acid, and consisted principally of the neutral glyceride. It dissolved with difficulty in absolute alcohol, but freely in ether and in light petroleum spirit. 5 c.c. shaken with 45 c.c. of alcohol and allowed to stand showed an oily layer measuring 2·5 c.c., so that the remaining 2·5 c.c. had dissolved in the alcohol in the proportion of 1 in 18. Upon adding 6 drops of oil No. 1 (free crotonoleic acid) the oil layer decreased to 1·8 c.c., and with 12 drops to 1·3 c.c., showing that, as recently suggested in these columns (before, p. 978), the solubility of croton glyceride in alcohol increases with the proportion of free crotonoleic acid accompanying it. This oil added drop by drop to 25 c.c. and shaken after each addition did not cause permanent turbidity until 24 drops had been added. (3) Oil extracted direct by means of light petroleum spirit from seeds not previously treated with alcohol had an acrid taste and contained, besides the neutral glyceride, some free acid, so that it might be described as an acid oil. Of this oil 31 drops could be added to 25 c.c. of alcohol before permanent turbidity was produced. (4) Oil extracted direct from the seeds by means of ether contained both neutral glyceride and free acid, the latter being present in rather larger proportion than in oil No. 3, as it is more soluble in ether than in petroleum spirit. This was shown by the addition of 37 drops to 25 c.c. of alcohol before a faint turbidity became apparent. (5) Croton oil of commerce; deep yellow; probably pressed from seeds. Added drop by drop to 25 c.c. of alcohol, turbidity was produced by 32 drops. In this and the previous cases the turbidity disappeared upon the addition of a drop or two of oil No. 1. Herr Reuter points out that as the methods of preparing croton oil differ, the proportions of the free acid and neutral glyceride in commercial oil may vary widely. Some manufacturers are said to have given up pressure as a means of obtaining the oil in favour of extraction with light petroleum spirit, which as shown by oil No. 3 would give an acid oil, whilst the proportion of free acid liable to be extracted would increase with the age of the seeds through the breaking up of the glyceride. Herr Reuter points out that Herr Hirschheydt has proved that a neutral oil, though free from some disadvantages attending the administration of an acid oil, is sufficiently active, since the neutral glyceride is split up in the human organism by the pancreatic ferment.

Camphor a Solvent of Iodoform.

According to Herr Sarzeau the addition of camphor to ether or alcohol increases the quantity of iodoform it is capable of dissolving (*Pharm. Cent.*, April 17, p. 236). To this Herr Haffer adds that olive oil saturated with camphor will dissolve as much as 6 per cent. of iodoform.

Protective Gauze Tissue.

In the *British Medical Journal* (June 14, p. 1367) Dr. Renton, of Edinburgh, describes a new form of gauze protective tissue, contrived with a view to "ensure the gauze or other dressings not sticking to the wound and still allow any discharge to be absorbed through it." It is made by stretching "coarse pale book muslin" on frames and soaking it with a mixture of isinglass, glycerine, water, aniline solution, bichloride of mercury solution (1 in 4000) and chloride of ammonium. When dry it is permanent and antiseptic. In using it a strip, the length of the wound and an inch in width, is cut and dipped into a tepid solution of bichloride of mercury (1 in 2000) and then applied over the wound, with the ordinary dressings above. Complete absorption of any discharge is said to be allowed, whilst sufficient dissolved isinglass remains as a coating over the wound to secure non-adherence of the tissue and thus enable the surgeon to remove the dressings without causing pain.

Nitroglycerin in Asthma.

Subcutaneous injections of nitroglycerin, in doses of 0·0005 to 0·001 gram, are recommended by Herr Hoffmann in angina pectoris and severe asthma (*Apot.-Zeit.*, *Rep.*, May 28, p. 156). The effect of the injection is said to be remarkable and no objectionable bye-effects have yet been observed.

Camphoric Acid in Night Sweats.

Camphoric acid, prepared through the oxidation of camphor with nitric acid, has been used experimentally by Herr Len in the treatment of the night sweats accompanying phthisis (*Apot.-Zeit.*, *Rep.*, May 28, p. 156). The average dose given was two grams, which was sometimes increased to three grams; the largest daily dose given was five grams, two grams at noon and three grams in the evening. A full result, the production of a perfectly dry skin, was obtained in about 60 per cent. of the cases; a partial result in 22 per cent.; and scarcely any result in 18 per cent. The acid, which is only slightly soluble in water, though more soluble in alcohol, is best given enclosed in wafers. It was observed that the action of the camphoric acid was sometimes not manifested in the night following immediately after its administration, but became first apparent in the next night and that its influence continued during several nights.

NOTE ON AN OFFICIAL TEST FOR PHYSOSTIGMINE.

BY JOHN C. UMNEY,

Pharmaceutical Chemist.

Whilst working recently through the tests of the pharmacopœial alkaloids, all were found to conform readily to the various requirements mentioned in that work, with the one exception of physostigmine. The Pharmacopœia in reference to this alkaloid reads thus:—"The aqueous solution has an alkaline reaction; when warmed with or when shaken with dilute solution of potash becomes red, and when evaporated to dryness over a waterbath leaves a bluish residue, the acidified solution of which is beautifully dichroic, being blue and red." The first and second tests were found perfectly satisfactory, but the last was quite the reverse. The aqueous solution neither left a bluish residue nor was its acidified solution in the slightest degree dichroic.

Being dissatisfied with the result of the test, I sought to ascertain the reason of its failure. The first thing that suggested itself was whether the Pharmacopœial statement might not be considered a little ambiguous and whether it was not "the solution after shaking with potash" that should give a bluish residue. But in this case the residue was of a dirty brown colour and its acidified solution not in the least dichroic.

The only other possible source of error, if the text of the test were correct, was the sample of physostigmine (of German manufacture) which I was employing. Thinking that possibly our improved knowledge of the constituents of calabar bean had resulted in the removal of some portion of the alkaloid, known commercially as physostigmine, at the time of the issue of the Pharmacopœia, a comparison was made with a sample over ten years old, which Mr. Holmes kindly lent me from the Museum of the Pharmaceutical Society. But this corresponded in every particular with the one which I had previously been employing, and pointed to the conclusion that the fault did not rest with the alkaloid, but with the test itself. On referring incidentally to my inability to perform the test to Professor Attfield (in whose laboratory I am working and whom I must thank for the opportunity of publishing this short note), he suggested that undoubtedly an alkali was needed and possibly ammonia might give the desired result.

The reaction was therefore performed, adding ammonia to the aqueous solution before evaporation, and the bluish residue was satisfactorily attained, the acidified solution of which was beautifully dichroic blue and red.

Further experiments were made with solutions of the hydrates and carbonates of potassium, sodium, calcium, and barium, all of which redden the solution of the alkaloid, but in no case was a bluish residue obtained on evaporation; whilst with other salts—as well as hydrate—of ammonia the bluish residue and dichroic solution when acidified were readily obtained, pointing undoubtedly to the fact that the bluish residue is an ammoniacal compound with the alkaloid.

On referring to the French Codex, the only other pharmacopœia in which the alkaloid physostigmine itself is official, I find a very similar test described, ammonia being necessary for its development. From the foregoing it will be seen that there is an omission in the text of the Pharmacopœia of the "ammonia." It is suggested, therefore, that the test in future editions should read "when evaporated to dryness over a water bath *with ammonia* leaves a bluish residue, the acidified solution of which is beautifully dichroic, being blue and red."

The Laboratory, 17, Bloomsbury Square.

THE PEPPERMINT INDUSTRY OF ST. JOSEPH COUNTY, MICHIGAN.*

Next to Wayne county, New York, St. Joseph county in Michigan is the largest peppermint producing locality in the United States. As early as 1846 farmers began to cultivate the plant in this locality and the industry has continued to grow ever since. Most every farmer thereabout now raises some peppermint, but usually in connection with other crops, while a few devote their whole time to its cultivation. By far the principal grower is Mr. Henry Hall, of Three Rivers, and "Halls Big Marsh of Florence" is the largest piece of land in America devoted to raising peppermint. The farm is eight miles southeast of Three Rivers, and contains some 900 acres, of which 400 acres are put into mint each year and alternated with clover to keep up the strength of the soil. Mr. Hall has four large distilleries with total capacity of some five hundred pounds of oil daily. The largest still house is situated in the centre of a 600-acre field; it contains four stills, and is surrounded with mint fields as far as the eye can see.

The cultivation of the plant is accompanied with more than ordinary care and the success of the crop depends largely upon the attention it receives, as well as the season. The ground is ploughed in August, September, or October, then thoroughly harrowed, and the following spring it must be harrowed again, then marked and planted. Old roots from "first" crop are removed from the ground in spring, and planted in rows three feet apart; a man carries the roots in a sack on his back, throws them into the rows, and they are then "kicked in."

Two or three crops are gathered from each planting, the first and second crops are the best, and twenty pounds of oil to the acre is a good yield; the third crop is very apt to be "weedy" and the yield only about ten pounds to the acre.

From the time the mint appears above the ground until it is gathered, it should be constantly cultivated and hoed to keep it free from weeds, which are the bane of the peppermint grower's existence. The plants mature from the middle of August to the first of September, soon as the blossom is out; the "second" crop mint comes first, then the "first" crop, and lastly the "third." It is cut with a mower and by hand with a scythe, and if weedy the weeds must be sorted out by hand. The plant stools out and spreads, but "first" crop is in quite distinct rows; the second year it grows from the runners which fill in the rows making it a more solid mass, and in the "third crop" this is still more apparent.

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* From the *Pharmaceutical Era*, April 1.

After cutting, the mint is allowed to partly dry or "cure," and is then raked into cots like hay and drawn to the still house, where it is immediately distilled.

The process of distillation is not complicated but interesting. The still is a large wooden tub with tight hinged top, a steam supply connection at the bottom and outlet to the condenser at the top of one side. The condenser used by Mr. Hall is a very effective and unique piece of apparatus, the worm instead of being in a coil is in longitudinal sections about 14 feet long, which lap under each other, the top about 6 inches in diameter and tapering to some 2 inches at the bottom or outlet, and is made of tin. The cooler consists of a tin trough about 8 inches in diameter with perforated bottom, the length of the condenser, over which it sets, and through the perforations a constant stream of water is kept flowing over the tin condensers.

The mint is drawn to the still house in waggons, pitched into the still, the packer "packs the tub," the top is fastened down and the steam turned on for about an hour or until exhausted; this is told by pulling out a plug in the top of the still. Across the inside bottom of the still is a frame with chain connections that run to the top; by means of a heavy crane, which is connected to these chains, the exhausted mint or "charge" is lifted out of the still and carried away on a waggon. The "mint straw," as it is called, is dried in the sun and used as fodder for sheep and cattle.

The quality of the oil produced depends entirely on the mint used, and the freedom from admixtures of "weeds" or other foreign substances.

Careless and lazy farmers raise poor mint as well as poor wheat, and whether it be "first," "second," or "third" crop mint, thorough cultivation is an important consideration in producing good oil of peppermint. Everything that comes from a still is by no means pure oil, and experience is a most important factor in judging of its quality.

Enough has been written about tests for oil of peppermint to fill a large volume, but one of experience in the business will judge of the quality of a can of oil almost as soon as he places his nose to the opening. It may be necessary to examine it for water or castor oil and alcohol and possible other adulterants, or to see that none of the menthol has been removed, but the natural *flavour* of pure oil of peppermint is what the man of experience first seeks.

TURPENTINE.*

BY R. GAILLARD DUNWODY, PH.G.

Turpentine is an oleoresin of a white semi-solid consistency which exudes from *Pinus palustris* and other species of the pine family when incisions are made. The trees are indigenous to the Southern States from Virginia to the Gulf of Mexico. Their usual height is from seventy-five to eighty feet, two-thirds of which are from eighteen to twenty inches in diameter and destitute of branches; the other third is branched, having leaves of a dark green colour about ten to fifteen inches in length, situated at the ends in clusters of three, surrounded by long ragged sheaths. The bark is dark brown, and has a revolute and longitudinally-fissured cork. Pines growing near swampy localities produce more oleoresin, and have longer leaves of a darker green than those grown in the interior, and are distinguished as *pitch pine*, *long-leaf pine* and *yellow pine*.

Turpentine is manufactured in the following manner:—

Boxes, as they are called by the manufacturers, are cut into the trees from the first of December until the middle of March; usually from one to four are cut in each tree according to its size. The boxes are made twelve inches above the ground so that the lower lip is five inches, and the arched upper lip eight to ten inches above the bottom of the box, extending into the tree a short distance; they usually hold from half to one gallon. The tree is then left from two to three days, when the bark is removed about three to four or sometimes ten feet above the boxes and the tree is scraped or hacked triangularly. The instrument used for scraping is made of iron, the shape of the letter L, with a ball attached to the long arm, the operator taking hold just above the ball, the weight of which aids in scraping.

The oleoresin begins to run about the first of March, and flows best during June, July and August, decreasing as cool weather begins to approach. The trees have to be slightly scraped about every ten to fifteen days to remove the oleoresin which has become solidified, preventing the flow.

Boxes are dipped every eight to ten days with a peculiar constructed instrument called *turpentine dipper*. The oleoresin is first put into buckets and then transferred to barrels on the waggon, their heads being removed until filled, when they are wedged on tightly; the barrels are then carried to the place of distillation.

A still made of copper is set into a brick furnace which is from ten to fifteen feet in length, five to six feet in width and about eight feet in height. The still usually holds between fifteen and twenty barrels of the "crude." With the "crude" a little water is added, then the still is warmed so as to make the chips and straw rise to the surface to be skimmed off; a little more water is now added and the top luted on and connected with a large condensing worm placed in a large tank kept filled with cold water. When all the joints have been made tight, heat is applied strongly; the water having a lower boiling point than the oil begins to come over, first bringing over a small quantity of oil which is gradually increased, and is condensed and run into a barrel previously placed at the end of the condensing worm. Water has to be added during distillation to aid the oil in coming over, also to keep the mass from becoming too thick and charring. Some manufacturers distil the "crude" without any water beyond that which is dipped up with the "crude," but there is danger in burning the residue.

In the receiving barrel the oil having a lighter specific gravity floats on top of the water and is dipped off. This constitutes the commercial spirits of turpentine. The residue in the still after all of the water and oil has stopped coming over is resin, which is run out through a faucet at the side of the still, having three strainers attached to it, into a long trough communicating with barrels which hold between three and four hundred pounds. This constitutes the commercial *resin*.

The first exudation of the tree is the best, and is distinguished by the name *virgin dip*, the resin being of a light amber colour, transparent, brittle, and melting at 75° C. Resin which is translucent contains too much oil and is very brittle.

The colour of resin becomes darker after each exudation of the tree until it finally becomes almost black, yielding little oil and decreasing in value a great deal.

For many years North and South Carolina furnished the above products; but of late years Georgia and some of the Gulf States have been yielding a great deal.

It is thought, of recent years, that the commercial oil of turpentine is much adulterated with petroleum.

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* From the *American Journal of Pharmacy*, June.

In order to determine how far this is the case, I obtained eight samples from the market in Philadelphia and three from manufacturers in Georgia, to all of which the following tests were applied. The rotary power was determined in a 200 mm. tube, and all were found to rotate the way of polarized light to the right before and after rectifying by distillation.

The specific gravity was taken at 15° C., before and after distillation. The temperature was carefully noted at the beginning of the boiling, and in the following table the two last columns give also the temperature at which most of the oil came over, and the temperature reached at the end of the distillation.

Samples.	Rotation.		Specific gravity.		Boiling point.		
	before	after	before	after	Beginning.	Most oil.	End.
	Distillation.		Distillation.		C.	C.	C.
1 Commercial . .	15·40	18·89	·868	·860	156°	164°	168°
2 " . .	22·51	23·80	·850	·851	158	161	167
3 " . .	2·60	3·90	·856	·853	156	160	166
4 " . .	14·45	15·10	·864	·860	158	161	168
5 " . .	36·64	38·62	·878	·868	159	169	170
6 " . .	21 82	22·55	·860	·858	155	161	165
7 " . .	16·42	17·40	·856	·852	159	162	170
8 " . .	25·52	26·40	·860	·858	158	161	168
9 From manufacturer, May, 1889 .	9·45	10·50	·876	·873	156	161	165
10 From manufacturer, June, 1889 .	8 85	8·90	·870	·868	157	161	166
11 From manufacturer, September, 1889	16·26	16·60	·867	·865	157	161	167
12 Own distillation from oleoresin. .	11·80	—	·869	—	—	—	—

According to Allen ('Organic Analysis,' ii., p. 439), the following test is of value in the detection of petroleum:—Three volumes of turpentine oil with one volume of castor oil will produce a homogeneous mixture, while with petroleum the liquid separates into two layers nearly equal in volume. On trying a mixture made of different proportions of petroleum (sp. gr. at 15° C., 0·786; boiling point between 150° C. and 160° C.; known as head light oil), it was found that as much as 65 per cent. of petroleum could be mixed without detecting it by the above test.

Absolute glacial acetic acid, 99·5 to 100 per cent. was tried and found to mix in all proportions with petroleum as well as with turpentine oil.

A mixture of 99 c.c. absolute glacial acetic acid with 1 c.c. of water when mixed with turpentine oil in the proportion of one to one formed a clear mixture, but with petroleum in the same proportions it would not mix. Mixtures of petroleum and turpentine oil in different proportions were found to require different amounts of the above acid for making a clear solution, as follows:—

Petroleum	1	2	3	4	5	7	8 c.c.
Turpentine oil. .	9	8	7	6	5	3	2 c.c.
Glacial acid. . .	40	60	80	110	150	230	270 c.c.

The crude "gum" was found to be dissolved by absolute alcohol, ether, glacial acetic acid, slightly by 70 per cent. alcohol, and not at all by water.

On treating 100 grams of the original "gum" with petroleum ether, boiling between 25° and 45° C., there was dissolved 81 per cent. of it; and by setting the solution aside, clear stellate crystals commenced to deposit in less than a week, and in two or three months about 20 to 25 per cent. of the solution had crystallized in the same form. The 19 per cent. of insoluble matter was treated with stronger ether, which dissolved it completely; the solution was set aside and crystals deposited on the bottom and sides of the beaker after long standing; as in the previous solution none formed at the surface.

Another 100 grams of the original "gum" were treated with petroleum ether boiling between 45 and 75° C., which dissolved 97 per cent.; the solution was filtered, and on standing gradually deposited crystals in the same manner and similar in appearance to those from light petroleum ether.

The 3 per cent. of the "gum" which was insoluble was dissolved in stronger ether, and upon spontaneous evaporation of the ether a resinous mass was left.

The crystals that were obtained from the different petroleum ethers were purified by recrystallization from stronger ether and submitted to ultimate analysis.

Two combustions of those from the light petroleum ether were made with the following results:—

	I.	II.	Composition of Abietic Acid.
	Per cent.	Per cent.	Per cent.
C	78·37	78·50	78·57
H	9·65	9·50	9·52
O	11·98	12·00	11·91
	100·00	100·00	100·00

Melting point. . . . . 131° C.

Melting point of abietic acid given by Flückiger . . . . 135° C.

Melting point of abietic acid given by Dragendorff, soften at 129° C., melts at . . . . 144° C.

Crystals from heavy petroleum ether:—

	I.	II.
	Per cent.	Per cent.
C	72·00	72·80
H	9·75	9·50
O	18·25	17·70
	100·00	100·00

Melting point . . . . . . 125° to 126° C.

The crystals obtained from the heavier petroleum ether were purified by recrystallization from ether, and combustions were made at different periods in their purification without finding any change from the above composition. It is likely that several crystallizable resins are present in the crude "gum." They are worthy of much further investigation.

ON CEDAR GUM (CEDRELA AUSTRALIS, F.v.M.).*

BY J. H. MAIDEN, F.L.S., F.C.S.

The well-known "Cedar" or "Red Cedar" of New South Wales and Queensland is the produce of a *Cedrela*, but in regard to the species there is a difference of opinion. Bentham (B.Fl., i., 387) considers it to be identical with *C. Toona*, Roxb., the Indian toon tree, which produces "Moulmein Cedar" and one of the "Chittagong woods." Baron von Mueller, on the other hand, created a new species for it (*C. australis*, F.v.M.). It is very certain the affinities of the two trees are very close, and it becomes interesting to see if examination of any of their products tends to throw any light on the subject.

The writer is not aware that the finding of gum on the New South Wales cedar has hitherto been recorded, but a collector sent to the Technological Museum a small quantity recently. An old cedar-getter says that trees well exposed to the sun (? in unsuitable situations) yield most gum.

It is a very pale yellow gum, almost colourless, and in thin tears about an inch long. Between the teeth it almost feels leathery. It swells up largely in cold water, but in the course of twenty-four hours it nearly wholly dissolves, forming a solution colourless and faintly cloudy, like good gum arabic, and leaving a small percentage of metarabin.

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* From vol. iv. (series 2nd), of the *Proceedings of the Linnean Society of New South Wales.*

It is one of the gums which form a connecting link between the arabin group,—those gums which dissolve almost immediately in water, and the metarabin group—those which merely swell up in that liquid. It forms a fair mucilage, and on account of its freedom from colour it would be a valuable commodity if obtainable in any quantity. An analysis gave the following result:—

Arabin.	68·3
Metarabin.	6·3
Hygroscopic moisture	19·54
Ash	5·16

Here we have a true gum, without so much as a trace of resin.

Following is the evidence the author has been able to collect in regard to the exudation of the Indian tree.

"It yields a *resinous* gum" (Cat. Kew Museums). Perhaps the experiments of von Essenbeck (*infra*) are the foundation for this statement.

"It is called bastard cedar from an aromatic (*sic*) *resin* exuding from it, resembling that of the American cedar" (Art. *Cedrela Toona* in Surgeon-General Balfour's 'Cyclop. of India'). No definite authority is given for this statement, and the writer is probably labouring under a misapprehension, as the name cedar was bestowed in reference to the wood, and not to any exudation.

The experiments of Nees von Essenbeck, who *extracted from the bark* a *resinous* astringent matter, and a brown astringent *gum*, do not affect the point at issue one way or the other.

"Toon-ke-gond" (*C. Toona*) is enumerated by Dr. Wight as one of the *gums* of Coimbatore. Yet Cooke ('Gums and Resins of India'), who quotes this statement, says, "From the character of the timber one might suppose it rather a resin than a gum." I am not impressed with the force of the latter observation.

A sample of "Toon-ke-gond," the exudation of *C. Toona*, was exhibited by Dr. Royle at the Exhibition of 1851 (No. 52, p. 180, Jury Reports). It is not definitely stated whether it is a gum or a resin, and there is nothing in the context to clear up the point absolutely.

Dragendorff ('Pflanzenanalyze,' Greenish's Trans., p. 212) speaks of "the partially soluble *gum* of species of . . . . *Cedrela*." To this specific statement of a man who only employs the term "gum" in its proper significance, I attach much importance.

I consider the balance of probability to be largely in favour of the exudation from the Indian species being a gum and not a resin. As collateral evidence, the exudations from the Indian *Melia Azadirachta*, Linn. (another of the "Chittagong woods"), and the Australian form of *M. Azedarach*, Linn., may be instanced together with the spotted or leopard-tree gum (*Flindersia maculosa*). These are the only other exudations of the *Meliaceæ* recorded as far as I know. I have seen and examined them and they are true *gums*.

EXAMINATION OF CRUDE PHENOL AND CRESOL.*

BY W. W. STAVELEY.

It is pointed out that the method of testing crude phenols and cresols, by shaking with a double volume of 9 per cent. soda, and measuring the volume of undissolved liquid either with or without the addition of light petroleum, is untrustworthy, because, firstly, the quantity of soda is insufficient for material containing more than 60 per cent. of phenol; secondly, cresol, although insoluble in petroleum in the presence of water, is soluble when the petroleum contains 10–20 per cent. of coal-tar oils, moreover the higher homologues of cresol are soluble in any case; thirdly, the water in the crude phenol is taken up by the alkali, and is reckoned as phenol; and fourthly, material containing even 2 to 3 per cent. of naphthalene gives a perfectly clear solution. The method is more workable if four volumes of 10 per cent. soda are used, the alkaline layer separated, neutralized with dilute acid, agitated with a measured volume of benzene, and the volume read off. In Williams's method for examining carbolic powders the quantity of alkali is also insufficient for treating rich material, whilst in Tidy's method not only is this the case, but also the solubility of the coal-tar acids in sodium sulphate is overlooked, and there is loss by volatilization of the phenol. In Tóth's method the strong alkali, of sp. gr. 1·250–1·300, gives rise to a strong solution of the cresoxides, which dissolve large quantities of hydrocarbons; moreover, any light hydrocarbons present could hold the free phenols in suspension, and so prevent their solution in the alkali. For estimating water in crude phenols, agitation of 50 c.c. with 30 to 50 c.c. of benzene and 30 c.c. of 50 per cent. sulphuric acid is recommended; the sulphuric acid is better than calcium chloride, which in its turn is better than sodium chloride.

PARTHENOGENESIS IN FICUS.

Dr. D. D. Cunningham, of the Indian Medical Service, has published a remarkable treatise on the production of the fruit of *Ficus Roxburghii*, Wall. The species is diœcious. The male receptacles or figs contain perfect male flowers with pollen, together with atrophied or imperfect female or "gall-flowers," which never produce seed. Within the ovary of these gall-flowers, an insect, usually a species of *Eupristis*, lays its eggs, and there they develope into perfect insects. The female figs contain perfect female flowers, producing fertile seeds, the insect never laying its eggs in their ovary. The ostiole, or opening, of both the male and female figs, is so obstructed by a covering of bracts that the receptacle is an almost completely closed chamber. The perfect development of both the male and female flowers is, however, dependent on the access of the "fig-insect" to the interior of the cavity, without which neither of them would attain a functional condition. But, although the development of the embryo in the female figs is essentially connected with this access of insects, Dr. Cunningham believes that it is not brought about by the introduction of pollen through their agency. The almost entire closure of the ostiole by bracts presents a nearly insuperable obstacle to the introduction into the female figs of a quantity of pollen sufficiently large to impregnate every one of the exceedingly numerous ovules by a separate pollen-grain; and he was able to detect but very few pollen grains within the female figs. Although it is possible that in some instances normal pollination may occur, Dr. Cunningham asserts that the embryo is ordinarily formed without any act of fertilization, and that it arises as an outgrowth of the parenchyme of the mucellus outside the embryo-sac. Up to the period of the access of the insects, and of the initial development of the embryo, the embryo-sac retains the character of a simple uninucleate cell, with no oosphere, synergidæ, or antipodal vesicles. The full development of both male and female flowers appears to be dependent simply on hypertrophy of the tissues of the receptacle, resulting from stimulation caused by the visits of the fig-insects. This stimulation is brought about in the male figs by the insect layings its eggs within the ovary of the gall-flowers. In the female flowers they attempt persistently to do the same; but these attempts are frustrated by the much greater strength and thickness of the ovary-wall, and a similar stimulation is the result. The treatise is illustrated by five fine folio plates.

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[*] *Chem. Zeit.*, xiii., 1126-1127. Reprinted from the *Journ. Chem. Soc.*, April.

The Pharmaceutical Journal.

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LOCAL CONFERENCES OF CHEMISTS AND DRUGGISTS.

DURING the past week another meeting of metropolitan chemists and druggists, organized by some of the Society's Divisional Secretaries, has been held, and a report of the proceedings will be found at p. 1075 of this number. A similar meeting, reported at p. 1068, has also been held at Dover. On both occasions the President of the Society spoke on the state of the law in relation to trade interests and the possibility of obtaining further legislation in favour of them. Both meetings were fairly well attended, and, for those who were present, they may have served the useful purpose of imparting more correct ideas of the causes to which present grievances are to be ascribed; but as conferences devised for the purpose of discussing means of remedying those grievances and of improving the position of pharmacy as a business it is scarcely possible to avoid the expression of disappointment at the absence of any suggestions of a practical nature. Considering the vehemence of the correspondence that has lately appeared, though for the most part anonymously, charging the Executive of the Pharmaceutical Society with incompetence and neglect of one of the avowed objects of the Society's Charter of incorporation, viz., the protection of those who carry on the business of chemists and druggists, it might have been expected that such meetings as have just been held would have been taken advantage of for the purpose of enforcing those charges and of putting forward some definite proposals calculated to secure the objects which are said to have been disregarded. But in no case has there been any attempt to do either the one or the other. It may be asked what is the explanation of this deficiency, which is the more striking at the present moment when preparations are being made for the drafting of a new Pharmacy Act Amendment Bill. Is it to be inferred that the attacks which have been made upon the Council are felt to be so unfounded and unreasonable that no one will venture openly to support them? Or is it that the spirit of antagonism to the Society is so generally prevalent that the energies and activity of chemists and druggists are reserved for opposition to whatever is proposed by it in the general interest? We venture to think that the former conclusion is more likely to be correct, and that the conviction is gaining ground that any hope of ameliorating the conditions under which chemists and druggists suffer disadvantage, must be based upon the capability of the Pharmaceutical Society to take the field as the representative of the body and concentrate in itself whatever influence can be contributed by the individual members of that body.

There can be no question of the fact that the interests of the trade are so interwoven with those of the Pharmaceutical Society that their protection can only be secured through its action. The cry has been that the Society does not represent the trade, and in one sense that statement is correct. But whether the fact be objected to from within or from without the Society, it must be remembered that for any shortcoming due to this fact those who abstain from connecting themselves with the Society and taking part in its work are alone responsible and to blame. Mr. BROAD, at the meeting held last Thursday, expressed the opinion that the Society is not flourishing, and that it could not be considered as flourishing so long as only one-third of those elegible to membership were found within its ranks. In our opinion it might be more reasonably urged that inasmuch as the Society is the only representative organization through the agency of which the interests of the trade can be considered and cared for, it is those who remain outside of that organization and oppose its efforts that should be regarded as not flourishing. When they complain that their interests are not protected as they think they should be, it may well be asked what have they done towards giving the Society such strength and influence as are essential for enabling it as a representative body to succeed in any undertaking intended to secure protection? Whatever foundation there may be for the charge that the general interests of trade have not been protected as the Charter of the Society contemplated, it is solely to the abstention from membership that any deficiency of action or failure of attempts must be ascribed. At the meetings lately held there have been as usual the stereotyped expressions of the opinion that unity is the great desideratum. That proposition is undeniable; but it is putting the cart before the horse to say that the united and combined action of the trade are dependent on the Council of the Society. If it be true that the opinions of members of the trade outside the Society are not represented in the Society's Council it is their own fault if there be such a deficiency, and they alone are to blame for the continued want of such legislative protection as it is assumed might be obtained if there were unity among the members of the trade.

In regard to the disadvantages now complained of as affecting chemists and druggists, each and all of them may be traced to the opposition, by which the trade has frustrated to some greater or lesser extent the past endeavours of the Society to promote the interests of the body. Exemption from jury service, which is now so much desired, might have been the privilege of every registered chemist and druggist if the attempt to unite the whole body had not been opposed. The dispensing of medicines might also have been secured instead of being to a large extent still a want, and if it had not been for opposition from the trade necessitating the adoption of the lowest grade of pharmaceutical qualification as the only condition on which the trade would agree to incorporation as a whole, the inconveniences resulting from the recent legal interpretation of the Pharmacy Act would never have been experienced. These illustrations of the evils that have been brought about by opposition to the Society taking the place of loyal co-operation in its work might be extended if it were necessary; but the question now is, how to deal with the existing condition of affairs? In reference to that question we would suggest that the expositions of the present situation given by the President should be well considered, so that everyone concerned may form an opinion as to the measures which are possible for the benefit of pharmacy, and contribute his share towards the solution of the various problems now involved in the advancement of pharmaceutical interests.

Concurrently with the meeting held at Dover last Friday week there was another gathering of pharmacists of that town, who met, together with a number of visitors from London and other places, to celebrate the completion of the fiftieth year that Mr. ALEXANDER BOTTLE, the present Vice-President of the Pharmaceutical Society, has been engaged in business in Dover. A report of the complimentary supper given to Mr. BOTTLE on that occasion will be found at p. 1072. It was attended by the President of the Society and other members of the Council, as well as by several former assistants of Mr. BOTTLE, and a number of congratulatory letters and telegrams were sent from present and past members of the Council and from friends who were prevented from being present at the supper. We need not remind our readers of the long period of time during which Mr. BOTTLE has taken part in the Society's work as a member of the Council, but we may mention the fact that, from the original formation of the Society, Mr. BOTTLE has taken an active interest in its proceedings. He is now the father of the Council, and, in view of the attempts sometimes made to represent members of that body as being unable to comprehend the interests and the needs of provincial chemists, we may point to Mr. BOTTLE's repeated re-election as evidence that the representations to which we have referred are not only greatly exaggerated, but totally unreasonable. We feel sure that in every respect our readers will learn with satisfaction of the compliment that has been paid to a truly representative pharmacist by his colleagues and friends.

* * *

We learn from Messrs. Bascombe, Robinson, Powell and Bate, the Divisional Secretaries for Brixton, Clapham, Norwood and Kennington, that a meeting of the chemists and druggists of those districts will be held at the Gresham Hall, Gresham Road, Brixton, on Thursday next, the 3rd of July, at 9 p.m. The President of the Pharmaceutical Society has promised to attend this meeting, and to deliver an address upon the laws relating to Pharmacy and the Sale of Poisons, after which it is expected that a discussion will take place on matters of practical interest in connection with trade interests.

* * *

On Friday, the 20th inst., the Pharmacy Act (Ireland) Amendment Bill passed through Committee, and was ordered to be reported. None of the amendments that were referred to last week were adopted, and only the last clause was temporarily omitted, apparently with the view of securing further discussion on report. On Wednesday, the 25th, on the order being reached that the Bill, as amended, be considered, Mr. Sexton moved to insert a new clause providing for the first election of representatives of chemists and druggists upon the Council, when Mr. Healy moved the adjournment of the debate, to allow time for an agreement to be come to between the promoters of the Bill and the Pharmaceutical Society. This was supported by the Attorney-General for Ireland, who stated that the points at issue were very few, and the discussion was adjourned until Wednesday next. The principal amendments now standing in the name of Mr. Sexton have for their object to limit the representatives of the chemists and druggists on the Council to seven instead of nine: to make the fee payable by persons entitled to registration in virtue of existing rights, one guinea instead of half-a-guinea; and the omission of the clauses providing for the payment of an annual fee of half-a-guinea as a condition of the retention of a name on the Register of Pharmaceutical Chemists or Chemists and Druggists.

* * *

We have very great pleasure in stating that the Rolleston Memorial Prize has been awarded to Professor J. R. Green for a series of dissertations on the chemical process of germination. According to the Oxford University Calendar the Rolleston Memorial Prize consists of two years' income of a fund of about £1200, which is to be given once in two years for original research in any subject comprised under the heads of animal and vegetable pathology and anthropology.

* * *

At a Pharmaceutical Congress held in Paris in August last a resolution was passed asking the Paris Society of Pharmacy to elaborate a Formulary of New Remedies, followed by a table indicating *doses maxima* for poisonous substances. In accordance a committee has been appointed by the Society to carry out the work, and a circular has been issued inviting the co-operation of the pharmaceutical societies in the departments. A provisional list has also been published of the drugs and chemicals which in the committee's opinion should be included in the Formulary, and this includes no less than 440 items.

Transactions of the Pharmaceutical Society.

MEETING OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, June 25, at 1 p.m. Present: Messrs. Boa, Gibson, Gilmour, Mackenzie and Stephenson, Edinburgh; Fisher, Dunfermline; Kerr, Dundee; Maben, Hawick; McAdam, Glasgow; Nesbit, Portobello; Paterson and Strachan, Aberdeen; Storrar, Kirkcaldy; and Watt, Haddington.

Apologies for absence were received from Messrs. Frazer and Kinninmont, Glasgow; Hardie, Dundee, and Lawrence, Oban.

On the motion of Mr. Stephenson, the chair was taken by Mr. Gilmour.

The minutes of last meeting were read and approved.

The Chairman having intimated that the first business was the election of a Chairman,

Mr. Stephenson said he had much pleasure in moving that Mr. Gilmour be elected Chairman for another year. During his term of office Mr. Gilmour had worthily represented them, both in the north and in the south, at Aberdeen, Dundee and Newcastle. They all regretted that he had been laid aside by illness, but now that he had recovered he thought they ought to ask him to continue in office for another year.

Mr. Nesbit, Portobello, in seconding the motion, said he regretted that owing to the services of the Chairman being constantly required in Edinburgh they were precluded from appointing a country member to this honourable position.

Mr. Mackenzie thought the honours should go round and not be confined to so limited a circle. He was not going to propose any other person, but they should guard themselves against anything like a permanency. He thought they could not get a better man than Mr. Gilmour, but some of the country members should get some encouragement.

Mr. Stephenson remarked that their choice of a chairman was limited, and they could hardly expect to have a new man every year. The Chairman must be resident in Edinburgh.

Mr. Mackenzie asked if they were limited in their choice to Edinburgh members. He would like to give country members an opportunity.

The Chairman said he thought they were very much in the same position as in London, where the President was always a London man.

Mr. Nesbit, Portobello, said one difficulty in the way of electing a country member was the fact that the Chairman also acted as Treasurer. He thought these two offices might be disjoined with advantage.

Mr. Storrar, Kirkcaldy, said he thought it was absolutely necessary that the Chairman should be resident in Edinburgh.

Mr. Stephenson's motion was then agreed to unanimously.

Mr. Gilmour, in accepting office, said he had to thank them for this renewed mark of confidence. He regretted that owing to the state of his health he had not been able to give so much attention as he would have liked to the duties of his office, but now that he had recovered he would endeavour to serve them to the best of his ability. He quite agreed with Mr. Mackenzie that the honours should go round, and in fact had thought of suggesting that they should ballot for a Chairman. That was the fairest way to all parties, and the Executive might consider the suggestion for a future occasion.

Mr. Paterson, Aberdeen, moved that Mr. Storrar be elected Vice-Chairman.

The motion was seconded by Mr. McAdam, Glasgow, and unanimously agreed to.

Mr. Storrar said he had to thank them for the honour they had again conferred on him. He felt as if he had done nothing else for the last two months but return thanks. Next year he hoped they would allow the honours to go round.

The Chairman, Vice-Chairman and resident members were appointed a General Purposes Committee, to take charge of any business arising between meetings.

The Assistant-Secretary submitted an estimate of the probable cost of enlarging the book cases in the Library. This was remitted to the General Purposes Committee with powers; the probable cost to be submitted for approval to the Council. The arrangements for evening meetings and a letter of inquiry from Mr. Blanc were also remitted to the Committee with powers.

The following letter was then read:—

"3, Pitt Street, Edinburgh,
"*June* 24, 1890.

'To the Chairman of the Executive
of the North British Branch,
"Pharmaceutical Society.

"Dear Sir,—I beg through you to bring under the notice of the Executive for Scotland (with a view to further consideration by the Society) the fact that, on Saturday last, I was informed by an officer of the Excise that I am acting contrary to law in *making French polish* and *spirit varnish*, although I have the licence to *sell* methylated spirit.

"From what the officer said, it appears I must have the permission of the Board of Inland Revenue, and a bond from two persons for £500 before I can make these articles.

"If that is the law, I feel certain a great majority of our calling are, like myself, in ignorance contravening it daily, and I do think our worthy President in London should take up the subject and endeavour to get it rectified.

"This being of trade interest is my excuse for troubling you.

"I remain,
"Dear Sir,
"Yours truly,
"(Signed) JAMES AITKEN.

"P.S.—Since writing the above I have heard of a chemist in this district being called in question for making liniment. opii meth. This almost seems as if the law has become a terror to those who *wish* to do well."

The reading of the letter gave rise to a prolonged discussion during which it was stated that retailers might use methylated spirit in the preparation of soap, compound camphor, aconite and belladonna liniments without giving any bond. It was clearly illegal to make opium liniment with methylated spirit.

Mr. Stephenson said Mr. Aitken had called upon him. He was under the impression that he might make varnish with methylated spirit, but he found that before he could do so he must have permission from the Board of Inland Revenue.

Mr. Strachan, Aberdeen, said they could make as much varnish as they liked by using "finish," without permission from the Board of Inland Revenue.

Mr. Boa said they could not make "finish" without permission.

Several members thought it would be better not to agitate the question or bring it in any way before the Board of Inland Revenue.

Ultimately it was moved by Mr. Mackenzie, seconded by Mr. Watt, Haddington.

"That the question as to the use of methylated spirit for making varnish and polish be remitted to the General Purposes Committee, with powers to communicate with the Inland Revenue authorities, and report to a future meeting of Executive."

It was also moved by Mr. Nesbit, seconded by Mr. Stephenson:—

"That the Executive remit the question to the Council, and request it to take steps to have the law regarding the use of methylated spirits in the manufacture of varnish and polish placed in the same position as that of belladonna and other liniments."

Mr. Strachan, seconded by Mr. McAdam, moved the previous question.

On being put to the vote the previous question was carried by a large majority.

It was then agreed to take no further action, and the Assistant-Secretary was instructed to communicate the decision to Mr. Aitken.

The Chairman intimated that at the next meeting of Executive he would submit the following motions. He gave notice now in order that members of Executive might have ample time to think over the matters referred to:—

"1. That the Executive take into consideration Professor Fraser's address, delivered at the opening of last session, with a view to ascertain in what way his suggestions may be taken advantage of for the benefit of the Society."

"2. That the Executive consider what steps may be taken with a view to increasing the membership of the Society in Scotland."

Mr. Paterson, Aberdeen, said he observed that the Universities Commissioners were already framing their recommendations, and he thought it would be desirable that they should appoint a Committee now. Otherwise they might be too late.

The Chairman said he thought they could hardly discuss these questions now and it would be better to wait till next meeting.

The meeting then closed.

Provincial Transactions.

MEETING OF CHEMISTS AND DRUGGISTS AT DOVER.

A meeting of the chemists and druggists residing in the East Kent district was held at the Apollonian Hall, Dover, on Friday evening, to confer with Mr. Carteighe, the President of the Pharmaceutical Society, upon matters generally affecting the interests of the trade. There was a fair attendance of members. Mr. Henry Peake, the President of the Dover Chemists' Association, occupied the chair, and was supported by Mr. Carteighe (President of the Pharmaceutical Society), and Mr. Alexander Bottle (the Vice-President of the Society). Amongst those present were the following:—Mr. Butt, London; Mr. W. Martindale, London; Mr. Warren, London; Mr. Bremridge, Secretary of the Pharmaceutical Society; Mr. Amos, Mr. Harvey, Mr. Bing, Canterbury; Mr. Palmer, Wingham; Mr. Dixon, Ash-next-Sandwich; Mr. Barnes, Mr. Ewell, Mr. Brown, Mr. Wyles and Mr. Bolton, Dover; Mr. Stooke, Milton, near Sittingbourne; Mr. Forth, Mr. Ingall and Mr. Brothers, Ashford, and others.

Mr. Carteighe, after a few introductory remarks, said: The powers of the Pharmaceutical Society are broadly these: its Executive has to see that every person placed on the register is qualified by having passed the Minor examination, or that such person was one of those who were in business before a certain Act of Parliament, which most of us call the Pharmacy Act of 1868, was passed. You remember that until 1868, although the Pharmaceutical Society had been in existence since 1841, there were no compulsory legal powers with regard to chemists and druggists. That Act, indifferent as it is in many respects, could never have been obtained if it had not been for the exertions, activity and loyalty of the small band of men who formed and fostered the Pharmaceutical Society itself. Now the Pharmaceutical Society, after its inception and foundation, had to struggle with the same sort of difficulty we feel at this moment—that a large number of people refused to join it and said, "You must give us something before we join you which will benefit our trade." We are now, gentlemen, in the same position. You remember that in 1852 the first Pharmacy Act was passed through the efforts of Jacob Bell. He spent a considerable sum of money, to say nothing of an amount of self-sacrifice, which is rare among men, in trying to get the sale of medicinal compounds and the compounding of prescriptions restricted to one class of men. That was the object with which he went into Parliament and the object with which the Pharmaceutical Society in 1852 sent up the measure into Parliament, and Bell was in hopes he might be able to carry it out. That Bill was one which would have placed the trade of the chemist and druggist on a definite basis. That original draft Bill was a true Pharmacy Bill. It would have restricted the title to certain individuals, it would have restricted the compounding of medical prescriptions to certain individuals, and to a certain extent the sale of medicinal compounds. That was a perfect Bill. The Act that was obtained, notwithstanding the fact that Bell was in Parliament, was not as good as was expected. The monopolizing clauses, as the House of Commons chose to call them, were taken out, and Bell was obliged, as the first instalment of legislation, to accept a Bill which gave certain powers to the Pharmaceutical Society, and which gave the title of pharmaceutical chemist to all persons who had certain qualifications. So that after all the Pharmacy Act of 1852 was simply a confirmation of the original charter; and I want to remind you, if the chemists of that day had been alive to their own interests tney would have joined that body immediately, for in 1853 bye laws were passed, and every person throughout the United Kingdom who was in business as a chemist and druggist was asked to join the Pharmaceutical Society, without any penalty, fees or fines; to become in that process a pharmaceutical chemist for life and strengthen the body for future legislation. Now I submit to you that was a very liberal arrangement, and it reflects great credit on Bell that all this was done. It was not his fault that he could not get compulsory powers, but he got Parliament to recognize that it was desirable when you saw a title like "pharmaceutical chemist" it should be associated with the name of a person who was competent; and every chemist and druggist of to-day who was alive at that time could have been if he had liked at this moment a pharmaceutical chemist and member of the Society. Therefore I have a little grievance to make from my point of view, that those who were old enough to join the Society in 1853 did not join and help to make the body stronger. You know what followed. In 1866 a Bill was promoted by the Council of the Society, under the able leadership of Mr. G. W. Sandford, which was based very much on the lines of the first Bill. The object was, as you know, to provide that the keeper of a shop should be a pharmaceutical chemist, and that his assistant should pass the Minor examination;—that you should have therefore in every pharmacy a principal with the qualification of a pharmaceutical chemist, and where an assistant was wanted, that he should have passed the Minor or assistants' examination. A Bill on the same lines as Bell's was drafted and sent to the Home Secretary, who at that time had charge of the bye-laws and the interests of the Pharmaceutical Society, so far as it was necessary to control them by Government. Mr. Sandford went with other members of the Council to the Home Secretary after the Bill had been sent to him, and Mr. Walpole, the then Home Secretary, agreed that this Bill should be introduced into Parliament by the Government, which was a desirable thing. While the Bill was being drafted a number of chemists and druggists, whom at the time we called "outsiders," because they had not joined during the time the doors of the Society had been left open, thought they saw a grievance. They objected to one particular clause in the Bill, which was this: that every chemist and druggist then in business was not to be made a pharmaceutical chemist. That was the proposition most complained of, and it was claimed that every chemist and druggist in business should have all the privileges of a pharmaceutical chemist who had passed the examination and been elected a member of the Pharmaceutical Society; so that on the one hand the Council had to safeguard to a certain extent the interests of those who had passed the examination, and on the other hand to encourage the chemists and druggists not to feel any umbrage in regard to their relation to the Society, and it proposed to do that not by giving them the title of pharmaceutical chemist, to which the examined men objected, but by asking them to come into the Society as chemist and druggist members of the body. The objection taken by the outsiders, who by that time had formed themselves into a body called the United Society of Chemists and Druggists, was that they claimed to have all the privileges in regard to title of those who had joined the Society in the early days, and also the same title as those who had obtained it by examination. I do not want to say anything about the fairness of this; I am only mentioning it as a matter of history. The Council of the Pharmaceutical Society could not come to terms with the outsiders. The United Society accordingly sent a peremptory sort of demand that the clauses should be altered in the way proposed, or it would oppose the Bill. The Council at the time thought it could not alter the Bill in the direction proposed, and the result was that the President with certain members of the Executive Committee of the Society of Chemists and Druggists waited upon the Home Secretary a fortnight after we had been there, and complained to him that the Bill was not satisfactory to them. You will not wonder when I tell you the Home Secretary shrugged his shoulders, and when we went to see him again he said, "I have had another deputation. You are all interested in the same calling, and you are not agreed amongst yourselves, and under the circumstances I can do nothing for you." That is the position we were in. From 1866 to 1868 the Council of the Society was doing its best to arrange a measure which would meet with the approval of both sides, and ultimately it was hoped some good would be attained. Before 1868 it was hoped unanimity would be obtained. In that respect we were disappointed. In the year 1867, when the Council on its own part introduced into Parliament the Bill I have referred to, the United Society of Chemists and Druggists introduced not a Pharmacy Bill but a Poisons Bill, into Parliament, and the inevitable result was that the House said, "Here are two Bills coming from two divisions of the same occupation, we will refer them to a Select Committee." A Select Committee was appointed and the merits of the two Bills were canvassed. Evidence was taken, and the Committee reported that it was desirable there should be legislation on the sale of poisons. I want you to understand that the difficulty about poisons which I, as President of the Pharmaceutical Society, have so much to do with now has not been brought about by myself or my predecessors. It was not our desire that we should ever have had to administer a Poisons Bill, but the majority of the trade outside the body, to its own great disadvantage, as we all see now, forced us to accept a Poisons Bill and we had to tack on to it what we could in the shape of pharmacy. That 1868 Bill was a Poisons Bill with a little pharmacy thrown in, and the circumstances were brought about by the opposition of the trade outside to the proposal of the Society; or, if you like it, to the obstinacy of the Pharmaceutical Society in not giving way on certain titles. The theme of my observations is that it was a great misfortune at that time we could not agree. The Pharmaceutical Society then had to carry out this Act, and you know what followed. In a short time organizations under various names came into existence, first, for the sale of proprietary medicines, then to retail drugs among other things, and lastly, they tacked on not only the sale of poisons, but many of them the dispensing of prescriptions. Some of these were co-operative societies in the strict sense of the word—that is to say, bodies which might have been held to be corporations not selling directly to the public. On the other hand, we found not only in London, but in other large towns, the growth of another class of thing, which we have called the bogus company. The grocer wants to sell poisons; he does sell poisons. The Registrar of the Pharmaceutical Society is down upon him. He pays the penalty, and then takes all his assistants, joins them together with him in the bonds of a limited liability company, calls himself "John Jones and Co., limited," and then we find we are stopped. The case I have mentioned actually occurred. A grocer actually became a chemist, and the keeper of an open shop of a chemist and druggist in Tottenham Court Road, London. We went at him, but before he actually received the writ he had converted himself into a company. It seemed to us that this was as flagrant a case of the evasion of the Act as we could possibly have, because in that case there was no true co-operation. Here was an ordinary grocer, swallowing up the retail druggist next door to him, and claiming to have the same privileges as an examined and registered man. We fought him all along the line. We went through the various law courts, and eventually to the House of Lords; and you know that inasmuch as we use the word "person" in our Act of Parliament, and inasmuch as we provide in one clause, unfortunately, as I think myself, that a deceased chemist and druggist's business can be carried on by means of a registered person, the law lords came to the conclusion that a corporation was outside our Act; that if it had been intended that companies should be licensed the Act ought to have so expressly stated it. In their opinion no such statement having been made, the word "person" being specifically mentioned, and a corporation not being a person who could be examined, they decided on the purely legal point that corporations were outside the Act. Lord Selborne, addressing the House of Lords, said in effect:—"I should have difficulty in coming to this conclusion if the person who handed over the poison in these cases had not been a duly qualified man." From that moment you see what happened. You see the connection between that observation and what happened the other day in the Wheeldon case. From that moment all thoughtful people who had your interests at heart saw that the law lords and the courts would always look upon these matters in that light, and members of Parliament so regard it. now. They have said:—"We are not concerned to register the open shops of chemists and druggists as profit-making places, but we are concerned that the persons who dispense or sell poisons shall be qualified men." And so it has come to pass that the Government of to-day, and the last Government as well, have both said "we see no reason whatever to alter the law in regard to companies, except in so far that, if you wish it, the name of the person who has charge of the poison department shall be placed over it, or on the label." Last year, Lord Milltown, who has been a great friend to the pharmaceutical chemists, was asked to introduce a Bill by the Irish chemists, which would have hit bogus companies. He consulted the members of the Government and the law lords and sent back to the Irish Pharmaceutical Council these curt observations:—"If you do not cut out clause so and so I cannot take charge of the Bill. There is no chance of its passing." I want to satisfy you we have done all in our power to obtain a clause interfering with bogus companies. We do not propose to touch true co-operation. We keep a kind of malefactors' book, in which every company that is formed for the purpose of carrying on drug trades is duly registered and the whole particulars. I could show you some such companies as these:—A man fails to pass his examination and he is advised how to evade the law. He is told to get other people to join him, make a company, and engage a qualified assistant, and that he will then be all right. When you look who the shareholders are you find that the unqualified person has 99 per cent. of the capital and the 1 per cent. is shared amongst the other six or seven shareholders. In fact, one man is carrying on the business to all intents and purposes, and he is getting protection only from the technical rule, that when once a Company is registered it becomes a Corporation, and we cannot attack it. We have interviewed amongst others the Lord Chancellor. We had the opportunity of having a long consultation with the present Lord Chancellor on the subject, and we got some of our friends—the veterinary surgeons and the dentists—to do the same with reference to a Bill to amend the Limited Liability Companies Act, to be brought into the House of Commons, to prevent such companies as these, which were obviously a fraud as regards company law, from being formed. We had a long interview with the Lord Chancellor, who had charge of the Bill, but unfortunately we found it was impossible to do what we required. He admitted that the case was extremely hard, and that there was justice on our side, but in the present state of business in the House of Commons what we proposed would never be accepted, and secondly, no wording he could think of would do what we want, without doing a great many other things which would be inconvenient in regard to this company business. In other words, the Limited Liability Companies Bill, which, when it became law, was supposed to be a means for allowing great undertakings to be carried on by means of capital derived from a large number of sources, had been applied to retail trade, and the whole thing was more or less abused from beginning to end. I have said we have tried to interest those who have authority, and the answer is emphatically, "No, you must take your stand on the qualification of the manager or seller. We cannot do anything further. We are not concerned who gets the profits or who keeps the shop so long as the person from whom we get our poison is a qualified man." And it follows that the present state of our law broadly is this as interpreted by the judges:—That it is necessary for the purpose of keeping open shop and calling oneself a chemist and selling and dispensing drugs, that the individual proprietor should be qualified, and if he leaves his shop that the person who serves poison shall also be qualified. In the case of a corporation it can own a shop, but in like manner it must have a qualified man to dispense the poison. Consequently there was this advantage in the recent decision, that whereas bogus companies held that they were outside the Act in every respect, and that they need not keep a qualified assistant, it is now possible for the Pharmaceutical Society to see that they have qualified people about them. We assume that the ordinary chemist and druggist will naturally obey the law, but when our attention is called to the fact that he does not we must deal with that matter. I think in many cases it will be found that it will not pay companies to have a registered man to look after that part of the business, so from a trade point of view I think on the whole we have gained in that respect. I think some of you will say this will be a great hardship upon small chemists. If it be a hardship, and there are times and conditions of things in which it might be so regarded, I think all of us ought to face the situation instead of grumbling. The chief complaint I have to make against chemists and druggists is that they grumble and object to any particular restraint put upon them instead of facing the situation. When it becomes known to the public that the real chemist and druggist is a person who must take charge of his business himself, or have someone who is equally qualified, he is justified in fighting for a proper recompense for his work, which he has not hitherto done. I have another grievance to make against the chemist and druggist—he will not value his own services. The privilege which this judgment puts upon you is that you can say to a person, I am the only person who can sell that preparation to you. Nobody can do it but a qualified man, and that being so I expect you to pay me for it. We have been showing the greatest amount of facility in these things and literally give the poisons away, thinking of the cost of the article and not thinking of the brains and responsibility involved in the transaction. I may conclude my observations by saying in regard to this state of the law, that notwithstanding at first sight it seems cruel, I do see the germ of better days, and let me remind you it is not for us to say that the judgment is illogical if we believe in our own qualifications. We do not want to transfer that qualification, just as we take off our coat, to Tom, Dick and Harry. If we carry on our business by means of apprentices and assistants like that, the Pharmacy Act ought to be repealed absolutely. Some would say "a good job, too." I am sorry to say we should have to go to Parliament even for that, and the disposition of Parliament is to say, "No, we will not take these fetters off you; they are very good for the public. You have all developed into extremely intelligent men and we think it is a good thing for the public. If you do not choose to get a fair recompense for your work that is your business, but it is good that this restriction in regard to poisons should be retained." Now you will say if that be so apply at once to the House of Commons and ask it to give us more monopoly and to increase the schedules of poisons, for instance, or to restrict the sale of certain drugs to the chemist and druggist. That is a fair proposal to make, logically, but you must remember that the difficulty of defining what is a drug is almost insuperable. We should be laughed at if we asked for the exclusive powers of selling and compounding what are called harmless preparations. The Legislature does not understand that it is just as important you should sell a good dose of rhubarb as it is you should sell laudanum of the proper strength. If we had, as they have abroad, a sort of intervening medical board to advise the Government in such matters, we might progress. But any attempt from the Council of the Pharmaceutical Society to appeal to Parliament for such power as that would only diminish its influence for good; and the most we can expect in the near future is to ask for the right of compounding prescriptions, and possibly, as has been suggested, the right of selling and compounding medicines of the Pharmacopœia. Our hopes in that respect must be limited to something of that kind, and I myself should consider we were very fortunate indeed if we could get Parliament to listen to us in this respect, because, remember, the number of persons interested in the retail sale of drugs who are not on the Register is about three to one. For every one of us who sells drugs there are at least three others who sell simple drugs either as grocers, herbalists, or something else. When we go into the lobby of the House, your President is met by a member of Parliament who says he has two applications from registered chemists and druggists asking him to support the Bill, but he will produce at the same time a perfect batch of letters from others objecting to it, and saying their living is going to be taken away from them. I mention this to show you we must get our power from the House of Commons, which is affected enormously by its constituents. The power of the House to do business now is almost paralysed. Anything that is not deeply political and is not supported by the whole strength of the Government stands very little chance of being passed. In conclusion, let me say it is obvious that whatever we have to do in Parliament we must have the assent of every chemist and druggist before we move. If we go to Parliament representing one-third of the registered chemists and druggists of the country, and if the others do not choose to follow, we are told we do not agree. If the trade has anything to complain of in the Pharmaceutical Society I hope I have shown you we are not responsible for the wretched Poisons Act of 1868, because we are not. We simply had to take another man's baby and put the best clothes we could on it. I have one favour to ask every chemist and druggist in this room who is not connected with the Pharmaceutical Society. I ask him if he does not choose to join us to at least give us his passive support. If, therefore, there are any here who are outside the body and do not choose to come into it, I ask them to take an intelligent interest in what we are doing and not to oppose a thing simply because it emanates from the Pharmaceutical Society, because in opposing what we do every chemist and druggist is opposing his own trade interests.

Discussion having been invited,

Mr. J. F. Brown (Dover) said: Those who advocate, as I do, that increased attention should be paid by the Council of the Pharmaceutical Society to so-called trade interests, more fitly named a wise and necessary regard for self interest, are usually met at the outset by the imputation that their motive is a consciousness of failure to obtain for themselves a due share of public confidence and support. But I do not propose, Mr. Chairman, to take up the time of the meeting by dealing with this particular imputation. If, in my own case, it is true, no amount of elaborate argument will make it less so, and if it is not true time will show, and I am content to await the issue. Another form of rebuttal is expressed by the sneer once indulged in by my esteemed and venerable friend, the Vice-President, at men "who expected the Society to do what they ought to do for themselves." That I disclaim most emphatically. The conducting of a man's own business is purely and simply a matter calling for his own personal exertions. He profits by its success, or suffers by its failure. In some respects I regret that a recent development of the Pharmacy Act tends rather to lessen the personal responsibility of the proprietor. The question whether an assistant, who may have had some years practical experience of the shop and the customers, may be trusted to sell a packet of Battle's vermin killer is to be decided, not by the person most deeply interested, his employer, but by the Society's Board of Examiners. I am not called upon to prove, Mr. Chairman, that the seeking of the decision by a court of law of a doubtful point in our difficult position, the improvement of our position by promoting fresh legislation, or the influencing of a department of the administration whose action affects it, are matters wholly above and beyond the powers of any individual, however earnest and self-sacrificing. So much I may surely take for granted. These things may be dealt with successfully by an organization; they are matters which we certainly can not do for ourselves. To illustrate the kind of question which only a Society can undertake satisfactorily, let us take that of resistance to the attempted monopoly of trade names by enterprising and advertising capitalists, an adverse influence of increasing seriousness. We have recently seen the recommendation of a particular lozenge by an eminent living physician, which should have redounded to the common benefit of all pharmacists, claimed by one such as a piece of personal property; a claim based merely upon incessant assertions in the public prints, regardless equally of cost—and truth. To defend our common rights against such encroachments is a task too hard for any one of us; but a central organization could, without undue strain, deposit the £100 required as security, and aided by the collective exertions of its members, make good the ground we stand upon. An example of how to do it, must be fresh in the minds of you all. The admirable promptitude and energy with which you, Mr. President, grappled with the threatened injury to the trade in the clause affecting the sale of methylated spirit lately before the House of Commons, deserves our warmest thanks, and shows that "the care of retail trade interests" is something more than an empty phrase. How not to do it may be exemplified by an instance of a little older date. More than two years ago, I brought before the quarterly meeting of our Association the fresh instructions then issued to the officers of the Inland Revenue, on the scope and working of the Patent Medicine Stamp Act. I confess that I hoped to gain the credit of being the first to give warning of the coming danger. So far as I can glean from the Journal, the resolution we passed and sent up to the Council in May was considered by it the following October. There was some official correspondence, but as *Punch* says: "Business done—nothing." Chemists throughout the country were pounced upon. Four penalties were paid, I think, in this town only, and a good deal of irritation was felt in consequence. In April of last year I wrote a letter commenting, in moderate and guarded terms, on the mistake in tactics which had been committed, but it was twice refused publicity in the columns of the Journal. That members should be forbidden reasonable means of communicating with their fellow members through the periodical which is their collective property, because that journal is subject to the arbitrary control of a paid servant of the Council, is a position apparently acquiesced in by the majority, but none the less is it fraught with future danger.[*] I do not overlook the fact that the Society is not wholly dependent upon voluntary subscriptions. It might conceivably maintain the position in which it is by law established, and continue to derive that considerable portion of its income which springs from examination fees, even if the number of members was only sufficient to fill the offices necessary to its existence. But no extended usefulness can flow from a line of policy which attempts to ensure the predominance of any particular party by forcibly throttling honest differences of opinion. A brief word or two on the general situation and I shall have done. Are we not perpetually increasing the supply of an article for which there is no corresponding increase of demand—skill in pharmacy. The willingness of our employers—the public—to award us due remuneration for our services is proportionate—

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[*] In publishing the statements and expressions of opinion contained in these two paragraphs we cannot omit to say that they are not in accordance with the facts of the case.—Ed., *Pharm. Journ.*

but alas, in an inverse ratio—to our eagerness to increase the value of those services by education. The description by Prince Bismarck of the youth of Germany and Russia applies equally to ourselves. We have been painfully prepared to compete for greater prizes than life really offers.

Replying to a member,

Mr. Carteighe said there was nothing in the Pharmacy Act to prevent a qualified chemist from supplying poison to a child; but there was, of course, a moral responsibility.

Mr. W. J. Barnes (Dover) pointed out that many patent cough mixtures, etc., for instance, contained poison, but evaded the law, and were sold by patent medicine dealers and grocers, and were not served by qualified persons. He suffered as they all did from grocers and other dealers selling patent medicines, and he thought that was a direction in which they should endeavour to obtain legislation. People often came into his shop for a pennyworth of cold cream having in their hand a patent medicine for which they had paid 1*s.* 1½*d.* Winslow's soothing syrup was one of the articles to which he referred. If the Society could be the means of stopping grocers selling proprietary articles containing poison he thought it would do a great deal of good to the trade.

Mr. Stooke (Milton) called attention to the fact that carbolic acid, spirits of salts, bluestone, and several other poisons were not scheduled and were sold by unqualified persons. He also complained of hucksters selling pennyworths of castor oil and pennyworths of articles that were poisons, which were made up and supplied wholesale by chemists. He thought the Pharmaceutical Society should take up more cases for the protection of chemists. It was a crying shame, too, that doctors should be allowed to have their prescriptions dispensed in their surgeries by anyone but a qualified person. He knew of a doctor whose medicines were actually dispensed by his groom.

Mr. Carteighe then replied generally to the remarks which had been made. Alluding to Mr. Brown's remarks as to the non-publication of his letter in the Journal, he pointed out that all such matters were left to the discretion of the Editor, and unless that were the rule it would be impossible to conduct any journal. It was the interest of the Editor to secure correspondents, and the publication of letters was never refused without good reason. The imputation conveyed in a printed circular sent out by Mr. Brown was therefore distinctly untrue. As to the Patent Medicine Stamp Act the Council had considered this subject and it came to the conclusion that the Act was positively beneficial to the trade. If they were not obliged to stamp proprietary medicines the trade would pass out of the hands of chemists altogether, for they would have them put up in penny boxes and bottles and sold by anybody. Mr. Carteighe pointed out that a great deal of harm was done to the trade innocently by the shortsightedness of the traders. The Chemists and Druggists' Trade Association went into this matter, and found that it was not desirable to interfere with it, and he thought so, too. Referring to Mr. Stooke's remarks, Mr. Carteighe said many cough-lozenges sold were not regarded as medicines at all, but were classed as confectionery, and exempted on that ground. As to the distribution by chemists of small quantities of poisonous medicines to hucksters, he was afraid many of the chemists who were the loudest in their cries for protection were the very people who were carrying on this trade. Unfortunately the Society had not the power to strike such a man off the Register. As to a doctor's dispensing in his private surgery there was an exemption. No doubt there was a very large part of that dispensing done very inefficiently. But with regard to open surgeries, there could be no doubt that they were required to have a qualified person to dispense the medicines. As to the question of carbolic acid, the Privy Council had declined to make it a statutory poison, owing to the impediment it might place upon its distribution as a disinfectant.

A vote of thanks to Mr. Carteighe was proposed by Mr. Peake, seconded by Mr. Wyles, and carried.

A vote of thanks to the Chairman (Mr. Peake) was then proposed by Mr. Harvey (Canterbury), seconded by Mr. Bolton (Dover), and carried.

The meeting then terminated.

COMPLIMENT TO MR. ALEXANDER BOTTLE.

On Friday, the 20th inst., Mr. Alexander Bottle, Vice-President of the Pharmaceutical Society, was entertained at a supper in the Apollonian Hall, Dover, organized under the auspices of the Dover Chemists' Association, to celebrate the completion of the fiftieth year since Mr. Bottle commenced business as a chemist and druggist. The chair was taken by Mr. E. Peake, President of the Association.

After the usual loyal toasts had been duly honoured, the Chairman proposed the toast of the evening, the health of Mr. Alexander Bottle. He said that when he first came to Dover, Mr. Bottle called on him, and rendered him every assistance in his power, and ever since then the most pleasant relations had existed between them. He referred to the fact that Mr. Bottle had been a member of the Council of the Pharmaceutical Society thirty-three years, and Vice-President six years, as showing in what esteem he was held as a pharmacist and man of business. Locally, also, Mr. Bottle had had the highest conferred upon him by his fellow-townsmen in being elected to the office of Chief Magistrate of the borough. He heartily congratulated him and wished him long life and happiness.

The Chairman then announced that congratulatory letters or telegrams had been received from Messrs. Allden (London), Allen (London), Atkins (Salisbury), Cross (Shrewsbury), Gostling (Diss), Greenish (London), Harrison (Sunderland), Hampson (London), Leigh (Brighton), Newsholme (Sheffield), Robbins (London), Richardson (Leicester), Savage (Brighton), Schacht (Clifton), E. Thompson (Dover), and J. Wilford (High Wycombe).

Mr. J. F. Brown said it was unusual to second a proposition of this kind, but he desired to express the great pleasure he felt on this occasion. He was an old servant of Mr. Bottle, having lived with him some years as assistant; and he rejoiced in the noteworthy circumstance that after fifty years hard work in business Mr. Bottle should be able to be present in the full enjoyment of good health, and he hoped he might be spared for many years to come.

Mr. Warren desired to say how gratified he was to be present on this occasion, he also having been a former assistant of Mr. Bottle's. He would always remember with pleasure the time he was with him.

Mr. Dyason said it had been his privilege to be associated with Mr. Bottle at the commencement of his business career, and had lively and grateful recollection of the influence Mr. Bottle's firm and upright character had exerted on his thoughts and actions in a not altogether inactive life. He looked on Mr. Bottle as a grand type of a grand man, and thought that perhaps he had done himself injustice by staying in a provincial town.

Mr. Bottle, in responding, said words failed him to express the gratitude he felt to all his friends for the kind sentiments that had been expressed. He had begun business fifty years ago in a small way, and was gratified to say that he had been successful. He did not think he had begun quite so badly as the founder of a famous London House, Mr. John Bell, who used to say that the first day he opened he took ten shilings and lost half a guinea, by taking a bad one. He was proud to say that he had not made his business by underselling his neighbours. He had taken higher ground, and maintained it by honourable competition. It was a gratification to him that he had always been on friendly terms with his brother chemists in Dover. He wished to offer his best thanks to the President and officers of the Pharmaceutical Society, his former assistants (especially Mr. Dyason, who was his first assistant on commencing business), and the other visitors who had come long distances to do him honour, as well as to those gentlemen who had been unable to be present, but who had written or wired their congratulations.

Mr. Martindale proposed success to the Dover Chemists' Association, coupling with it the name of Mr. Peake, the President. He congratulated the members on having among them so distinguished a pharmacist as Mr. Bottle, and he wished to express his pleasure in being present on this interesting occasion. He thought there must be something specially invigorating in the air of Dover when he saw such well preserved specimens of pharmacists as he had the pleasure of meeting that day, notably, Mr. Bolton, Mr. Hambrook and Mr. Bottle.

Mr. Peake, in responding to the toast, said that although he had retired from active work in the business, the members still continued to elect him their President (he supposed because he had nothing else to do), and he was happy to be of use to them.

Mr. Wyles proposed the toast of "The Visitors," coupling with it the name of Mr. Butt.

Mr. Butt in response to the toast said it had given him great pleasure to be present to do honour to his old friend Mr. Bottle, whom he had known and respected for many years.

Mr. Barnes then proposed "The Pharmaceutical Society," coupling with it the name of the President, Mr. Michael Carteighe.

Mr. Carteighe thanked the company for the cordial reception given to the toast, which he was pleased to say was always received, if not with enthusiasm at least with respect. He also wished to thank them personally for their courteous reception of himself, almost a stranger.

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, June 18.

Present:—Mr. Umney, President, in the chair, Dr. Attfield, Messrs. Branson, Carteighe, Davies, Gerrard, Holmes and Ward; Messrs. Naylor and Ransom (Hon. Gen. Secs.) and Mr. Nightingale (Assistant Secretary).

A summary of the arrangements in connection with the forthcoming Annual Meeting of the Conference at Leeds was presented by Messrs. Branson and Ward on behalf of the Local Committee.

The head quarters of the Conference will be the Great Northern Railway Hotel. The usual reception by the President and officers of the Conference will be held on the evening of Monday, September 1st, in the Philosophical Hall, and will be followed by a Conversazione. The President will deliver his address and the papers will be read in the same Hall on the two following days. On the Tuesday evening there will be a reception by the Principal and Council of the Yorkshire College. After the business on Wednesday it is intended to drive to Roundhay Park. The following day will be devoted to an excursion to Upper and Mid Wharfedale, during which Bolton Abbey and various other places of interest will be visited.

Mr. Carteighe, in moving that the programme be adopted, expressed the best thanks of the Committee to Messrs. Ward and Branson, for their kindness in coming from Leeds to explain the proposed arrangements.

The proposition was seconded by Mr. Davies and carried unanimously.

Several gentlemen were elected members of the Conference.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society held on Thursday, June 5, Dr. W. J. Russell, F.R.S., President, in the Chair, the following papers were read:—

The Production of Pure Metallic Copper in a Crystalline Condition. By C. C. DUNCAN, King's College, London.—The method of precipitating copper oxide from a boiling solution of copper sulphate with potassium hydroxide and then reducing in electrolytic hydrogen having been found unsatisfactory, as the last traces of sulphate could not be washed away, experiments were made on the reduction of the sulphate by zinc. To a solution containing several grams of purified sulphate, made acid with chlorhydric acid, metallic zinc (containing only a trace of lead) was added in small fragments. Dark, spongy looking copper at once separated, and this soon protected the zinc from the action of the acid; consequently the copper was very slowly deposited: it was found to be in the form of feathery, dendritic crystals. A portion of the crystalline copper, well washed with dilute chlorhydic acid and distilled water, was dissolved in strong nitric acid free from sulphuric, the solution was diluted and barium nitrate added; no precipitate of any kind formed, even after standing 48 hours, showing the absence of sulphur. To discover whether the metallic copper contained zinc, two of the finest crystals (about 8 mm. long) were again well washed and dried in hydrogen. These crystals were then fixed in an ordinary sparkstand and the spark from a 2-inch Apps' coil, with a Leyden jar of 1 quart capacity in the circuit, was passed between them. The light from the copper terminals was analysed by one of Browning's two-prism spectroscopes; and the spectrum given by the copper was compared with that of zinc. None of the lines of zinc coincided with those given by the copper; it was therefore assumed that zinc was absent. The bright lines given by the copper crystals agreed with those described by Thalèn ("Mémoire sur la détermination des longueurs d'onde des raies métalliques." *Act. Nova Upsal.*, iii., 6, 1868, 29). The spark and lines were extremely bright and no faint lines were to be seen (except the usual air-lines), showing the absence of any metallic impurity. Microscopic examination proved the dendritic crystals to be built up of octahedrons. As the production of these crystals was quite accidental, experiments were made with different strengths of copper sulphate solutions, with and without free acid, in order to reproduce them. In the literature relating to the reduction of metallic copper from its salts by means of metallic zinc, there is no mention whether the copper so reduced is in the crystalline state, except in a paper by Dr. Gladstone and Mr. Tribe (*Proc. Roy. Soc.*, xx., 1872, 219), who mention the deposition of metallic copper in a crystalline condition, but they make no remark on the purity or size of the crystals so formed. In another paper, "On the Crystallization of Silver, Gold and other Metals" (*Proc. Roy. Institute*, vi., 1872, 428), Dr. Gladstone again refers to crystalline copper in the following terms:—"Copper salts give round nodules which have no crystalline appearance when deposited from moderately weak solutions, but a very strong solution of the chloride—about 40 per cent.— yields with zinc first a black, thick growth, then arborescent fringes of red metal, terminating in crystals of very appreciable size." In all the experiments made by the author with acid and neutral copper solutions, dendritic crystals of copper were found which could be seen with the unaided eye; they were small in the case of neutral, and large in the case of acid solutions. The following tables give the quantity of copper sulphate, water and chlorhydric acid (rel. den. 1·152) used in the different experiments and the results :—

	$CuSO_4$.	Water.	Acid.	Results.
	grams.	c.c.	c.c.	
I.	10	400	0	Copper was at once reduced in spongy state and then in minute dendritic crystals just visible to the unaided eye. The spongy copper proved to be composed of octahedrons under the microscope. The crystals did not increase in size on standing.
II and	20	,,	0	Same as I.
III.	50	,,	0	
IV.	10	,,	10	The dendritic crystals produced were larger than any of those in I., II. and III.
V.	20	,,	10	Same as IV.
VI.	10	,,	100	Crystals of copper which were slightly larger than those produced in V.
VII.	20	,,	200	Dendritic crystals of copper were produced, several of which were 10 mm. in length. Sulphur was detected in these crystals, and in most other crystals which had been reduced in a solution which was very strongly acid. No zinc was detected by the spectroscope.
VIII.	40	,,	200	The crystals produced were only very slightly larger than those in VII, but more numerous.

	$CuCl_2$.	Water.	Acid.	Results.
	grams.	c.c.	c.c.	
I.	10	400	0	Small dendritic crystals of copper were quickly produced. On standing the crystals increased slightly in size.
II.	20	,,	0	Numerous small dendritic crystals with several about 7 mm. long. No impurity detected.
III.	10	,,	20	Two or three crystals about 11 mm. long with the usual mass of smaller crystals. No impurities were detected.
IV.	40	,,	20	Four or five crystals 12 mm. long with the usual mass of smaller crystals. No impurity detected.
V.	140	500	40	This solution gave the finest crop of dendritic crystals yet produced. One crystal measured 15 mm., and its lateral branches were composed of clumps of crystals. The crystals were erect, and had a beautiful metallic appearance. Several of the crystals were from 5—8 mm. in length, two or three 12–13 mm., and only a little spongy copper was to be seen. No impurity could be detected. The pure crystalline copper is insoluble in pure nitric acid (free from nitrous acid). See Veley (*Proc. Roy. Soc.*, 1890).

As sulphur has been detected in several of the crystals deposited from the copper sulphate solutions, a few experiments were made with copper chloride free from sulphate. Crystalline copper is said to have been obtained by using iron and aluminium as reducing agents. Thus, Gore, in his text-book of "Electro-Metallurgy," pp. 203-204, refers to the use of iron in recovering copper from large deposits of the Tharsis and Rio Tinto mines in Spain. The copper is dissolved by means of chlorhydric acid, and the liquid is run into large vats filled with scrap iron. In a short time all the copper is reduced in the form of feathery crystals upon the iron. The process is described by P. Argall and G. A. Kinahan in the *Sci. Proc. Roy. Dublin Soc.*, N.S., iii., 1883, 302—328, and on p. 309 the production of crystalline copper is mentioned. No reference is made to the purity or size of the crystals. The reduction of copper from its sulphate by the aid of aluminium is mentioned in "Watts' Dictionary of Chemistry," 2nd Sup., 1875, p. 383, in a passage which is extracted from Cossa (*Nuovo Climento*, [2], iii., 75). The crystals of copper are described as follows:—"Aluminium foil immersed in a solution of sulphate or nitrate of copper is not acted upon at once, but after two days the foil becomes covered with crystals consisting partly of dendrites, but for the most part of well-defined octahedrons." It was found that if the solution of the copper sulphate is neutral, only octahedrons are produced; but that if an acid is present, dendrites are produced. Sulphur was the only impurity detected. "Copper is immediately reduced by aluminium from a solution of cupric chloride, and likewise, though more slowly, from the acetate." It is not mentioned whether the copper is deposited in the crystalline or amorphous state, but the author has found on experimenting with these substances that dendritic crystals of copper are produced in both cases. No impurity could be detected. Magnesium was found to reduce copper from a solution of copper sulphate in very small quantities, the copper being formed in small patches composed of dendrites and octahedrons. Magnesium added to a solution of copper chloride caused an evolution of gas, throwing down a green precipitate, and at the same time reducing the copper in the spongy state. The well-washed copper contained magnesium. In a note by M. A. Commaille "On the Action of Magnesium on Neutral Metallic Salts" in the *Chem. News*, xiv., 188, it is mentioned "that copper sulphate gives with magnesium the metal (copper), the hydrated peroxide and a green subsalt. With the chloride no metal (copper) is precipitated, but a deposit of Brunswick green." In experiments made by the author with the chloride, copper was reduced in appreciable quantity, but in an entirely amorphous state.

The Action of Ethylic Oxalate on Camphor. By J. BISHOP TINGLE, Ph.D.

The Oxidation of Turpentine in Sunlight. By HENRY E. ARMSTRONG.—It was pointed out by Sobrero in 1851 (*C. R.*, xxxiii., 66), that when turpentine is exposed to light in presence of moisture and oxygen a crystalline substance is formed which has the composition represented by the formula $C_{10}H_{18}O_2$; and that this substance is decomposed when boiled with dilute sulphuric acid, an oil being formed which has a powerful odour recalling both that of camphor and that of turpentine. The author's attention became directed to this substance about 12 years ago in the course of his studies of the terpenes and camphor, and in most years since, during the summer, he has carried on experiments on the oxidation of $C_{10}H_{16}$ hydrocarbons in sunlight, and has been able to confirm Sobrero's statements in every particular. As the crystalline product in question has not yet been named, it is proposed to term it—at all events, provisionally and until its constitution is determined—*sobrerol.* Sobrerol is readily soluble in alcohol, and crystallizes from this solvent usually in large, flexible, monosymmetric prisms, having a peculiar hourglass structure inside and showing hemihedrism. It is slightly soluble in water, benzene, chloroform and petroleum spirit; the aqueous solution has a bitter taste. It melts at about 150°. The results obtained on analysis (carbon, 70·57 and 70·49 per cent.; hydrogen, 10·71 and 10·74 per cent.), show that, as Sobrero states, it has the formula $C_{10}H_{18}O_2 = C_{10}H_{16} + H_2O_2$, and there can be very little doubt that it is a glycol, but, owing to its extreme sensitiveness to the action of acids, it is difficult to prove this by the ordinary methods. Sobrerol is optically active in a high degree, the apparent specific rotatory power of the products from French turpentine in a 5 per cent. solution in alcohol (B.P.) being slightly above 150°. Sobrerol from American turpentine (from Savannah) was found to have about the same rotatory power, but in the opposite direction. The optical similarity of the two products is noteworthy, inasmuch as the American has less than half the rotatory power of French turpentine. It would seem that only the terpenes proper, and not the citrenes, etc. (*cf.* *Chem. Soc. Trans.*, 1879, 734; *J. Soc. Chem. Ind.*, 1882, 478), form sobrerol. To ascertain whether this be the case, and what are the crystallographic and optical relationships of the products obtained from terpenes from different sources, the author is engaged in conjunction with Mr. W. J. Pope—to whom he is indebted for assistance in the research—in studying the behaviour of pure $C_{10}H_{16}$ hydrocarbons of all kinds. When boiled with dilute sulphuric acid, sobrerol is readily converted into the oil referred to by Sobrero; the product is undoubtedly identical with the isomeride of camphor which Wallach and Otto have obtained by treating turpentine with nitrous acid (*Annalen*, ccliii., 249), and which they have provisionally named *pinol*; as the compound is not an *ol*, *i.e.*, an alcohol, it may be suggested that it might appropriately be termed *sobrerone*. The product from sobrerol begins to boil at 150°-160°, but passes over almost entirely at about 183°, leaving a small amount of a viscid oil; it readily combines with bromine, forming a dibromide (bromine found 50·78 per cent.) which crystallizes very beautifully in forms of the rhombic system, the lengths of the axes being in the ratio $a : b : c = 0{\cdot}5696 : 1 : 1{\cdot}5553$, dimensions which almost absolutely agree with those quoted by Wallach and Otto, viz., $a : b : c = 0{\cdot}5700 : 1 : 1{\cdot}5553$. The dibromide was found to melt at 93·5°, 94° being the melting point given by Wallach and Otto. The formation of sobrerone from sobrerol is of interest as serving to explain its formation by Wallach and Otto's method: very probably sobrerol is first produced, and is at once acted on by the acid. Sobrerol is probably always the initial product of oxidation of turpentine. It may be expected that sobrerone will be found among the oxygenated constituents of some essential oils, and it is proposed to search for it. If, as appears probable, sobrerol be a glycol, the formation of sobrerone from it is analogous to that of pinacolin from pinacone; but, in this latter case, an isomeric change takes place, pinacolin being a ketone, $CMe_3{\cdot}CO{\cdot}CH_3$, and not the oxide corresponding to pinacone. Wallach and Otto's observations, however, show that sobrerone is not a keto-compound. It would, therefore, appear to follow that sobrerone is an oxide formed by withdrawal of the elements of a water molecule from two hydroxyls attached to contiguous carbon atoms.

The Structure of Cycloid Hydrocarbons. By HENRY E. ARMSTRONG.

Tertiary Butyl Mercaptan. By LEONARD DOBBIN, Ph.D.—The author finds that when tertiary butyl iodide is digested at a gentle heat with a sufficient quantity of zinc sulphide, an interaction takes place which results in the formation of tertiary butyl mercaptan. It is a colourless, extremely volatile liquid which boils at 65°-66°, possessing an overpowering and disagreeable smell, recalling that of other mercaptans; it solidifies in a freezing mixture of snow and salt to a white semi-translucent mass; it forms white, insoluble compounds with mercuric chloride and with silver nitrate. Products of higher boiling point are formed at the same time as the mercaptan; these are believed to be tri-isobutylene, and probably also tertiary butyl sulphide. This part of the subject is under investigation.

Desylacetophenone. By ALEX. SMITH, B.Sc., Ph.D.

MEETING OF NORTH LONDON CHEMISTS.

A meeting of Islington and St. Pancras and North London chemists and druggists was held on Thursday afternoon at the Midland Hotel, St. Pancras, Mr. Holding in the chair. Mr. Carteighe, Mr. Allen, Mr. Hampson, Mr. Martindale and Mr. Bremridge, the Secretary of the Society, were present, and there was a fair attendance of the trade.

The Chairman said the object of the meeting was to discuss several business matters, and to build up a better feeling amongst the trade. In visiting friends in his district he heard various complaints, but he did not think there was much substance in them. The curriculum would certainly be an advantage and would help to place pharmacists in a better position. The great desideratum was for those in the trade to join the Pharmaceutical Society, and thus secure strength and energy in carrying any legislation which might be desired.

Mr. Hyslop, as one of the district Secretaries, said he was convinced of the truth of the saying "Sweet are the uses of adversity." The interests of the trade were interwoven with those of the Pharmaceutical Society, which was founded in consequence of adverse circumstances and unfounded attacks made upon chemists, and it had continually increased in power and influence since. The great difficulties of the present day came not from outside, but from inside. All the *élite* of the medical profession were on their side, and the great obstacle was selfish ignorance. He concluded by referring to a correspondence in the *Daily Telegraph* some years ago, in which "the merry chemist" was alluded to, since which time he had made up his mind to be as merry as he could, and to the desirability of going for information to headquarters, and not to places where the truth would be perverted.

A letter was read from Mr. Chapman, hoping the question of early closing would be considered. He thought chemists should close early on one evening a week, as other shopkeepers did.

Mr. Stamp said he had declined to close at five on Thursdays, the chemist's business being so different from any other.

Mr. Fitch said the greater part of the trade in Hackney was done in the evening.

Mr. Taplin thought the drug trade was in a very bad state, and the question was, what could be done? He gave several instances of different prices being charged for the same article, which could not be defended. When they went to Parliament they must make it clear that they wanted to protect themselves as well as the public. You could not charge for brains if the purchaser knew the market price of what was in the bottle. He thought the sale of drugs and pharmaceutical preparations should be confined to chemists as it was in France and Germany. There should be larger meetings held.

The Chairman said about 250 cards had been sent out for that meeting, and only 110 took the trouble to reply at all. Many had no assistant and could not leave.

Mr. Taplin said he was only able to come by paying someone to take his place. The last decision would, he thought, be the ruin of the trade.

Mr. Hampson thought the meeting was very encouraging. Big meetings were often of little use except to impress the public. Having referred to the Trade Association, which had to be dissolved, he said the Pharmaceutical Society could do all that was possible to be done for the trade, but it was no use asking for anything from Parliament which was not in the interests of the public. Possibly, if they were all united, they might secure a monopoly of dispensing, and that was as much as they could expect. Competition was universal, and the only way to meet it all was by raising the status of the chemist and getting the public to recognize that the chemist was an educated and skilful man.

Mr. Martindale next addressed the meeting, advocating unanimity in support of such a Bill as had lately been introduced, the main features of which he hoped would form the basis of a measure to be brought forward next session. The decision in the Wheeldon case he looked upon as a great protection to the trade. Early closing must depend on the neighbourhood, and generally speaking it was not practical to close early once a week.

Mr. Broad thought chemists were too easily satisfied. The Society could not be considered very flourishing when only one-third of those eligible were found within its ranks. He commented on several of the preceding speeches, and blamed men who took apprentices though they were incompetent to teach them. The great desideratum was unity, and that could only come from a representative Council, on which all opinions were represented. He believed the sympathies of M.P.'s were very much with chemists and druggists, and if they were united the necessary measures might be passed.

Mr. Allen expressed the hope that gentlemen present would state their views as to the legislation required.

Mr. Humphreys thought medical men who supplied their own medicines should be liable to visits by inspectors under the Adulteration Act.

Dr. Paramore did not see how a chemist in a poor neighbourhood could make a living without counter prescribing, in the face of the competition he was subjected to. He made some caustic remarks on an Association which offered to provide the best medical advice and unlimited medicine for 1d. a week, and on the abuse of the hospital system.

Mr. Wallis spoke of the unsatisfactory state of the trade and the unfortunate jealousies which existed. The main thing was for them all to join the Society. Even if they did not do that they should support the Benevolent Fund. The sale of patent medicines containing poisons should be confined to registered men, and all men in the business should be exempt from jury service. All men who passed the Major ought to join the Society.

Mr. Carteighe emphasized this last observation, and would extend it also to the Minor men. It was a great mistake to suppose that the Society made money out of the examinations, especially when men came up two, three or more times. If chemists would respect themselves more and put a higher value on their own qualifications there would be more probability of that estimate being accepted by the public. He pointed out, with regard to legislation, that it was comparatively easy to prevent a measure or a clause becoming law, but it was a very different thing to pass constructive legislation. The moment the interests of any one section in a constituency were touched, the member representing it was approached, and he had to consider the interests of all his constituents, not of chemists and druggists only. It had been said that doctors were protected, but that was not so; there was free trade in medicine in England, and owing to the peculiar history of medicine in this country, where it had gradually grown up from mere quackery to a science, the profession even now was not so much respected as the other learned professions. It was a great mistake to suppose that turning one man out of the Council, even the President, would alter the whole current of affairs. Twenty years hence probably there would be the same complaints as to-day, that the trade would not support the Society. The fact was, many of them worked a great deal too hard, and were so much absorbed in their business that they lost all individuality and public spirit. It would be a very good advertisement for a man to shut up his shop and take a half-holiday when he wanted it. He had just seen an article in an American journal headed "Backbone in Pharmacy," and that was what he was always preaching. The Society was now much stronger than it ever was, but it would be infinitely stronger if it had the whole trade within its ranks. There was no occult power in Bloomsbury Square to raise men's incomes or get protection. In 1852 Bell could only succeed in getting protection for the title of pharmaceutical chemist, and in 1868 they only got protection for the sale of poisons. The sale of patent medicines containing poisons was a matter on which a judicial decision might have to be obtained, but it was necessary to be cautious in taking action in such cases, and not to appear to be moving on trade union lines. He considered both the Wheeldon and Matthias decisions of great advantage to the trade. No practical suggestion for legislation had been put forward beyond that of Mr. Hampson with regard to dispensing, which might perhaps be carried out, but it would not be without a struggle. In conclusion, he advised all the trade to read the Journal, so as to know what was going on, and to support the Society.

The Chairman having said a few words, in which he advocated exemption from jury service as desirable.

Mr. Stamp moved "That this conference of chemists and druggists from Islington, St. Pancras, Marylebone and Hampstead, is of opinion that the Pharmaceutical Society deserves the support of the trade, and pledges itself to help the Council in its endeavours to obtain amended legislation in the interests of all chemists and druggists."

Mr. Walton seconded the motion, which was carried unanimously.

Mr. Carteighe then moved a vote of thanks to the Chairman, which was seconded by Mr. Humphreys, and carried unanimously.

Parliamentary and Law Proceedings.

Poisoning by Oxalic Acid.

An inquiry was held on Thursday, June 19, at the Board Room, Ebury Bridge, into the circumstances attending the death of Mary Ann Keefe, aged 59, the wife of a messenger at the Spanish Embassy. The evidence went to show that on Tuesday Mrs. Keefe complained of being very ill, and her husband went for a doctor, but when he returned with the medical man Mrs. Keefe was dead. During this interval Mrs. Keefe had told her son and daughter that she had poisoned herself with oxalic acid because she had so much "worry and trouble." The jury returned a verdict of suicide whilst of unsound mind.—*Evening Standard.*

B. Sc.—Particulars as to the examination for the B.Sc. degree will be found in the Calendar of the University of London, a copy of which is in the Society's Library.

D. Dickinson.—We are unable to identify the wood beyond saying that it is derived from one of the Simarubaceæ.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Tubby, Allen, Clarkson, Coulter, Epithelium, East Anglian.

INDEX TO VOL. XX.

(THIRD SERIES.)

ABBOTT, J., Obituary Notice of, 498.
Abel, Sir F., Smokeless Explosives, 685.
Aberdeen and North of Scotland Society of Chemists and Druggists, 40, 652.
— Chemists' Assistants and Apprentices' Association, 416, 457, 494, 614, 670, 727, 782, 826, 867.
Abney, W. de W., Effect of Light upon Matter, 549, 564.
Abraham, A. C., Lime Water, 440, 520.
Abrus Poison, 197.
Acetanilid, Poisoning by, 1059.
Acetyl Values, Benedikt's, Criticism of, 990, 1031.
Acetylethylenephenylhydrazin, 604.
Acidum. Hydrocyan. Dil., B.P. (A. Lees), 824.
— Sulphuricum Aromaticum (F. W. Fletcher), 580; (E. J. Millard), 580; 600.
Aconite and Belladonna Roots, Extraction of (R. Wright), 376.
— Chloroform of, 559.
— Cultivation in Cambridgeshire, 122.
Aconitine, Crystallized, Poisoning by, 734.
Adams, W., Proprietary *versus* Legitimate Pharmacy from a Medical point of view, 45.
Adenium Boehmianum, Poison of, 343.
Adiantum binulatum, 660.
Adulterated Drugs, Sale of, 652.
Agaric Acid, 168.
Alangium Lamarkii, 660.
Albumen, Ash-free, 503.
— Coagulation, 604.
— Egg, Crystallized Preparation of (F. Hofmeister), 876.
— Esbach's Test Solution for, 400.
— in Urine, New Test for, 424, 1059.
Albumose, Crystalline Ethers of, 343.
Alcock, F. H., Note on Carbonate of Potassium, 1018.
Alcoholic Strength of the B.P. Tinctures (R. Wright), 240.
Alkali Works Inspection, Editorial Remarks upon, 68.
Alkaloids, Synthesis of (S. P. Sadtler), 544.
Allen, A. H., A Chemist's View of the Sheffield Water Supply, with Special Reference to its Action on Lead, 802.
— A. H., Testing of Spirit of Nitrous Ether, 788.
— A. H., Vermin Killers containing Strychnine, 296.
— William, 1001.
Allium Sphærocephalum (J. W. White), 460.
Almond Oil, Bitter, 855.
— Oil from Peach Kernels, 856.
Aloes (J. Bainbridge and C. Morrow), 570; (E. M. Holmes), 561.
— Musambra, a variety of East Indian (D. Hooper), 121.
Aluminium (H. E. Roscoe), 55, 77.
American Pharmaceutical Association, Editorial Remarks on, 47.
Ammoniacum Resin Oil, 856.
Ammonium Iodide, 242.
Amyl-Nitrite, Explosion while Distilling, 858; (W. R. Dunstan), 888.
Andropogon Fragrans Oil, 283.
Anethol and Anise Oil, 836.
Angelica Root Oil, 263.
Angostura Bark Oil, 856.
Anise Fruit, Adulterated (W. Lawson), 722.
— Oil and Anethol, 836.
Anisodus Luridus, Constituents of, 709.
Annidalin, 241.
Annual General Meeting, 957.
Annuitant, Death of an, 28, 245, 407, 758, 796, 879, 916.
Antacid Remedies in Dyspepsia and Gravel, Some Practical Points in the Use of (Sir W. Roberts), 151.
Anthrarobin and Goa Powder, 789.
Anthrax Albumose, 344.
Antipyretics, The Search for Improved, Editorial Remarks upon, 567.
Antipyrin, Alleged Improper Sale of, 417.
— and Caffeine, 711.
— and Carbolic Acid, 977.
— and Chloral Hydrate, 602, 977.
— and Iodine, 162.
— and Sodium Salicylate, 1058.
— in Asthma, 791.
Antipyrin Incompatibles, 61, 502; (E. J. Millard and A. C. Stark), 860.
— Poisoning by, 1059.
— Salicylate, 1058.
Antiseptic Dressing (Sir J. Lister), 389, 542.
Antiseptics, Supply of to Midwives, 775.
Apothecaries Act, Prosecutions under the, 1043.
Apprentices, Election of, 9, 112, 267, 553, 623, 735, 814, 918, 1005.
Apprenticeship, Conditions of, 996.
Aqua Destillata (G. Coull), 415; (J. R. Hill), 416.
Arabinon, the Saccharon of Arabinose, 558.
Arata, P. N. and F. Canzoneri, Bark of Quina Morada, 854.
— P. N. and F. Canzoneri, True Winter Bark, 1026.
Arenaria gothica, 345.
Argentine Republic, Exhibits from, 301.
Aricine, 791.
Aristol, 601.
Aristolochia Subglauca Oil, 282.
Armstrong, H. E., Molecular Weight of Substances in Solution, especially Colloids, 96.
Arnica Flowers Oil, 264.
— Root Oil, 836.
Aromatic Sulphuric Acid (R. A. Cripps), 542.
Arsenic, Illegal Sale of, 575.
— in Glycerine (L. Siebold), 277, 682
— Poisoning by, 1054.
Artemisia Barellieri Oil, 282.
— Hispanica Oil, 282.
Asafœtida, 660.
Ashby-de-la-Zouch as a Health Resort, 81.
Ashdown, H. H., Substances Found in the Urine which Reduce the Oxide of Copper upon Boiling in the Presence of an Alkali, 606.
Assistants, Unqualified, Editorial Remarks upon, 936.
Associates, Election of, 8, 112, 267, 362, 443, 553, 622, 735, 813, 917, 1005.
Aston, W., Prizes for Students, 519.

Atkins, S. R., Address to the Sheffield Pharmaceutical and Chemical Society, 290.
Atropine and Cocaine, 1057.
— Hyoscyamine and Hyoscine, 342.
— Optically Active, 422.
— Poisoning by, 611.
Austrian Pharmacopœia, New, 28.

BACTERIA (F. Davis), 348.
Bainbridge, J., and C. Morrow, Aloes, 570.
Bain, J., Early Closing in Liverpool, 1056.
Baldwin and Co., What is Lin. Saponis Co.? 691.
Balkwill, F. P., Botanical Ramble in Cornwall and Scilly, 440.
Ball, A., Papain as a Digestive Agent compared with Commercial Pepsine, 227.
Balsamodendron Berryi (D. Hooper), 143.
Barium Sulphate, Solubility of in Alkaline Citrates, etc. (B. S. Proctor), 320.
Barras, T. E., Pharmaceutical Society, 787.
Baxter, W., Fertilization of Cypripedium Calceolus, 412.
— W., Notes on a Botanical Ramble in Cornwall and Scilly, 412, 520.
Bay Oil, 264.
Beech-Tar Oil, 856.
Beer Purity Bills, 813.
Bell Memorial Scholarships, 30, 115; Letter respecting, 908.
Bell, Sir L., Address to Chemical Section of the British Association, 237, 256, 338.
Belladonna, Chloroform of, 559.
— Cultivation in Bedfordshire, 122.
— Poisoning by, 245.
Belladonnin and Hyoscine, 601.
Benevolent Fund Committee, 9, 113, 267, 363, 444, 554, 623, 736, 815, 920, 1006.
— Fund, Discussion respecting the, 554, 815.
— Fund, Financial Statement, 912.
— Fund, Grants from the, 9, 113, 267, 363, 444, 554, 623, 736, 815, 920, 1006.
— Fund, Letter respecting, 360.
— Fund, List of Subscriptions and Donations to the, in 1889, 693.
— Fund, Statement of Relief Granted during 1889, 692.
Bennett, A. R., Address to the Edinburgh Chemists' Assistants and Apprentices' Association, 373.
Berberis Lycium, 244.
Beringer, G. M., Oleates, 676.
Betel Leaves, Oil of, 264, 423, 836; (D. S. Kemp), 749.
Bismuthyl Iodide (C. E. Green), 5.
Bitters, Tonic Effect of, 425.
Blair, J., Pharmaceutical Society of Ireland, 160.
Blowpipe (J. C. Evans), 686.
Blunt, T. P., Assay of Ipecacuanha Wine, 254, 380.
— T. P., Attempt to Determine Emetine by Alkalimetric Titration, 809.
Boa, P., Digestive Extract of Tea, 572.
— P., Pil. Colocynth. Co., 866.
Bolivia, Exhibits from, 301.
Books Received, 120, 160, 280, 580, 768, 786, 950, 995, 1055.
Boracic Acid as a Food Preservative, Prohibition of, in Germany, 758.
Borax in Epilepsy, 980.
Botany, History of (G. C. Druce), 511, 536.
Bottle, A., Compliment to, 1066, 1072.
Boucher, C. E., Dissociation, 1020.
Bourgougnon, A., Manufacture of Commercial Hydrogen Dioxide and its Applications, 874.
Bowers, C. E., Oil of Maize, 404.
Bradwall, J. H., Metric System of Weights and Measures, 592.
Brain and Spinal Cord, Electrical Relations of the (F. Gotch), 783.
Braithwaite, J. O. and J. C. Umney, Ipecacuanha, Fluid Extract and Wine, Standardised, 252.
— J. O. and J. C. Umney, Ipecacuanha Wine, B.P., 253.
Brazil, Exhibits from, 301.
Brighton Association of Pharmacy, 938, 1030.
Bristol Pharmaceutical Association, 513.
British Association, Meeting of, 8, 219, 231.
— Association, Editorial Remarks upon, 223, 1044.
— Medical Association, 189, 1044.
Broad, J. M., Council Election, 926.
Bronte, Vineyards of, 1040.
Brookes, A. F., Dispensing Query, 828.
Brown, A. P., New Medium for Mounting Starches and Pollens, 188.
— F. A., Lime Water, 440.
Brunton, T. L., Relation between Chemical Structure and Physiological Action, 35, 50, 73, 92, 133.
Buchanan, M. E., Report on Pharmacology, 784.
Buck, A. S., Infusum Senegæ Concentratum, 486.
Building Committee, 14.
Butterflies, Yellow Pigment in, 98.

CAIRNS, F. A., Council Election, 888.
Cajuput Oil (R. A. Cripps), 415.
Calamine (W. M. Holmes), 474.
Calcium Hypophosphite, Syrup of, B.P.C., 560.
Caledonian Balsam, 979.
Calotropis gigantea, 660.
Calvert, J., Chinese Method of Preparing Extract of Opium, 148.
Cambridgeshire, Cultivation of Medicinal Plants in (E. M. Holmes), 122.
Campbell, N. S., Pharmacy in Colombo, 1056.
Camphor Aldehyd, 712.
— Compounds, 62.
— Oil of (H. Trimble and H. J. M. Schrœter), 145.
Camphoric Acid in Night Sweats, 1060.
Canaigre (H. Trimble), 187.
Cannabis indica, 792, 894.
Caoutchouc Plasters (A. Schneegans and M. Corneille), 984.
Capsicum, Ethereal Tincture of, 974.
Caraway Oil and Carvol, 856.
Caraways, Norwegian, Oil of, 603.
Carbo Animalis Purificatus, and Carbo Ligni, B.P., 946.
Carbolic Acid, Poisoning by, 150, 280.
— Acid, Synthetic, 241, 791.
Carbon Dioxide, Aqueous Solution of (W. A. Munro), 440.
Carboys as Advertising Agents (C. R. Knapp), 888.
Carrot Oil, 836.
Carter, R. B., Colour Vision and Colour Blindness, 991.
Carvol and Caraway Oil, 856.
Cascara Sagrada, 165, 343; (J. Moss), 1056.
— Sagrada Extract, Aloes in, 503.
Cascaræ Sagradæ Extractum Liquidum (J. Findlay), 491.
Cascarilla Oil, 836.
Casearia Esculenta (P. S. Mootooswamy), 377; 660.
Cassia Oil, 264, 836.
— Examination of (H. Gilbert), 575.
Castor Oil Adulteration (M. Conroy), 385.
— Oil, Chocolate, 242.
Cedar Gum (J. H. Maiden), 1063.
— Oil of, 244.
Cellulose, Acetylation of, 457.
"Cheap Jack," 828.
Chelidonium Alkaloids, 342.
Chemical Change under great Pressure, Evidence afforded by Petrographical Research of the Occurrence of (J. W. Judd), 859.
— Problems of To-day (V. Meyer), 608, 771.
— Society, 79, 96, 432, 457, 507, 615, 765, 859, 882, 943, 989, 1031, 1073.
— Structure and Physiological Action, Relation between (T. L. Brunton), 35, 50, 73, 92, 133.
Chemists' Assistants' Association, 313, 348, 367, 407, 433, 494, 511, 536, 558, 595, 617, 686, 725, 734, 842, 860, 884, 899, 944, 976, 1033.
— Ball, 568.
Chloral Hydrate, Action of, on Glass, 163.
Chloralamide, 161, 341; (R. C. Harrison), 200.
Chloralimide, 789.
Chlorine, Action of, on Water in the Light, and on the Action of Light on Certain Chlorine Acids (A. Pedler), 943.
Chlorodyne and Morphia, Poisoning by, 925.
— Poisoning by, 1035.
Chloroform, Camphorated, B.P.C., 559.
— Decomposed, Note on a Sample of (A. C. Stark), 407.
— Manufacture of, Recent Improvements in the Methods for the (S. P. Sadtler), 84.
Chloroxylon Swietenia, 660.
Christy, T., Strophanthus Plants, 318.
Chromic Acid in Hyperidrosis, 504.
Cinchona Bark, Aromatic, 343.

Cinchona and Quinine Production in India, Editorial Remarks upon, 149.
Cinchonas in Bengal, 605.
Cinnamomum Cassia, 658.
Cinnamon, Ceylon, 150.
— Leaf, Oil of, 749, 856.
Cinnamylcocaine, 162.
— in Coca Leaves (B. H. Paul and A. J. Cownley), 166.
Citronelle Oil, 264.
Cistus Landaniferus Oil, 282.
Citrus, Some Crystalline Substances obtained from the Fruits of Various Species of (W. A. Tilden and C. R. Beck), 767.
Clague, T. M., Council Election, 951.
— T. M., Easton's Syrup, 249.
— T. M., Examination of Urine, 574.
Clerodendron inerme, 660.
— infortunatum, 660.
Clove Culture in Zanzibar, 1042.
Clove Oil, 281.
Cloves, Artificial, 64.
Clower, J., Vinum Ipecacuanhæ by Fractional Percolation, 360.
Coal, Search for, in the South of England (W. B. Dawkins), 1032.
Cobalt and Nickel, Estimation of, 617.
Cocaine and Atropine, 1057.
— Colour Test for, Erroneous, 162.
— Dextro and Methyl, 790, 889.
— Hydrochlorate and Borax, 977.
— Poisoning, Ammonia as a Restorative in, 504.
Cochin China, Exhibits from, 301.
Codeine and Morphine Sulphate, Incompatibility of, 791.
Cod Liver Oil (M. Gautier and L. Mourgues), 1018.
— Liver Oil and Glycogen, 423.
Coffee and Bacteria, 711.
— French, 857.
Colchicum autumnale, 714.
Cole, M. J., Preparation of Microscopical Sections from Barks and Roots used in Pharmacy, 497.
Coleman, A., Council Election, 995.
Collier, H., Resin Soap as an Emulsifying Agent, 751.
Colombo, Pharmacy in (N. S. Campbell), 1056.
Colour Vision and Colour Blindness (R. B. Carter), 991.
Committees, Appointment of, 1005.
CONFERENCE, BRITISH PHARMACEUTICAL, 118, 212, 225, 246, 273, 294, 318, 328, 351, 375.
  Editorial Remarks on the, 150, 173, 190, 201.
  Election of Officers, 380.
  Meetings of the Executive, 118, 225, 351, 479, 902, 1073.
  Place of Meeting for 1890, 378.
  President's Address (C. Umney), 214.
  Report of Executive Committee, 212.
CONFERENCE BRITISH PHARMACEUTICAL, PAPERS READ AT THE:—
  Aconite and Belladonna Roots, Relative Value of Chloroform and Alcohol, and Mixtures of the Two for the Extraction of (R. Wright), 376.

CONFERENCE, BRITISH PHARMACEUTICAL, PAPERS READ AT THE—continued.
  Arsenic in Glycerine (L. Siebold), 277.
  Casearia Esculenta (P. S. Mootooswamy), 377.
  Chloride of Methyl, New Method of Applying (W. Martindale), 256.
  Easton's Syrup (T. M. Clague), 249.
  Euonymus, Chemical Observations on the root bark of (W. A. H. Naylor and E. M. Chaplin), 273.
  Ferri et Ammonii Citras (B. S. Proctor), 246.
  Gentian, Infusion of (W. Johnston), 356.
  Glass Bottles, are they Soluble? (R. Reynolds), 230.
  Hypophosphorous Acid as a Solvent of Strychnine and Morphine (H. W. Jones), 256.
  Ipecacuanha, Fluid Extract and Wine (Standardized) (J. O. Braithwaite and J. C. Umney), 252.
  — Wine, B.P., J. O. Braithwaite and J. C. Umney), 253.
  — Wine, Volumetric Process for the Assay of (T. P. Blunt), 254.
  Lead in Drinking Water, Negative Evidence of (R. Reynolds), 294.
  Lemon Juice (T. H. Williams), 336.
  — Peel, Tincture of (W. Johnston), 357.
  Liquor Morphinæ Meconatis (C. A. Macpherson), 375.
  Liquors, Exact Formulæ for the Official One per Cent. (C. A. Macpherson), 357.
  Lithia, Medical and Chemical Misconceptions about (L. Siebold), 275.
  Narceine and its Salts (D. B. Dott), 335.
  Nitrous Vitriol, Effect of the use of, in making Certain Aerated Waters (J. Pattinson), 251.
  Papain as a Digestive Agent Compared with Commercial Pepsines (A. Ball), 227.
  Prussic Acid, Scheele's, Strength of Commercial Samples of (R. Wright), 376.
  Senna, Tincture of (B. S. Proctor), 225.
  Small Residues, Note on a Scale of (B. S. Proctor), 318.
  Sodium Salicylate, Impurity in a Commercial Sample of (R. Wright), 377.
  Stramonium, Extract of (A. W. Gerrard), 246.
  Strophanthus Hispidus, Chemistry of (T. R. Fraser), 328.
  — Plants (T. Christy), 318.
  Tannin: Its Solubilities, etc. (B. S. Proctor), 351.
  Vermin Killers containing Strychnine (A. H. Allen), 296.

CONFERENCE, BRITISH PHARMACEUTICAL, PAPERS READ AT THE—continued.
  Wild Cherry Bark and its Preparations (L. W. Hawkins), 355.
Conroy, M., Castor Oil Adulteration, 385.
Conversazione and Annual Dinner, 896, 914, 936, 955, 957.
— Committee, 817, 921.
Copaiba in Surgery, 164.
Copper, Crystalline, 1073.
— Reagent, Delicate, 603.
Corder, O., Council Election, 887.
— O., Gorse Seeds, 400.
— O., Scopola Carniolica, 500.
Corn Grain, Gluten in the, 345.
Cornwall and Scilly, Botanical Ramble in (W. Baxter), 412, 520; (F. P. Balkwill), 440.
Correspondents, Answers to, 20, 40, 60, 80, 100, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340, 360, 380, 400, 420, 440, 460, 520, 560, 580, 620, 652, 691, 728, 748, 788, 808, 828, 848, 868, 888, 932, 996, 1036, 1056.
Cotton Seed Oil in Olive Oil, 242.
— Seed Oil, Production of, in the United States, 125.
Coull, G., Aqua Destillata, 415.
Coumarin, 856.
— in the Vegetable Kingdom (J. H. Maiden), 80.
Council Election, 975.
— Election, Editorial remarks upon, 915, 956.
— Candidates for Election on the, Opinions of, 930.
— Election of, Letters respecting (J. M. Broad), 926; (F. A. Cairns), 888; T. M. Clague), 951; (A. Coleman), 995; (O. Corder), 887; (R. A. Cripps), 927; (E. J. Evans), 927; (J. H. Fisher), 995; (J. Hart), 950; (G. G. Hornsby), 927; (J. Humphrey), 951; (J. C. Hyslop), 928; (W. Johnston), 907; (D. Kingan), 907; (J. H. Lake), 996; (J. W. Lloyd), 888; (N. H. Martin), 906; (E. J. Millard), 888; (H. H. Millhouse), 928; (J. Peebles), 907; (R. Reynolds), 926; (G. W. Sargent), 928; (W. D. Savage), 926; (S. Summers), 928; (E. G. L. Wansbrough), 951; (W. Warren), 951; (F. T. P. Wells), 906.
— Meetings, Editorial Remarks on the, 7, 109, 265, 361, 441, 551, 621, 732, 811, 999.
— Meetings of the, 8, 112, 267, 362, 443, 553, 622, 735, 813, 917, 957, 1001.
— Members who retire, 622.
— Nominations for Election to the, 814.
— of the Pharmaceutical Society (W. Warren), 439.
— Statement of Attendances by Members of, 922.
Country Walk (W. A. Salter), 598.
Cream of Tartar, Poisoning by, 180.

Cream of Tartar Fruit from Pretoria (E. J. Millard), 829.
Cripps, R. A., Aromatic Sulphuric Acid, 542.
— R. A., Cajuput Oil, 415.
— R. A., Council Election, 927.
— R. A., Determination of the Diastasic Power of Extract of Malt, 481.
— R. A., Rosemary Oil, 415.
Croton Oil, 978, 1060.
Crozophora tinctoria, 504.
Crystallography in its Relation to Pharmacy (T. S. Dymond), 725.
Cubebs, 243.
Culbreth, D. M. R., Successful Druggist, 830.
Cullinan, E., Sale of Poison by Unqualified Persons, 480.
Curare, 893.
Cypripedium Calceolus, Fertilization of (W. Baxter), 412.

DAMARIUM, 893.
Damascenine, 891.
Davies, D. H., What is Lin. Saponis Co? 652.
— E., Enamelled Cooking Vessels, 309.
Davis, F., Bacteria, 348.
— F., University Degree for Pharmacists, 520, 617, 748, 827.
— R. H., A Revelation, 728.
— R. H., Poisonous Patents, 908.
Dawkins, W. B., Search for Coal in the South of England, 1032.
Degree, University, for Pharmacists (F. Davis), 520, 617, 748, 827; (W. Johnston), 690, 787.
Desylphenol, 990.
De Wilde, P., and A. Reychler, Conversion of Oleic into Stearic Acid, 26.
Dextro-Cocaine and Methyl-Cocaine, 790, 889.
Diethylphosphorous Acid, 1031.
Digitalin, 503.
Digitalis, Infusion of (J. W. England), 186.
Diiodosalicylic Acid, 502.
Dinner, Annual, of the Members of the Pharmaceutical Society, 953, 957.
Disinfection (H. F. Parsons), 191.
— by Steam, Conditions of, 603.
Dispensers, Responsibility of, Editorial Remarks upon, 589.
Dispensing, Incorrect, Prosecutions for, 600.
— Query (A. F. Brookes), 828; (C. F. Henry), 781.
Distillation in Vacuo, 836.
Dissociation (C. E. Boucher), 1020.
Disulphones, Physiological Action of, 161.
Diuretin, 501.
Dodge, F. D., Indian Grass Oils, 855.
Dott, D. B., Litmus, 797, 833.
— D. B., Mercury and Zinc Cyanide, 420.
— D. B., Narceine and its Salts, 335.
— D. B., Peroxide of Hydrogen, 833.
— D. B., Uralium or Ural (Chloral-Urethan), Note on, 793.
D. B., Urea, Estimation of, 793.
Douglas, J. W., Pharmaceutical Society as part of a Teaching University, 120.
Dover, Meetings at, 937, 1068.
Dragendorff Scholarship, 758.
Dragon Tree near Lisbon, 224.
Druce, G. C., History of Botany, 511, 536.
Druggist, The Successful (D. M. R. Culbreth), 830.
Drugs, How they are Imported (J. C. Umney), 992.
— Purity of (W. Kirkby), 777.
Duboisine, 709.
— and Hyoscine (P. W. Squire), 600.
Duckworth, Sir D., Therapeutic Action of Scopola Carniolica, 466.
Dundee Chemists' Assistants and Apprentices' Association, 286, 313, 328, 350, 397, 417, 438, 456, 493, 516, 574, 594, 614, 670, 685, 727, 747, 782, 826.
Dunstan, W. R., Amyl Nitrite, Explosion during the Preparation of, 888.
— W. R., So-called Double Cyanide of Zinc and Mercury, 653.
— W. R., So-called Mussænda Coffee of Reunion, 381.
— W. R., and A. E. Chaston, Chemical Constituents of Scopola Carniolica, 461.
— W. R., and T. S. Dymond, Conditions under which Hydrogen Peroxide is formed from Ether, 989.
Dunwody, R. G., Turpentine, 1062.
Dymock, W., and C. J. H. Warden, Luffa Echinata, Roxb., 997.
— W., and C. J. H. Warden, Picrasma quassioides, 41.
Dymond, T. S., Crystallography in its Relation to Pharmacy, 725.
— T. S., Review of Recent Work on Spirit of Nitrous Ether and Ethyl Nitrite, 755.

EASTON'S Syrup (T. M. Clague), 249.
Echujin, 343.
Ecuador, Exhibits from, 323.
Edinburgh Chemists' Assistants and Apprentices' Association, 20, 373, 415, 455, 490, 571, 746, 781, 824, 866, 946, 1031.
— Meeting in, 865.
Election of Annuitants, 454.
— of Apprentices, 9, 112, 267, 553, 623, 735, 814, 918, 1005.
— of Associates, 8, 112, 267, 362, 443, 553, 622, 735, 813, 917, 1005.
— of Council, 975.
— of Members, 8, 112, 362, 553, 622, 735, 813, 917, 1005.
— of Officers, 1001.
Electric Lamp, Physics of an, 724.
Electro-Magnetic Radiation (Professor Fitzgerald), 846.
Elemi Oil, 281, 837.
Ellwood, T. A., Address to the Assistants' Association, 313.
— T. A., Lime Water, 408, 459.
Emetine, Attempt to Determine by Alkalimetric Titration (T. P. Blunt), 809.
— Disturbing Influence in the Estimation of, 342.
Enamelled Cooking Vessels (E. Davies), 309.
England, J. W., Incompatibility in Prescriptions, 872.
— J. W., Infusion of Digitalis, 186.
Eschscholtzia Californica, Alkaloids of, 342.
Eseridine, 550.
Essential Oils, Altered, 63.
— Oils, Aqueous Solutions of, 423.
— Oils, Iodine Absorption as a Test for the Purity of (H. W. Snow), 4
— Oils, Notes on, from Messrs. Schimmel and Co.'s Report, 263, 281, 836, 855.
— Oils, Testing of, 163.
— Oils, Pyrrol as a Test for, 892.
Ether, Vinyl Alcohol in, 423.
Ethoxycaffeine, 890.
Ethylenephenylhydrasinsuccinic Acid, 601.
Ethyl Iodide in Bronchitis, 504.
— Nitrite, Estimation of, in Spirit of Nitrous Ether (J. C. Thresh), 752.
Eucalyptol, 856.
Eucalyptus Honey, 164.
— Oil, 281, 837.
— Spray in Whooping-Cough, 424.
Euonymus Bark (D. Hooper), 460.
— Bark and Euonymin (W. A. H. Naylor and E. M. Chaplin), 472.
— Chemical Observations on the Root Bark of (W. A. H. Naylor and E. M. Chaplin), 273.
Euphrasia Officinalis in Colds, 424.
Evans, E. J., Council Election, 927.
— J. C., The Blowpipe, 686.
Evening Classes, Letters on, 140, 160.
EVENING MEETINGS IN EDINBURGH, PAPERS READ AT THE:
  Anise Fruit, Adulterated (W. Lawson), 722.
  Gum Samples (T. Maben), 717.
  Lithium, Detection and Separation of Sodium from (J. W. Thomson), 720.
  Litmus (D. B. Dott), 797.
  Milk, Acidity of, Simple Method for Estimating the (J. W. Thomson), 721.
  Pharmacy, Future of, as a Trade and a Profession (D. Storrar), 798, 879.
  Sulphur, Igniting Point of (J. R. Hill), 722.
  Tinctura Quininæ Ammoniata (G. Lunan), 794.
  Uralium or Ural, Chloral-Urethan, Note on (D. B. Dott), 793.
  Urea, Estimation of (D. B. Dott), 793.
EVENING MEETINGS IN LONDON, PAPERS READ AT THE:—
  Betel Leaves, Notes on Recent Researches on the Oil of (D. S. Kemp), 749.
  Calamine (W. M. Holmes), 474.
  Ethyl Nitrite, Estimation of, in Spirit of Nitrous Ether (J. C. Thresh), 752.
  Euonymus, Notes on the Root Bark of, and on Euonymin (W. A. H. Naylor and E. M. Chaplin), 472.

EVENING MEETINGS IN LONDON, PAPERS READ AT THE—continued.
  Museum, Report on Recent Donations to the (E. M. Holmes), 658, 749.
  Mussænda Coffee of Réunion, So-Called (W. R. Dunstan), 381.
  Nitrous Ether, Spirit of, and Ethyl Nitrite, Review of Recent Work on (T. S. Dymond), 755.
  Resin Soap as an Emulsifying Agent (H. Collier), 751.
  Scopola Carniolica (Introductory), (W. R. Dunstan), 461.
  — Carniolica, Chemical Constituents of (W. R. Dunstan and A. E. Chaston), 461.
  — Carniolica, Histological Characters of the Rhizome of, as Compared with those of the Root of Atropa Belladonna (T. Greenish), 471.
  — Carniolica, Jacq., Natural History of (E. M. Holmes), 468.
  — Carniolica, Pharmacy of (F. Ransom), 464.
  — Carniolica, Therapeutic Action of (Sir Dyce Duckworth), 466.
  Sterculia Gum (J. H. Maiden), 381.
  Zinc and Mercury, The So-called Double Cyanide of (W. R. Dunstan), 653.
Exalgin, 710, 825.
— Phenacetin and Antifebrin, 710.
Examinations in Edinburgh, 72, 347. 638, 924.
— in London, 70, 327, 507, 723, 897, 1005.
— Visitors' Reports on the, 817.
— Written, Appointment of Superintendents and Deputy-Superintendents of, 13, 112.
Examiners, Appointment of, 443.
— Report of the Boards of, 13, 116, 366, 558, 638, 746, 923.
Exostemma floribundum, 64.
Explosives, Smokeless (Sir F. Abel), 685.
Extracts, Vegetable (P. MacEwan), 455.

FENNEL Oil, 281, 282, 837.
Ferri et Ammonii Citras (B. S. Proctor), 246; (R. Wright), 320.
Ferrous Phospho-Citrate, Crystallized, 242.
Ficus, Parthogenesis in, 1064.
Fields and Lanes, Lessons from, 21, 101, 181, 675, 769, 849, 933, 1037.
Finance Committee, Reports of, 9, 113, 267, 363, 443, 554, 623, 736, 814, 919, 1006.
Financial Statement, 910.
Findlay, J., Extractum Cascaræ Sagradæ Liquidum, 491.
— J., Synonyms, 572.
— J., What is Lin. Saponis Co. ? 652.
Fisher, J. H., Council Election, 995.
— J. H., Medicated Wines, 459.
Fitzgerald, Prof., Electro-Magnetic Radiation, 846.
Flames, Radiating Power of, 170.
Flax, Constituents of, 509.
Fletcher, F. W., Acidum Sulphuricum Aromaticum, 580.
Fletcher, F. W., Estimation of Extractive and Specific Gravities of Official Tinctures, 439.
Flower, W. H., Presidential Address to the British Association, 219, 231.
Flowers, Blue Colour of, 65.
Flückiger, F. A., Jalap and Jalap Resin, 546.
Fluoroform and Fluoral, 892.
Foam (Lord Rayleigh), 864.
Formulæ of the Official One Per Cent. Liquors (C. A. Macpherson), 357.
Formylamidophenol Ether, 341.
Fowler, G. J. and J. Grant, Influence of Different Oxides on the Decomposition of Potassium Chlorate, 765.
Frangulin, 558.
Fraser, T. R., Address to the North British Branch, 428.
— T. R, Chemistry of Strophanthus Hispidus, 328.
Freezing Points of Solutions, Law of the (S. U. Pickering), 507.
Fruit Candying Industry of Leghorn, 86.
Fuge, H. D., Estimation of Reduced Iron, 1053.
Fumaric Acid, Synthesis of, 891.
Fungi, Heat evolved in the Respiration of, 345.

GABOON, Exhibits from, 324.
Galactane, 165.
Galanga Oil, 837.
Galbanum Oil, 837.
Garlic Oil, 282.
Gas Generator, Convenient (J. H. Hoseason), 572.
Gases, Passage of through Plants, 243.
Gautier, M., and L. Mourgues, Cod Liver Oil, 1018.
Gauze Tissue, Protective, 1060.
Gauzes, Quick Method of Preparing (H. Helbing), 495.
Gelatines, Medicinal, 810.
General Purposes Committee, Reports of the, 16, 115, 269, 367, 454, 558, 638, 745, 820, 921, 1009.
Gentian, Infusion of (W. Johnston), 356.
German Apotheker-Verein, Meeting of, 48.
— Pharmacopœia, New, 1044.
Germination, Alkaloids and, 604.
Gerrard, A. W., Extract of Stramonium, 246.
— A. W., and W. H. Symons, Ulexine and Cytisine, 1017.
Ghatti Mucilage (A. Mander), 748.
Gilbert, H., Examination of Oil of Cassia, 876.
Gilmour, W., Address to the Dundee Chemists' Assistants and Apprentices' Association, 286.
— W., Sale of Poison by Unqualified Persons, 929.
Glasgow Chemists and Druggists' Association, 494, 573, 613, 670.
— Chemists and Druggists' Assistants' Association, 307, 540, 573, 727, 803.
Glass, Action of Chloral Hydrate on, 163.
— Bottles, Are they Soluble (R. Reynolds), 230.
— Solubility of, 344; (A. Mander), 260.
Glycerine, Arsenic in (L. Siebold), 277, 682.
Glycerinum Belladonnæ (W. Johnston), 769.
Glyco-Gelatine (T. S. Wokes), 612.
Goodall, G. L., Protoplasm and its History, 1025.
Gorse Seeds, Physiological Action of (O. Corder), 400; (G. Welborn), 360, 500.
Gotch, F., Electrical Relations of the Brain and Spinal Cord, 783.
Gowan, A., Pharmacy Acts Amendment Bill, 672.
Gramineæ, Researches on the Germination of the, 882.
Grape Sugar, Synthesis of, 890.
Grass Oils, Indian (F. Dodge), 855.
Grasses, Leaves of, 894.
Green, C. E., Bismuthyl Iodide, 5.
— Professor J. R., Award of Rolleston Prize to, 1066.
Greenish, T., Histological Characters of Scopola Carniolica, 471.
Guaiacolcarboxylic Acid, 977.
Gum Ghatti (C. F. Henry), 781.
— Persian, 793.
— Samples, Notes on Some (T. Maben), 717.
Gurjun Oil as an Expectorant, 979.

HAIRS, Plant, Structure of, 65.
Hanbury Medal, Award of, 91, 116.
Harrison, R. C., Chloralamide, 200.
— R. C., Oleate of Mercury, 433.
Hart, J., Council Election, 950.
— J., Future of Pharmacy, 1035.
Hawkins, L. W., Laboratory Notes, 945.
— L. W., Report on Inorganic Chemistry, 616.
— L. W., Wild Cherry Bark and its Preparations, 355.
Helbing, H., Botanical Press, 495.
— H., Surgical Gauze, 495.
— H., Ointment Bases, 496.
— H., Quick Method of Preparing Gauzes, 495.
Helichrysum Stœchas Oil, 282.
Henbane Cultivation in Cambridgeshire, 122.
Henderson, T. C., Lotio Hydrargyri Nigra et Lotio Plumbi c. Opio, 517.
Henry, C. F., Dispensing Query, 781.
— C. F., Gum Ghatti, 781.
— C. F., Natural and Artificial Salicylates of Soda in Mixtures containing Sal Volatile or Sweet Spirit of Nitre, 782.
— C. F., " Shake the Bottle " on Sal Volatile Mixtures, 781.
Herbarium Prize, Award of, 115.
Herpestis Monniera, 660.
Hesse, B. C., Salicylic Acid, its Isomers and Homologues, 174.
Hill, J. R., Aqua Destillata, 416.
— J. R., Igniting Point of Sulphur, 722.

Hill, J. B., Supposed Formation of Quinine Carbonate, 748.
Hippomane Mancinella, 163.
Hislop, I., Pill Coating, 516.
Hoangnan, 425.
Hocking, F. A., and E. Brooke, Suppositories, 851.
Hofmeister, F., Preparation of Crystallized Egg Albumen, 876.
Holmes, E. M., Aloes, 561.
— E. M., Cultivation of Medicinal Plants in Cambridgeshire, 122.
— E. M., Materia Medica Problems, 899.
— E. M., Museum, Recent Donations to the, 561, 581, 658.
— E. M., Scopola Carniolica, Natural History of, 468.
— E. M., Scopola Hladnikiana, Note on, 1017.
— E. M., Sterculia Gum, 560.
— W. M., Calamine, 474.
— W. M., Peppermint Water, 930.
Hooper, D., Balsamodendron Berryi, 143.
— D., Euonymus Bark, 460.
— D., Musambra, a Variety of East Indian Aloes, 121.
Hornsby, G. G., Council Election, 927.
Hoseason, J. H., Convenient Gas Generator, 572.
— J. H., Seidlitz Powders, 492.
Humphrey, J., Letter on the Council Election, 951.
— J., Pepsin Wine, 714.
Husband, J. C., Estimation of Extractive and Specific Gravities of Official Tinctures, 420.
— J. C., Tinctures and their Specific Gravities, 414.
Hydracetin in Psoriasis, 61.
Hydrastinine as a Hæmostatic, 601.
Hydrocyanic Acid, Action of, on Calomel (T. H. Powell), 828.
— Acid and Calomel, 792.
— Acid, Dilute (A. Leys), 824.
— Acid forming Elements in Plants, 892.
— Acid (Scheele), B.P.C., 559.
Hydrogen Dioxide and its Applications, Manufacture of Commercial (A. Bourgougnon), 874.
— Peroxide of (D. B. Dott), 833; (C. T. Kingzett), 868.
— Peroxide, Conditions under which it is formed from Ether (W. R. Dunstan and T. S. Dymond), 989.
— Peroxide, Estimation of, 616.
— Sulphide, Explosion of and of Carbon Bisulphide with Air and Oxygen, 944.
Hydroxylamine, 789.
Hygiene and Bacteriology, Relation of Pharmacy to, 346.
Hyoscine, 243, 601.
— Crystalline, 342, 709.
— Hydrobromide, Commercial, 890.
Hyoscyamine, 342.
Hypnal, 889.
Hypochlorites and Ammonium Salts, Interaction of, 766.
Hypophosphorous Acid as a Solvent of Strychnine and Morphine (H. W. Jones), 256.
— Acid, B.P.C., 559.
Hyslop, J. C., Chemists' Trade Interests, 886.
— J. C., Claims of the Pharmaceutical Society, 688.
— J. C., Council Election, 928.
— J. C., Lime Water, 459.

INCE, J., Maceration, 596.
— J., Gender of Pharmacopœial Nouns, in as, ătis; is, ītis, 871.
— J., Public Teaching of Pharmacy, 673.
Incompatibility in Prescriptions (J. W. England), 872.
Indian Snuff, 345.
Influenza Epidemic, Favourite Remedies (F. A. Rogers), 595.
Infusions and Decoctions, Concentrated (C. D. Moffat), 682.
Infusum Senegæ Concentratum (A. S. Buck), 486.
Ink, Typewriter, 712.
Inland Revenue Commissioners, Report of the, 171.
Insect Powder, 605.
Insects in Drugs and Preparations used in Pharmacy (C. J. Strother), 409.
— Powder, Active Constituent of, 892.
Interpretation Act, New, 172.
Introductory Sessional Address (Professor J. Marshall), 261.
Inverness Chemists' Assistants and Apprentices' Association, 438, 925.
— Chemists' and Druggists' Association, 57.
Iodoform, Absolute, 423.
— and Silver Nitrate, 62.
— Camphor as a Solvent for, 792, 1060.
Iodized Phenols, 241.
Ipecacuanha Alkaloids, 342.
— Fluid Extract and Wine, Standardized (J. O. Braithwaite and J. C. Umney), 252.
— Wine, Assay of (T. P. Blunt), 380.
— Wine, B.P. (J. O. Braithwaite and J. C. Umney), 253.
— Wine, Volumetric Process for the Assay of (T. P. Blunt), 254.
Ireland, Pharmaceutical Society of, 30, 130, 210, 285, 304, 392, 484, 536, 569, 665, 763, 841, 859, 939, 1009, 1029.
— Pharmaceutical Society of, Letter respecting (J. Blair), 160.
Iron, Reduced. Estimation of (H. D. Fuge), 1053.
— Salts, Official (D. McEwan), 866.
Isle of Man, Non-Application of Pharmacy Act to, 1001.
Isomeric Organic Compound, Relative Antiseptic Powers of, 1031.

JALAP and Jalap Resin (F. A. Flückiger), 546.
Japaconitine, 1057.
Jatropha glandulifera, 660.
Jessop, C. M., Physiological Value of Meat Food for Invalids and Waste in Methods of Preparation, 194.
Johnson, J. R., Influence of Light upon the Growth of Plants, 416.
Johnston, W., Council Election, 907.
— W., Glycerinum Belladonnæ, 763.
— W., Infusion of Gentian, 356.
— W., Tincture of Lemon Peel, 357.
— W., University Degree for Pharmacists, 690, 787.
Jones, H. W., Hypophosphorous Acid as a Solvent of Strychnine and Morphine, 256.
Joule Memorial, Proposed, 776.
— Scientific Work of, 615.
Judd, J. W., Evidence Afforded by Petrographical Research of the Occurrence of Chemical Change under Great Pressure, 859.
Juniper Berry Oil, 856.
Juniperus Oxycedrus Oil, 282.
Jury Service, Exemption from (T. Reade), 690.
— Service, Exemption of Chemists and Druggists from, Editorial Remarks upon, 680.

KEMP, D. S., Oil of Betel Leaves, 749.
— H., Manchester Association and its Future Programme, 438.
Kephir, 67.
Kerner, Dr. G., Death of, 681.
Kesso Root Oil, 281, 837.
Kingan, D., Council Election, 907.
Kingzett, C. T., Peroxide of Hydrogen, 868.
Kinninmont, A., Address to the Glasgow Chemists and Druggists' Association, 307.
Kino, Botany Bay or Eucalyptus (J. H. Maiden), 221, 321.
Kirkby, W., Purity of Drugs, 777.
Kola Nut, 165.
— Nut in Seasickness, 979.
Knapp, C. R., Carboys as Advertising Agents, 888.
Kraussia coriacea (E. M. Holmes), 658.
Kumyss, 66.
Kuro-moji Oil, 282, 856.
Kyllingia monocephala, 660.

LABORATORY Notes (L. W. Hawkins), 945.
Lac Fermentatum (A. Tscheppe), 66.
Lactarius piperatus, Constituents of, 170, 792.
Lake, J. H., Council Election, 996.
Lasché, A. J. M., Manufacture of Compressed Yeast and its Detrimental Germ Impurities, 584.
Laudanum, Illegal Sale of, 1035.
Lavandula Dentata Oil, 282.
— Stœchas Oil, 282.
Lavender, Oil of, 659.
Law and Parliamentary Committee, Reports of the, 628, 737.
Lawson, W., Adulterated Anise Fruit, 722.
Lead, Action of on Potable Waters, 603, 980.
— Action of on Sheffield Water Supply (A. H. Allen), 802.
— in Drinking Water, Negative Evidence of (R. Reynolds), 294.
— Salts as Oxygen Carriers, 602.
Leaves, Forms of, 713.

Leeds Chemists' Association, 350.
Lees, A., Acidum Hydrocyan. Dil., B.P., 824.
Leicester and Leicestershire Chemists' Association, 266, 311, 479, 822.
Lemon Juice (T. H. Williams), 336.
— Peel, Tincture of (W. Johnston), 357.
Leptotrichic Acid, 6.
Levisticum Seed Oil, 856.
Leys, A., Acid. Hydrocyanicum Dil., B.P., 824.
Library, Donations to the, 9, 113, 363, 444, 555, 626, 737, 816, 920, 1006.
— Museum Laboratory and House Committee, 9, 113, 363, 444, 555, 626, 737, 816, 920, 1006.
Light, Action of on Phosphorus, and on some of the Properties of Amorphous Phosphorus, 944.
— Effect of upon Matter (W. de W. Abney), 549, 564.
— Effects of, upon Plants, 416, 713.
Lime Water (A. C. Abraham), 440, 520; (F. A. Brown), 440; (T. A. Ellwood), 408, 459; (J. C. Hyslop), 459.
Lin. Saponis Co., What is it? 600; (F. G. Baldwin and Co.), 691; (D. H. Davies), 652; (J. Findlay), 652; (W. Wilkinson), 672.
Liquor Ammonii Acetatis Fortior, 945.
— Morphinæ Meconatis (C. A. Macpherson), 375.
— Potassæ, Poisoning by, 260.
Liquors, Official One per Cent., Exact Formulæ for (C. A. Macpherson), 357.
Lister, Sir J., Antiseptic Dressing, 542.
Lithia in Granite, 64.
— Medical and Chemical Misconceptions about (L. Siebold), 275.
Lithium Carbonate, 791.
— Detection and Separation of Sodium from (I. W. Thomson), 721.
Litmus (D. B. Dott), 797.
Little and Unknown, by One of Them (L. B. Ross), 908.
Liverpool Chemists' Association, 309, 394, 436, 486, 590, 667, 823.
— Early Closing in (J. Bain) 1056.
— Pharmaceutical Students' Society 328, 372, 416, 456, 515, 575, 612, 670, 746, 823, 885.
Liverseege, J. F., Optical Illusions, 834.
Lloyd, J. W., Council Election, 888.
Lobelia inflata and Lobeline, 342.
Lobeline, 164.
Local Conferences of Chemists and Druggists, Editorial Remarks upon, 1043, 1065.
— Secretaries, Appointment, 10, 269, 736, 817.
Loewig, Dr., Death of, 813.
Logwood, Liquid Extract of B.P.C., 560.
Long, H., Address to the North Kensington Chemists' Association, 821.
Lotio Plumbi c. Opio, Formula for (T. C. Henderson), 517.
— Hydrargyri Nigra, Improved Formula for (T. C. Henderson), 517.
Luffa Echinata, Roxb. (W. Dymock and C. J. H. Warden), 997.
Lunan, G., New Remedies, 825.
— G., Tinctura Quininæ Ammoniata, 794.
Lychnis Vespertina, Changes Produced in by a Parasitic Fungus, 482.

Maben, T., Notes on some Gum Samples, 717.
Maceration (J. Ince), 596.
McEwan, D., Official Iron Salts, 866.
MacEwan, P., Our Vegetable Extracts, 455.
Maclagan, Sir D., Report on the Examinations, 818.
McMillan, Address to the Glasgow Chemists' and Druggists' Assistants Association, 803.
Macpherson, C. A., Exact Formulæ for the Official One Per Cent. Liquors, 357.
— C. A., Liquor Morphinæ Meconatis, 375.
Madagascar, Exhibits from, 324.
Magnetic Rotation of Nitric Acid and of Hydrogen and Ammonium Chlorides, Bromides and Iodides in Solution, Additional Observations on the (W. H. Perkin), 432.
Maiden, J. H., Australian and Tasmanian Sandarach, 562.
— J. H., Botany Bay or Eucalyptus Kino, 221, 321.
— J. C., Cedar Gum, 1063.
— J. H., Chemistry and Commercial Possibilities of Wattle Gum, 869, 980.
— J. H., Coumarin in the Vegetable Kingdom, 80.
— J. H., Spinifex Resin, 998.
— J. H., Sterculia Gum, Its Similarities and Dissimilarities to Tragacanth, 381, 868.
Maisch, J. M., Origin of False Senega Root, 547.
— J. M., Useful Plants of the Genus Psoralea, 183.
Maize, Oil of (C. E. Bowers), 404.
Major Examination, 70, 72, 326, 347, 506, 638, 723, 897, 924, 1045.
Malt Extract and Acid Phosphates, 979.
— Extract, Determination of the Diastasic Power of (R. A. Cripps), 481.
Manchester Pharmaceutical Association, 311, 414, 488, 575, 652, 682, 777.
Mander, A., Ghatti Mucilage, 748.
— A., Solubility of Glass, 260.
Mandragorine, 242.
Mandrake (W. W. Westcott), 810.
Maqui Berries, 711.
Marrubium Alysson Oil, 283.
Marshall, J., Introductory Sessional Address, 261.
Martin, N. H., Address to the North of England Pharmaceutical Association, 870.
Martin, N. H., Council Election, 906.
— S., Proteid Poisons, with Special Reference to that of the Jequirity (Abrus Precatorius), 197.
Martindale, W., New Mode of Applying Chloride of Methyl, 256.
Materia Medica Problems (E. M. Holmes), 899.
Matzoon, 67.
Meat Foods for Invalids, Physiological Value of and Waste in Methods of Preparation (C. M. Jessop), 194.
Medical Act, Bill to Amend the, 16, 20.
— Men in Fiction, 123.
— Register, 879.
Medicated Wines, Discussion in Council respecting, 453.
— Wines, Discussion in Edinburgh respecting, 427.
— Wines, Editorial Remarks upon, 27, 715, 857.
— Wines, Sale of, Letter respecting (J. H. Fisher), 459.
Medicinal Preparations, Sale of, Defective and Spurious, Editorial Remarks upon, 283.
Medicine Jars, Old (H. Taylor), 460.
— Stamp Act, Discussion in Council respecting, 449.
— Stamp Act, Editorial Remarks upon the, 405, 812.
— Stamp Act, Letters respecting, 768; (W. Thirlby), 479.
— Stamp Acts, Memorial Respecting, 638, 742.
— Stamp Licence, 879.
Members, Election of, 8, 112, 362, 553, 622, 735, 813, 917, 1005.
— Honorary, Election of, 820.
Mendeléef, D., An Attempt to Apply to Chemistry One of the Principles of Newton's Natural Philosophy, 138, 153.
Mentha aquatica Oil, 283.
— Pulegium, 792.
— viridis, 244.
Menthol and Saffrol, 63.
— in Sickness, 711.
Merck, E., Chemically Pure Narceine, 481.
Mercuric Chloride in Dysentery, 424.
— Salts, Estimation of, 617.
Mercury and Thymol, Double Salts of, 341.
— and Zinc Cyanide (D. B. Dott), 420.
— Oleate of (R. C. Harrison), 433.
— Sublimate, Detection of, 617.
Metals, Molecular Weights of, when in Solution, 860.
Methacetin, 61.
Methylated Spirit (C. J. Strother), 409.
— Spirit, Board of Inland Revenue and the Sale of, 483.
— Spirit, Notice to Retailers of, 505.
— Spirit, Proposed Restriction of the Sale of, 896, 914, 923, 930, 937.
— Spirit, Prosecution for Sale of, on Sunday, 949.

Methylated Spirit, Sale of, Editorial Remarks upon, 915.
Methyl Chloride, New Method of Applying (W. Martindale), 256.
— Cocaine, 790.
Methylene Blue as an Anodyne, 1057.
Metric System of Weights and Measures (J. H. Bradwall), 592.
Meyer, V., Chemical Problems of To-day, 608, 771.
Microscopical Sections of Barks and Roots used in Pharmacy, Preparation of (M. J. Cole), 497.
Midland Counties Chemists' Association, 293, 415, 685, 988.
Milan and the International Pharmaceutical Congress, 16, 924, 1028.
Milk, Acidity of, Simple Method for Estimating the (I. W. Thomson), 721.
— Cows', Dilution of in Infant Feeding (G. Smith), 3.
— Fat Globules of, 63.
— of Abnormal Quality, 616.
— Souring, 64.
Millard, E. J., Acidum Sulphuricum Aromaticum, 580.
— E. J., Council Election, 888.
— E. J., Examination of a Cream of Tartar Fruit from Pretoria, 829.
— E. J., and A. C. Stark, Antipyrin and its Incompatibles, 860.
Miller, W. E., Draft Pharmacy Bill, 690.
Millhouse, H. H., Council Election, 927.
— H. H., Council Election, 928.
Minor Examination, 70, 72, 326, 347, 506, 638, 723, 897, 924, 1045.
Modified Examination, 347, 506, 1045.
Moffat, C. D., Concentrated Infusions and Decoctions, 682.
Mogador Gum, White, 749.
Molecular Weight of Substances in Solution, especially Colloids (H. E. Armstrong), 96.
Mond, L., Address to the Society of Chemical Industry, 34.
Month, The, 61, 161, 241, 341, 421, 501, 601, 709, 789, 889, 977, 1057.
Moorland Water and Lead, 980.
Mootooswamy, P. S., Casearia Esculenta, 377.
Morphia, Abuse of, 224.
Morphine in a Cough Linctus, Poisoning by, 671.
Morrison, J. W. T., The Proposed Pharmacy Bill, 520.
Moss, J., Cascara Sagrada, 1056.
Mussænda Coffee of Réunion, So-Called (W. R. Dunstan), 381.
Munro, W. A., Aqueous Solution of Carbon Dioxide, 440.
Musambra, a variety of East Indian Aloes (D. Hooper), 121.
Museum, Donations to the, 10, 114, 364, 444, 556, 626, 737, 816, 920, 1007.
— Recent Donations to the (E. M. Holmes), 561, 581, 749.
Musk, 856.
Myrrh, Constituents of, 1059.

NAPHTHALENE, 501.
Naphthol Camphor and Salol Camphor, 62.
Narceine (P. C. Plugge), 401.
— and its Salts (D. B. Dott), 335.
— Chemically Pure (E. Merck), 481.
Narcotic, Supposed Poisoning by a, 40.
Natal Botanic Gardens, 894.
Naylor, W. A. H. and E. M. Chaplin, Chemical Observations on the Root Bark of Euonymus, 273.
— W. A. H. and E. M. Chaplin, Euonymus Bark and Euonymin, 472.
Newcastle, 89, 127.
— Industries, Editorial Remarks upon, 149.
— on-Tyne Chemists' Assistants and Apprentices' Association, 438, 490, 574, 613, 670, 824, 847.
New Remedies (G. Lunan), 825.
— Remedies, the Paris Society and, 1066.
Newton's Natural Philosophy, An Attempt to Apply to Chemistry One of the Principles of (D. Mendeléeff), 138, 153.
Night Sweats, Camphoric Acid in, 1060.
Nitella Nordstettiana, 793.
Nitrobenzol, Poisoning by, 165.
Nitrogen, Do Plants absorb, Directly from the Atmosphere, 564.
Nitroglycerine, in Asthma, 1060.
Nitrous Ether, Sale of, Defective Spirit of, 200, 651.
— Ether, Spirit of, and Ethyl Nitrite, Review of Recent work on (T. S. Dymond), 755.
— Ether, Spirit of, Estimation of Ethyl Nitrite in (J. C. Thresh), 752.
— Ether, Testing of Spirit of (A. H. Allen), 788.
— Oxide, Preparation of, 617.
— Vitriol, Effect of the Use of, in making Certain Aerated Waters (J. Pattinson), 251.
Nomenclature, Suggestion as to, 241, 503.
North British Branch, Election of, Executive of 13, 1029, 1045.
— British Branch, Meetings of Executive, 17, 427, 858, 1067.
— British Branch Report of Executive, 918.
— of England Pharmaceutical Association, 284, 370.
— Kensington Chemists' Association, 821, 865, 1000, 1052.
— London, Meeting of Chemists of, 1075.
— Paddington, District Meeting of Chemists at, 937.
Nottingham and Notts Association, (L. Priestly), 1036.
— and Notts Chemists' Association, 490, 1015, 1054.
Nouns, Pharmacopœial, in as, ătis; is, itis, Gender of (J. Ince), 871; 952.
Nux vomica, Suicide of a Chemist by taking, 359.
Nychthemerum Process (J. Ince), 596.

OBITUARY, 20, 40, 57, 99, 120, 160, 19 240, 260, 280, 319, 340, 359, 38 419, 459, 498, 560, 580, 600, 63 670, 688, 728, 768, 786, 827, 84 885, 950, 995, 1054.
Ogle, J., Composition of Tragacanth, 3.
Ointment Bases (H. Helbing), 436.
Oleates (G. M. Beringer), 676.
Oleic Acid, Conversion of into Stearic Acid, 26.
Oleite, Note on, 605.
Olibanum Oil, 282.
Ontario Pharmacy Act, Decision as to Seller under, 406.
Opium, Estimation of Morphine in, 588.
— Extract of, Chinese Method of preparing (J. Calvert), 148.
— Industry in the N. W. Provinces and Oudh, Short Account of the (P. A. Wier), 178.
Optical Illusions (J. F. Liversege), 834.
Orange Flower Oil, 282.
— Flower Water Coloration, 61.
Orexin, 709, 825, 977.
Orthin, 567.
Oxalic Acid, Poisoning by, 1075.
Oxygen Dissolved in Water, New Method of Estimating the (J. C. Thresh), 615.
— in Water, Schützenberger's Process for the Estimation of, 99.
— Moist, Action of Light upon (A. Richardson), 457.
Ozone Production by Flame, 766.

PACHYMA Cocos, 713.
Packages, Original, and the Liquor Law in the United States, 1021.
Papain as a Digestive Agent Compared with Commercial Pepsines (A. Ball), 227.
Paraguay Plants, 425.
Pararabin, Occurrence of in Sterculia Gums (J. H. Maiden), 381.
Paregoric devoid of Opium, Prosecutions for the Sale of, 885, 925.
Paris Congress, Exhibits at the, 166.
— Exhibition, The, 1, 23, 43, 82, 103, 141, 301, 323, 402.
Parsons, H. F., Disinfection, 191.
Patent Medicine Stamp, Correspondence respecting, 737.
— Medicines (B. S. Proctor), 747.
— Medicines, Editorial Remarks upon, 714.
— Medicines in the House of Commons, 796, 812.
Pattinson, J., Effect of the Use of Nitrous Vitriol in making Certain Aerated Waters, 251.
Paul, B. H. and A. J. Cownley, Cinnamylcocaine in Coca Leaves, 166.
Paulowilhelmia Speciosa, 604.
Pedler, A., Action of Chlorine on Water in the Light, and on the Action of Light on Certain Chlorine Acids, 943.
Peebles, J., Council Election, 907.
Peppermint Industry in Michigan, 1061.
— Water (W. M. Holmes), 930.
Pepper Oil from Long Pepper, 886.
— Olive Stones in, 64.

Pepsin Wine (J. Humphrey), 714.
Peptones and Nutrition, 63.
Perkin, W. H., Magnetic Rotation of Nitric Acid and of Hydrogen and Ammonium Chlorides, etc., in Solution, 432.
Petiole Structure in Dicotyledons, 65.
Petroleum Soap, 62.
Pharmaceutical Organization, Editorial Remarks upon, 505.
— Society, Letters respecting (T. C. Barrass), 787; (J. C. Hyslop), 688; (C. E. Pickering), 848.
— Society as Part of a Teaching University (J. W. Douglas), 120.
Pharmacists, Relation of to the Public, Remarks upon, 775.
Pharmacology, Report on (M. E. Buchanan), 784.
Pharmacopœia Addendum Committee, 454.
— Addendum to the, 553, 638, 1009; Editorial Remarks upon, 1000.
— Austrian, New, 28.
— German, New, 1044.
— Revision, Editorial Remarks upon, 985.
Pharmacy Acts Amendment Bill, Letters respecting (A. Gowan), 672; (H. H. Robins), 728.
— Acts, Amendment of the, Editorial Remarks upon, 757.
— Act, Indefinite, 935.
— Act (Ireland) Amendment Bill, 938, 947, 1028, 1044, 1066.
— Act (Ireland), Prosecutions under the: Henderson, 905; Rankin, 904; Holroyd, 1035.
— Act, Prosecutions under the: Anderson, 119; Eastaway, 58; Law, 650; Matthias, 805; Morren, 119; Onion, 767, 925 (Judgment); Preston, 558, 904; Reid, 119; Restall, 768; Tyrell, 380; Warrack, 119; Wheeldon, 397, 640 (Appeal), 902 (Judgment).
— Act, Prosecutions under the, Editorial Remarks upon, 111.
— as a Trade and a Profession, Future of (D. Storrar), 798.
— Bill, Discussion in Council respecting, 449, 638, 738, 1009.
— Bill, Editorial Remarks upon, 661, 679.
— Bill, Proposed, Letters Respecting, 672; (A. Gowan), 672; (J. W. T. Morrison), 520; (B. S. Proctor), 499; (W. E. Miller), 690; (H. H. Robins), 728; (J. W. White), 689.
— Certificates and the Royal College of Physicians and Surgeons of Ireland, 48.
— Future of, Letters respecting (J. Hart), 1035; (C. Swinn), 1016; (W. R. Wheeler), 1036; W. N. S. Richardson, 1056.
— Public Teaching of (J. Ince), 673.
Phenol and Cresol, Crude, Examination of (W. W. Staveley), 1064.
Phenolated Celluloid, 241.
Phenylhydrazids of Acids, 421.
Phenylmethane, 889.
Phenylurethan, 581.
Phosphorous Oxide (T. E. Thorpe and A. E. Tutton), 943.
Phosphorus, Action of Light on and Properties of Amorphous Phosphorus, 944.
— Glow of (T. E. Thorpe), 845.
— in Diabetes, 504.
Phosphoryl Trifluoride, 457.
Photo-Chemical Action (W. L. Williams), 410.
Photography and Physiological Processes, 425.
Photomicrography (M. Swan), 367.
Physicians, College of and Dispensing, 858.
Physostigmine, Official Test for (J. C. Umney), 1061.
Phytolacca decandra, 792.
Pichi, 163.
Pickering, C. E., Pharmaceutical Society, 848.
— S. U., Isolation of a Tetrahydrate of Sulphuric Acid Existing in Solution, 432.
— S. U., Law of Freezing Points of Solutions, 507.
— S. U., Nature of Solutions as Elucidated by a Study of their Freezing Temperatures, 79.
Picrasma Quassioides (W. Dymock and C. J. H. Warden), 41.
Pil. Colocynth. Co. (P. Boa), 866.
Pill Coating (I. Hislop), 516.
Pills and their Excipients (A. S. Smith), 513.
Pilocarpine in Belladonna Poisoning, 711
— in Jaundice, 711.
Pimpinella Oil, 856.
Pine Oils, 837.
Plants, Influence of Light upon the Growth of (J. R. Johnson), 416.
— Passage of Gases through, 243.
Plugge, P. C., Note on Narceine, 401.
Podophyllum Emodi, 979.
Poison, Death by, Editorial remarks upon, 476.
— *Medical Press* on the Definition of, 839.
— Proprietary Preparations Containing, Labelling of (J. Stewart), 828; (E. Warrell), 930, 952.
Poisoning, Death by, in Scotland, Editorial Remarks upon, 611.
Poisonous Patents, Letters respecting, 868; (R. H. Davis), 908; (H. H. Pollard), 908, 952.
Poisons, *Aberdeen Free Press* on the Supply of, 126.
— and Poisoners (F. Spurr), 581, 729.
— Discussion at Liverpool as to seller of, 436; at Sheffield, 395.
— Sale of by Unqualified Assistants, Resolution passed by the Chemists' Assistants' Association, 476.
— Sale of by Unqualified Persons, 520; (E. Cullinan), 480; W. Gilmour), 929; (J. Preston), 420; (G. F. Schacht), 929; (T. E. Taylor), 929; (C. J. Wood), 560.
— Sale of by Unqualified Persons, Editorial remarks upon, 303, 387, 426.
Poisons, Sale of, Editorial Remarks upon, 894.
Polariscope, and its Applications in Pharmacy (W. L. Williams), 842.
Pollard, H. H., Poisonous Patents, 908, 952.
Polygala butyracea, 165.
Pontederia cordata, Pollen of, 504.
Poppy, Alkaloids in the, 242.
Potassii Permanganatis Pilula, Estimation of (A. Shaw), 823.
Potassium, Carbonate of, Note on (F. H., Alcock), 1018.
— Chlorate, Influence of Different Oxides on the Decomposition of (G. J. Fowler and J. Grant), 765.
— Permanganate in Pills, Estimation of (A. Shaw), 820.
Powell, T. H., Action of Hydrocyanic Acid on Calomel, 828.
— T. H., State of Teeth in Prehistoric Skeletons, 828.
Preliminary Examination, 71, 327, 639, 898.
— Examination, Attendance at the Centres, 13, 72, 328, 640, 899.
— Examination, Certificates received in lieu of, 71, 327, 506, 639, 724, 898, 1045.
— Examination, Questions set at the, 29, 285 569, 840.
Press, Botanical, Portable (H. Helbing), 495.
Preston, J., Unqualified Assistants' and the Sale of Poisons, 420.
Priestly, L., Nottingham and Notts Association, 1036.
Primula obconica, 65.
Prize Examinations, Papers for the, 49, 72, 820.
Prizes, Award of, 115, 921.
— Distribution of, 269.
— for Students (W. Aston), 519.
— for Students, Discussion in Council respecting, 445, 556.
Proctor, B. S., Ferri et Ammonii Citras, 246.
— B. S., New Pharmacy Bill, 499.
— B. S., Note on a Scale of Small Residues, 318.
— B. S., Patent Medicines, 747.
— B. S., Solubility of Sulphate of Barium in Alkaline Citrates, etc., 320.
— B. S., Tannin: Its Solubilities, etc., 351.
— B. S., Tincture of Senna, 225.
Professors, Appointment of, 13.
— Reports of the, 269, 921.
Proprietary Medicines containing Poisons, Sale of, Editorial Remarks upon, 795.
— Preparations containing Poisons Labelling of, 671.
— versus Legitimate Pharmacy from a Medical Point of view (W. Adams), 45.
Proteid Poisons, with Special Reference to that of the Jequirity (Abrus Precatorius), (S. Martin), 197.
Protoplasm and its History (G. L. Goodall), 1025.

Provincial Transactions:—
- Aberdeen and North of Scotland Society of Chemists and Druggists, 40, 652.
- — Chemists' Assistants and Apprentices' Association, 416, 457, 494, 614, 670, 727, 782, 803, 826, 867.
- Brighton Association of Pharmacy, 938, 1030.
- Bristol Pharmaceutical Association, 513.
- Dundee Chemists' Assistants and Apprentices' Association, 286, 313, 328, 350, 375, 397, 417, 438, 456, 493, 516, 574, 594, 614, 670, 685, 727, 747, 782, 826.
- Edinburgh Chemists' Assistants and Apprentices' Association, 20, 373, 415, 455, 490, 571, 746, 781, 824, 866, 946, 1031.
- Glasgow Chemists and Druggists' Assistants' Association, 307, 540, 573, 727, 803.
- — Chemists and Druggists' Association, 494, 573, 613, 670.
- Inverness Chemists' and Druggists' Association, 57.
- — Chemists' Assistants and Apprentices' Association, 438, 925.
- Leeds Chemists' Association, 350.
- Leicester and Leicestershire Chemists' Association, 311, 479, 822.
- Liverpool Chemists' Association, 309, 394, 436, 486, 590, 667, 823.
- — Pharmaceutical Students' Society, 328, 372, 416, 456, 515, 575, 612, 670, 746, 823, 885.
- Manchester Pharmaceutical Association, 311, 414, 488, 575, 652, 682, 777.
- Midland Counties Chemists' Association, 293, 415, 685, 988.
- Newcastle-on-Tyne Chemists' Assistants and Apprentices' Association, 438, 490, 574, 613, 670, 824, 847.
- North of England Pharmaceutical Association, 370.
- Nottingham and Notts Chemists' Association, 490, 1015, 1054.
- Sheffield Pharmaceutical and Chemical Society, 259, 290, 395, 490, 513, 592, 682, 746, 802, 884.

Prunus Virginiana Bark Oil, 856.
Prussic Acid, Scheele's, Strength of Commercial Samples of (R. Wright), 376.
Psoralea, Useful Plants of the Genus (J. M. Maisch), 183.
Ptomaines, Fever, 164.
Pulpy Fruits, 345.
Pyoktanin, 889.
Pyrocatechol, Preparation of, 1031.

Quassia amara and Picræna excelsa, 891.
Quebrachite and Pinite, 603.
Quesneville, Dr., Death of, 427.
Quina Morada, Bark of (P. N. Arata and F. Canzoneri), 854.
Quinine Arsenate, 162.
— Carbonate, Supposed Formation of (J. R. Hill), 748.
Quinoline as a Preservative, 502.

Radley, W. V., Obituary Notice of, 848.
Railway Rates for Merchandize, 129.
Ransom, F., Alcoholic Extract of Scopola, 500.
— F., Pharmacy of Scopola Carniolica, 464.
Rathbun, R., Sponge Fishery and Trade of the United States, 25, 105.
Rayleigh, Lord, Foam, 864.
Reade, T., Exemption from Jury Service, 690.
Redwood Scholarship, The, 30, 115.
Register, Additions to the, 554, 736, 918.
— Restorations to the, 443, 554, 623, 736, 814, 918.
Registration of Firms Bill, 812.
Report, Annual, 909.
Reports, Registrar's, 624.
Research Committee, 637.
Residues, Small, Scale of (B. S. Proctor), 318.
Resin Soap as an Emulsifying Agent (H. Collier), 751.
Resorcin as an Anti-Vomicum, 711.
Réunion, So-called Mussænda Coffee of (W. R. Dunstan), 381.
Review of the Year 1889, 521.

Reviews:—
- American Pharmaceutical Association, Proceedings of the, 786.
- Analytical Tables, Coloured (H. W. Hake), 580.
- Botany, Cryptogamic, Handbook of (A. W. Bennett and G. Murray), 59.
- Bronchitis, Chronic, and its Treatment (W. Murrell), 1055.
- Chemistry, Fundamental Principles of (R. Galloway), 578.
- — Practical Organic (S. Rideal), 158.
- — Practical Pharmaceutical (G. Robertson), 579.
- Chemists' Assistants' Association, Proceedings of the, 300.
- Extra-Pharmacopœia (W. Martindale and W. W. Westcott), 847.
- Flowering Plant (J. R. Ainsworth-Davis), 847.
- Materia Medica, Manual of Organic (J. M. Maisch), 994.
- Massage and Electricity in the Treatment of Diseases, Lectures on (T. S. Dowse), 517.
- Old Age (G. M. Humphry), 619.
- Organic Compounds, Exercises on the Preparation of (E. Fischer), 119.
- Pharmacists, Medical Practitioners, Students, etc., Pocket Book for (T. Bayley), 827.
- Pharmacopœia, Companion to the British (P. W. Squire and A. H. Squire), 867.
- Plants, Uses of (G. S. Boulger), 100.

Reviews—continued.
- Simple Salts, Solids and Solutions, How to Analyse (H. B. Thornton), 320.
- Urines (E. Gautrelet), 159.
- Wandtafeln zur Microscopie der Nahrungs und Genussmittel aus dem Pflanzenreiche (J. Nevinny and C. Hennig), 359.
- Watts's Dictionary of Chemistry (M. M. P. Muir and H. F. Morley), vols. i. and ii., 41
- — Manual of Chemistry, vol. i. (W. A. Tilden), 518.
- Wine (A. Webber), 100.
- Year-Book of Pharmacy, and Transactions of the British Pharmaceutical Conference, 559.

Reynolds, R., Are Glass Bottles Soluble, 230.
— R., Council Election, 926.
— R., Negative Evidence of Lead in Drinking Water, 294.
Rhamnus Purshiana, Active Constituents of (A. C. Zieg), 173.
Rhubarb, Preservation of from Insects (J. C. Sawer and A. R. Ferguson), 143.
Richardson, A., Action of Light upon Moist Oxygen, 457.
— W. N. S., Future of Pharmacy, 1056.
Ricin, 344.
Ricinus Communis, Flowers of, 714.
— Communis, Germination of, 713.
Robbins, H. H., Pharmacy Acts Amendment Bill, 728.
— Mr., Retirement of, 1005.
Roberts, Sir W., Some Practical Points in the Use of Antacid Remedies in Dyspepsia and Gravel, 151.
Robinia pseudacacia, 711.
Rogers, F. A., Influenza Epidemic, 595.
Roscoe, H. E., Aluminium, 55, 77.
Rose, Perfume of the, 387.
Rosemary Oil, 282, 283, 581, 856; (R. A. Cripps), 415.
Ross, L. B., Little and Unknown, by One of Them, 908.
Rother, Mr., Death of, 427.
Royal Institution, 55, 77, 138, 15 615, 685, 724, 783, 845, 864, 991, 1032.
— Society, 941.
Rubidium-Ammonium Bromide, 62.

Saccharin Tablets, Alleged Adulteration of, 483, 575.
— What is, 501.
Sadtler, S. P., Recent Improvements in the Methods for the Manufacture of Chloroform, 84.
— S. P., Synthesis of Alkaloids, 544.
Saffron, Adulterated, 504.
— Prosecution for the Sale of Adulterated, 651.
Saffrol, 856.
Sale of Food and Drugs Act, Prosecution under, 438, 600, 651, 796, 807, 885, 925.
Salep, Royal, 244.

Salicylates of Soda, Natural and Artificial, in Mixtures containing Sal Volatile or Sweet Spirit of Nitre (C. F. Henry), 782.
Salicylic Acid, Cresyl Ether of, 424.
— Acid, Existence of in certain Liliaceæ, 99.
— Acid in Colds, 424.
— Acid, its Isomers and Homologues (B. C. Hesse), 174.
— Acids, Natural and Artificial, 502.
— and Anisic Compounds, Melting Point of, 79.
Saliva, Chemistry of (G. Sticker), 88.
Salmon, E. F., One Per Cent. Solutions, 439.
— E. F., Senna Pods, 281.
Salol Camphor, 62.
— Solvents of, 792.
Sal Volatile Mixtures, "Shake the Bottle" on (C. F. Henry), 781.
— Volatile, Sale of Defective Spirit of, 807.
Salter, W. A., Country Walk, 598.
Salts, Simple, Dry Reactions of (H. Wyatt), 515.
Samuel, A. H., Address to the Liverpool Chemists' Association, 487.
Sandarach, Australian and Tasmanian (J. H. Maiden), 562.
Santonin and Castor Oil, 978.
Sargent, G. W., Council Election, 928.
Satureja Thymbra Oil, 283.
Savage, W. D., Council Election, 926.
Sawer, J. C., and A. R. Ferguson, Preservation of Rhubarb from Insects, 143.
Schacht, G. F., Sale of Poison by Unqualified Persons, 929.
Schneegans, A., and M. Corneille, Caoutchouc Plasters, 984.
School of Pharmacy, 839.
— of Pharmacy Students' Association, 19, 414, 458, 498, 509, 570, 616, 784, 945, 992, 1016, 1053.
Schools of Pharmacy, Grants to Provincial, Discussion Respecting, 366, 556, 921, 1007.
Science Teaching, Elementary, Editorial Remarks upon, 325.
Scopola, Alcoholic Extract of (F. Ransom), 500.
— Alkaloids, 342.
— atropoides, Constituents of, 709.
— atropoides, New Alkaloid from, 890.
— Carniolica (C. Corder), 500.
— Carniolica, Chemical Constituents of (W. R. Dunstan and A. E. Chaston), 461.
— Carniolica, Histological Characters of (T. Greenish), 471.
— Carniolica, Natural History of, (E. M. Holmes), 468.
— Carniolica, Pharmacy of (F. Ransom), 464.
— Carniolica, Therapeutic Action (Sir D. Duckworth), 466.
— Japonica, 792.
— Hladnikiana, Note on (E. M. Holmes), 1017.
Seidlitz Powders (J. H. Hoseason), 492.
Selenious Acid, Physiological Action of, 602.
Senega, Japanese, 343.
— Root, False Origin of (J. M. Maisch), 547.
Senegin, 422.
Senna, Elixir of, B. P. C., 559.
— Pods, 164; (E. F. Salmon), 281.
— Pods, Essence of (C. Symes), 394.
— Tincture of (B. S. Proctor), 225.
Session, Opening of New, 244.
Shaw, A., Estimation of Pilula Potassii Permanganatis, 823.
Sheffield Pharmaceutical and Chemical Society, 259, 290, 395, 490, 513, 592, 682, 746, 802, 884.
— Water Supply, A Chemist's View of the, with Special Reference to its Action on Lead (A. H. Allen), 802.
Shops (Weekly Half-Holiday) Bill, Editorial Remarks upon, 681, 812.
Sideroxylon dulcificum, 65.
Siebold, L., Arsenic in Glycerine, 277, 682.
— L., Medical and Chemical Misconceptions about Lithia, 275.
Silver Salts, Estimation of, 617.
Simons, A. J. and A. O. Scrivener, Titanium and its Compounds, 509.
Singapore and Ceylon, Pharmacy in, (A. Tschirch), 982.
Slinn, A. E., and H. Stubbins, A Simple Apparatus for Testing Spiritus Ætheris Nitrosi, 181.
Smeeton, William, Obituary Notice of, 885.
Smith, A. S., Pills and their Excipients, 513.
— Dr. Aquilla, Obituary Notice of, 827.
— G., Dilution of Cow's Milk in Infant Feeding, 3.
Smoke Abatement Bill, 812.
Snow, H. W., Iodine Absorption as a Test for the Purity of Essential Oils, 4.
Soaps, Liquid, 712.
SOCIETIES IN LONDON, PROCEEDINGS OF:—
  Chemical Society, 79, 96, 432, 457, 507, 615, 765, 859, 882, 943, 989, 1031, 1073.
  Chemists' Assistants' Association, 313, 348, 367, 407, 433, 494, 511, 536, 558, 595, 617, 686, 725, 842, 860, 884, 899, 944, 976, 1033.
  North Kensington Chemists' Association, 821, 865, 1052.
  Royal Institution, 55, 77, 138, 153, 615, 685, 724, 783, 845, 864, 991, 1032.
  Royal Society, 941.
  School of Pharmacy Students' Association, 19, 414, 458, 498, 509, 570, 616, 784, 945, 992, 1016, 1053.
  Society of Chemical Industry, 33, 178.
Soda Process, New, 421.
Sodium Alum, 1059.
— Cresotinate, 601.
Sodium Hypophosphite, Syrup of, B.P.C., 560.
— Iodide, 978.
— Salicylates, Impurities in a Commercial Sample of (R. Wright), 377.
— Salicylsulphonate, 424.
— Silicofluoride, 712.
Soil, Relations of Plants to, 345.
Solanaceous Alkaloids, 422.
Solanum Carolinense, 711.
Solidago Oil, 283.
Solutions, Nature of, as Elucidated by a Study of their Freezing Temperatures (S. U. Pickering), 79, 507.
— One per cent. (C. F. Macpherson), 357; (E. F. Salmon), 439.
Somerset House Laboratory, Report of the Principal upon, 172.
Somnal, 341.
Sozoiodol Salts, 1039.
Spanish Essential Oils, 282.
Spinifex Resin (J. H. Maiden), 998.
Spirit Duty, Increase in, 879, 996.
— Methylation of, 896.
Spirits of Salts, Death by, 1000.
Spiritus Ætheris Nitrosi, Simple Apparatus for Testing (A. E. Slinn and H. Stubbins), 181.
Sponge, Action of Poison on, 894.
— Fishery and Trade of the United States (R. Rathbun), 25, 105.
Spurr, F., Poisons and Poisoners, 581, 729.
Squire, P. W., Duboisine and Hyoscine, 600.
Star Anise Oil, 856.
Starches and Pollens, A New Medium for Mounting (A. P. Brown), 188.
Stark, A. C., Note on a Sample of Decomposed Chloroform, 407.
Staveley, W. W., Examination of Crude Phenol and Cresol, 1064.
Stearic Acid, Conversion of Oleic into (P. de Wilde and A. Reychler), 26.
Sterculia Gum, its Similarities and Dissimilarities to Tragacanth (J. H. Maiden), 381, 868.
— Gum (E. M. Holmes), 560.
Stevenson, Dr., Report on the Examinations, 817.
— T., Report on the Examinations, 817.
Stewart, J., Labelling of Proprietary Preparations containing Poison, 828.
Sticker, G., Chemistry of Saliva, 88.
Stipules, Forms of, 713.
Storrar, D., Future of Pharmacy as a Trade and a Profession, 798.
Stramonium, Extract of (A. W. Gerrard), 246.
Strophanthin and Ouabain as Anæsthetics, 791.
Strophanthus Hispidus, Chemistry of (T. R. Fraser), 328.
— Plants (T. Christy), 318.
— Tincture of, 243.
Strother, C. J., Insects in Drugs and Preparations used in Pharmacy, 409.
— C. J., Methylated Spirit, 409.

Strychnine and Brucine in Strychnos Preparations, 341.
— Vermin Killer, Poisoning by, 259, 319.
— Vermin Killers, Supply of, 200.
Sugar Compounds, New, 241.
— Reagent, New, 503.
— Transformation of, into Starch by Plants, 504.
Sugars, Synthesis of, 789, 891.
Sulphaminol, 889.
Sulphates, Alkaline, Volumetric Estimation of, 616.
Sulphites and Thiosulphites, Constitution of, 161.
Sulphonal, 161, 425, 791.
Sulphoricinic Acid, 502.
Sulphur and Carbon, 421.
— Igniting point of (J. R. Hill), 722.
— in Japan, 169.
Sulphuric Acid, Aromatic (R. A. Cripps), 542.
— Acid, Test for Nitrogen Compounds in (J. H. Wilson), 541.
— Acid, Tetrahydrate of, Isolation of a (S. U. Pickering), 432.
Summers, S., Council Election, 928.
Suppositories (F. A. Hocking and E. Brooke), 851.
Swan, M. E., Photomicography, 367.
Swinn, C., Future of Pharmacy, 1016.
Symes, C., Addresses at Liverpool, 590, 668.
— C., Essence of Senna Pods, 394.
Symons, W., State of Teeth in Maori Skulls, 996.
Synonyms (J. Findlay), 572.
Syrup of Sodium Hypophosphite, 560.
— of Calcium Hypophosphite, 560.

TANNIC Acid, 424.
Tannin in Plants, 65.
— Its Solubilities, etc. (B. S. Proctor), 351.
Taxine, the Alkaloid of Yew, 790.
Taylor, H., Old Medicine Jars, 460.
— T. E., Sale of Poison by Unqualified Persons, 929.
Tea, Digestive Extract of (P. Boa), 572.
Teeth, State of, in Prehistoric Skeletons (J. Ward), 788, 952; (T. H. Powell), 828.
— State of in Maori Skulls (W. Symons), 996.
Tetronal, 161.
Teucrium Funkianum Oil, 288.
Theobromine Sodiosalicylate, 501.
Therapeutics and Materia Medica, International Congress in Paris, Editorial Remarks upon the, 69, 109, 116.
Thirlby, W., Medicine Stamp Act, 479.
Thomas, H. A., Chemists' Trade Interests, 905.
Thomson, I. W., Detection and Separation of Sodium from Lithium, 721.
— I. W., Test for the Acidity of Milk, 721.
Thorpe, T. E., The Glow of Phosphorus, 845.
Thorpe, T. E., and A. E. Tutton, Phosphorous Oxide, 943.
Thresh, J. C., Estimation of Ethyl Nitrite in Spirit of Nitrous Ether, 752.
— J. C., New Method of Estimating the Oxygen Dissolved in Water, 615.
Thyme Oil, 282.
Thymus capitatus Oil, 283.
Tiliacin, 892.
Tin Oxide, A New, 617.
— Poisoning, 879.
Tinctura Quininæ Ammoniata (G. Lunan), 794.
Tinctures and their Specific Gravities (J. C. Husband), 414.
— and Public Analysts, 438.
— Medicinal Export of, 129.
— Official Estimation of Extractive and Specific Gravities of (J. C. Husband), 420; (F. W. Fletcher), 439.
Tilden, W. A., and C. R. Beck, Some Crystalline Substances Obtained from the Fruits of Various Species of Citrus, 767.
Titanium and its Compounds (A. J. Simons and A. O. Scrivener), 509.
Trade and Profession, Editorial Remarks upon, 877.
— Interests, Chemists', Letters respecting (J. C. Hyslop), 886; (H. A. Thomas), 905; (W. W. Urwick), 905; (W. Warren), 867, 887; (W. Wilkinson), 952.
— Interests, Editorial Remarks upon, 838, 1027.
Tragacanth, Composition of (J. Ogle), 3.
TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY, 8, 29, 49, 70, 112, 267, 285, 326, 347, 362, 389, 427, 443, 477, 506, 553, 569, 622, 663, 717, 735, 759, 797, 813, 840, 858, 879, 897, 917, 957, 1001, 1029, 1045, 1067.
  Annual General Meeting, 957.
  Apprentices, Election of, 9, 112, 267, 553, 623, 735, 814, 918, 1005.
  Associates, Election of, 8, 112, 267, 362, 443, 553, 622, 735, 813, 917, 1005.
  Attendances of Members of Council, 922.
  Bell Scholarships, 30, 115.
  Benevolent Fund Committee, 9, 113, 267, 363, 444, 554, 623, 736, 815, 920, 1006.
  — Fund, Discussion respecting the, 554, 815.
  — Fund, Grants from the, 9, 113, 267, 363, 444, 554, 623, 736, 815, 920, 1006.
  Building Committee, 14.
  Committees, Appointment of, 1005.
  Conversazione Committee, 817, 921.
  Council, Election of, 975.
  — Meetings of the, 8, 112, 267, 362, 443, 553, 622, 735, 813, 917, 957, 1001.
  — Members who Retire, 622.
  — Nominations for Election to the, 814.
TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY—continued.
  Election of Annuitants, 454.
  — of Apprentices, 9, 112, 267, 553, 623, 735, 814, 918, 1005.
  — of Associates, 8, 112, 267, 362, 443, 553, 622, 735, 813, 917, 1005.
  — of Council, 975.
  — of Members, 8, 112, 362, 553, 622, 735, 813, 917, 1005.
  — of Officers, 1001.
  Evening Meetings. *See under* Evening Meetings.
  Examinations in Edinburgh, 72, 347, 638, 924.
  — in London, 70, 326, 506, 723, 897, 1045.
  — Visitors' Reports on the, 817.
  — Written, Appointment of Superintendents and Deputy Superintendents of, 13, 112.
  Examiners, Appointment of, 443.
  — Reports of the Boards of, 13, 116, 366, 558, 638, 746, 923.
  Finance Committee, Reports of, 9, 113, 267, 363, 443, 554, 623, 736, 814, 919, 1006.
  Financial Statement, 910.
  General Purposes Committee, Reports of the, 16, 115, 269, 367, 454, 558, 638, 745, 820, 921, 1009.
  Ground Rents, Freehold, Committee, 16.
  Hanbury Medal, Award of, 116.
  Herbarium Prize, Award of, 115.
  Introductory Sessional Address, 261.
  Law and Parliamentary Committee, Reports of the, 628, 737.
  Library, Donations to the, 9, 113, 363, 444, 555, 626, 737, 816, 920, 1006.
  — Museum, Laboratory, and House Committee. Reports of the, 9, 113, 363, 444, 555, 626, 737, 816, 920, 1006.
  Local Secretaries, Appointment of, 10, 269, 736, 817.
  Major Examination, 70, 72, 326, 347, 506, 638, 723, 897, 924, 1045.
  Medical Acts Amendment Bill, 16.
  Medicated Wines, 453.
  Medicine Stamp Acts, 449, 638, 742.
  Members, Election of, 8, 112, 362, 553, 622, 735, 813, 917, 1005.
  — Honorary, Election of, 820.
  Methylated Spirits, Proposed Limitation in the Sale of, 923.
  Milan, Proposed Congress at, Discussions respecting the, 16, 924.
  Minor Examination, 70, 72, 326, 347, 506, 638, 723, 897, 924, 1045.
  Modified Examination, 347, 506, 1045.
  Museum, Donations to the, 10, 114, 364, 444, 556, 626, 737, 816, 920, 1007.
  North British Branch, Election of Executive of, 13, 1029, 1045.

TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY—continued.
North British Branch, Meetings of Executive, 17, 427, 858, 1067.
— British Branch, Report of Executive, 918.
Pharmacopœia, Addendum to the, 454, 553, 638, 1009.
Pharmacy Bill, Discussion Respecting, 449; (Text), 638; 738, 1009.
Poisons, Sale of, Communications from Privy Council respecting, 1008.
Preliminary Examination, 71, 327, 639, 898.
— Examination, Attendance at the Centres, 13, 72, 328, 640, 899.
— Examination, Certificates received in Lieu of, 71, 327, 506, 639, 724, 898, 1045.
— Examination, Questions set at the, 29, 285, 569, 840.
Prize Examinations, Papers for the, 49, 72, 820.
Prizes, Award of, 115, 921.
— Distribution of, 269.
— for Students, 445, 556.
Professors, Appointment of, 13.
— Reports of the, 269, 921.
Railway Rates, Discussion respecting, 366.
Redwood Scholarship, The, 30, 115.
Register, Additions to the, 554, 736, 918.
— Restorations to the, 443, 554, 623, 736, 814, 918.
Report, Annual, 909.
Reports, Registrar's, 624.
Research Committee, 637.
Robbins, Mr., Retirement of, 1004.
Savage, Mr., Retirement of, 8.
Schools of Pharmacy, Grants to Provincial, Discussion respecting, 366, 556, 921, 1007.
Trees, Temperature of, 345.
Trimble, H., Canaigre, 187.
— H. and H. J. M. Schroeter, Oil of Camphor, 145.
— H. and H. J. M. Schroeter, Oils of Wintergreen and Birch, 166.
Trional, 161.
Tscheppe, A., Lac Fermentatum, 66.
Tschirch, A., Pharmacy in Singapore and Ceylon, 982.
Tumbeki, 424.
Turpentine (R. G. Dunwody), 1062.
— Oxidation of, in Sunlight, 1074.

ULEX Europæus, Physiological Action of the Seeds of (G. Welborn), 360, 500.
Ulexine and Cytisine, 978.
— and Cytisine (A. W. Gerrard and W. H. Symons), 1017.
Umbelliferæ, Vittæ of, 404.
Umney, C., Presidential Address to the British Pharmaceutical Conference, 214.
— J. C., How Drugs are Imported, 992.
— J. C., Official Test for Physostigmine, 1061.
United States Pharmacopœia Convention, 987.
Unqualified Assistants (J. Wood), 560.
Uralium or Ural (Chloral-Urethan), Note on (D. B. Dott), 793.
Uranium, Discovery of in Cornwall, 222.
Urea, Estimation of (D. B. Dott), 793.
Urine, Examination of (T. M. Clague), 574.
— Lævogyre, 712.
— Substances found in that Reduce Copper Oxide when Boiled in the Presence of an Alkali (H. H. Ashdown), 606.
Uroglycuronic Acid, 607.
Urtica Glucosides, 343.
Urwick, W. W., Chemists' Trade Interests, 905.

VACUO, Distillation in, 836.
Valerian and Kesso Oil, 837.
Vanilla Trade of Bordeaux, 170.
Vaselin and Water, 63.
Vermin Killers Containing Strychnine (A. H. Allen), 296.
Victoria Park, Meeting at, 1048.
— Pharmacy Act, Decision as to Seller under, 442.
Vinum Ipecacuanhæ by Fractional Percolation (J. Clower), 360.

WANSBROUGH, E. G. L., Council Election, 951.
Ward, J., State of Teeth in Prehistoric Skeletons, 788, 952.
Warrell, E., Proprietary Preparations containing Poison, 929, 952.
Warren, W., Chemists' Trade Interests, 867, 887.
— W., Council Election, 951.
— W., The Society's Council, 439.
Water Gas, Poisoning by, Editorial Remarks upon, 483.
Wattle Bark, 343.
— Gum, Chemistry and Commercial Possibilities of (J. H. Maiden), 869, 980.
Weather Plant, Alleged, 568.
Weights and Measures, Metric System of (J. H. Bradwall), 592.
— and Measures Act, Editorial Remarks upon the, 406.
— and Measures Act, London County Council and the, 590.
— and Measures Act, Prosecution under the, 994.
Welborn, G., Physiological Action of the Seeds of Gorse, 360, 500.
Wells, F. T. P., Council Election, 906.
Westcott, W. W., Mandrake, 810.
Wheeler, W. R., Future of Pharmacy, 1036.
White, J. W., Allium Sphærocephalum, 460.
— J. W., Draft Pharmacy Bill, 689.
Wier, P. A., Short Account of the Opium Industry in the N. W. Provinces and Oudh, 178.
Wild Cherry Bark and its Preparations (L. W. Hawkins), 355.
Wilkinson, W., Trade Interests, 952.
— W., What is Lin. Saponis Co., 672.
Williams, T. H., Lemon Juice, 336.
— W. L., Photo-Chemical Action, 410.
— W. L., The Polariscope and its Application in Pharmacy, 842.
Wilson, J. H., Convenient and Delicate Test for Nitrogen Compounds in Sulphuric Acid, 541.
Wine Bouquet, 242.
— Licence Question in Edinburgh, 839.
— Medicated Sale of, Editorial Remarks upon, 27, 857.
Winter Bark, True (P. N. Arata and F. Canzoneri), 1026.
Wintergreen and Birch, Oils of, 503; (H. Trimble and H. J. M. Schroeter), 166.
Wokes, T. S., Glyco-Gelatine, 612.
Women as Pharmacists, 868.
Wood, J., Unqualified Assistants, 560.
Woolley, Harold, Obituary, Notice of, 340.
Wright, R., Alcoholic Strength of the B.P. Tinctures, 240.
— R., Ferri et Ammonii Citras, 320.
— R., Impurity in a Commercial Sample of Sodium Salicylate, 377.
— R., Relative Value of Chloroform and Alcohol, and Mixtures of the Two, for the Extraction of Aconite and Belladonna Roots, 376.
— R., Strength of Commercial Samples of Scheele's Prussic Acid, 376.
Wyatt, H., Dry Reactions of Simple Salts, 515.

XANTHOXYLON Senegalense, 163.

YEAST, Compressed Manufacture of and its Detrimental Germ Impurities (A. J. M. Lasché), 584.
Yucatan, Pharmacy in, 150.

ZIEG, A. C., Active Constituents of Rhamnus Purshiana, 173.
Zinc and Mercury, So-called Double Cyanide of (W. R. Dunstan), 653.

CONTRACTIONS OF TITLES.

*The following is a list of the contractions and the corresponding full titles of Journals most frequent used in "The Month." The titles prefixed by a * are those of official Journals.*

Amer. Drug. = American Druggist. New York. Monthly.

* *Amer. Journ. Pharm.* = American Journal of Pharmacy. Philadelphia. Monthly.

Annalen = Justus Liebig's Annalen der Chemie. Liepzig. Monthly.

* *Apot.-Zeit.* = Apotheker-Zeitung. Organ of the Deutsche Apotheker-Verein. Berlin. Twice a week.

* *Apot. Zeit. Rep.* = Repertorium der Pharmacie. Supplement to the Apotheker-Zeitung.

* *Archiv* = Archiv der Pharmacie. Berlin: J. Greiss. Twice a month.

* *Berichte* = Berichte der deutschen chemischen Gesellschaft. Berlin. Once or twice a month.

* *Brit. Med. Journ.* = British Medical Journal, London. Weekly.

Bull. Com. = Bulletin Commercial. Supplement to L'Union Pharmaceutique. Paris: Pharmacie Centrale de France. Monthly.

* *Can. Pharm. Journ.* = Canadian Pharmaceutical Journal. Toronto. Monthly.

Chem. Zeit. = Chemiker Zeitung. Cöthen. Twice a week.

Chem. Zeit., Rep. = Chemisches Repertorium. Supplement to the Chemiker Zeitung.

* *Compt. Rend.* = Comptes Rendus des Séances de l'Académie des Sciences. Paris: Gauthier-Villars. Weekly.

Deut.-Am. Apot.-Zeit. = Deutsch-Amerikanische Apotheker Zeitung. New York. Twice a month.

Deut. Med. Woch. = Deutsche medicinische Wochenschrift, Berlin. Weekly.

Drug. Circ. = Druggists' Circular. New York. Monthly.

Glas. Med. Journ. = Glasgow Medical Journal. Glasgow: A. Macdougall. Monthly.

L'Union Pharm. = L'Union Pharmaceutique. Paris: Pharmacie Centrale de France. Monthly.

Med. Bull. = Medical Bulletin. Philadelphia. Monthly

Med. Chron. = Medical Chronicle. Manchester: He wood. Monthly.

Med. Pr. Circ. = Medical Press and Circular. Londo A. A. Tindall. Weekly.

* *Monatshefte* = Monatshefte für Chemie. Vienn Monthly.

Mon. Scient. = Moniteur Scientifique. Paris. Monthl

Münch. med. Woch. = Münchener medicinische Woc enschrift. Munich. Weekly.

* *Ned. Tijdsch. Pharm.* = Nederlandsch Tijdschrift vo Pharmacie, Chemie en Toxicologie. The Hagu Monthly.

Nouv. Rém. = Les Nouveaux Rémèdes. Paris. Twi a month.

Pharm. Centralh. = Pharmaceutishe Centralhall Dresden. Weekly.

Pharm. Post = Pharmaceutische Post. Vienna. Weekly

Pharm. Rec. = Pharmaceutical Record. New Yor Twice a month.

Pharm. Runds. = Pharmaceutische Rundschau. Ne York. Monthly.

Pharm. Zeit. = Pharmaceutische Zeitung. Berlin: J Springer. Twice a week.

* *Pharm. Zeit. Russl.* = Pharmaceutische Zeitschrift fü Russland. St. Petersburg. Monthly.

Répertoire. = Répertoire de Pharmacie et Archives d Pharmacie reunis. Paris. Monthly.

Scient. Amer. = Scientific American. New York. Weekly.

West. Drug. = Western Druggist. Chicago. Monthly.

* *Zeit. öst. Apot.-Ver.* = Zeitschrift des allgemeinen österreichischen Apotheker-Vereines. Vienna. Weekly.

Zeit. phys. Chemie. = Zeitschrift für physiologische Chemie. Strasburg: J. Trübner. Monthly.

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NB 301